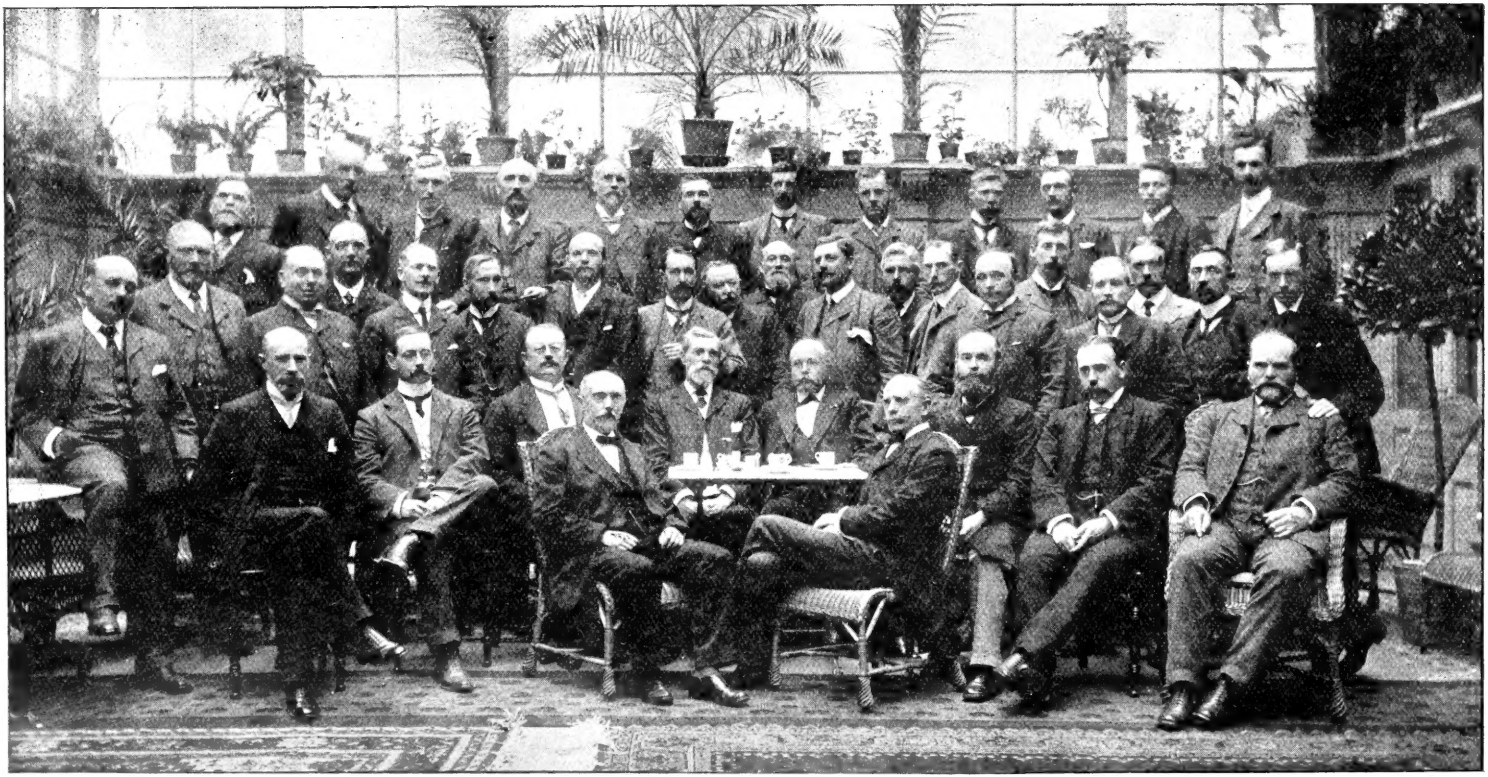

MEMBERS OF THE COMMISSION AT COPENHAGEN, WITH PROFESSORS BANG, MAAR AND BÖGGILD, AND MR SALICATH OF THE DANISH MILK COMPANY

REPORT

OF THE

SCOTTISH COMMISSION ON AGRICULTURE

TO

DENMARK

JUNE 19TH TO JUNE 30TH 1904

WITH COMPARATIVE OBSERVATIONS AND SUGGESTIONS

EDINBURGH AND LONDON

WILLIAM BLACKWOOD & SONS

A PEASANT'S FARM HOUSE

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

THE COMMISSION AT WORK

INTRODUCTION

DENMARK, as a field of agricultural knowledge and co-operation in successful practice, has often been harvested in recent years. The Report of the Recess Committee, which formed the starting-point of Ireland's striking industrial revival, was one of the first and best store-houses of fact. In 1898, the British Dairy Farmers' Association devoted a number of its Journal to narratives of a conference held in Denmark and Sweden by a representative company of men and women especially interested in the work of the dairy. Two years later a party of farmers from Essex printed the notes taken in the course of a very thorough investigation. More comprehensive than either of these was the inquiry set on foot by the Department of Agriculture and Technical Instruction for Ireland. The Report produced in 1903 by the members of the deputation appointed by this Department showed a high degree of expertness, both in the collection and massing of detail and in the bringing out of luminous generalisations. It is the classic paper on Danish agriculture. Thus a great array of testimony exists—testimony agreeing in the facts, pointing the same broad truths, enforcing the same lessons. To say anything new is impossible; to say anything as well is difficult.

But printed accounts, however painstaking and vivid, must always be less educative than personal observation. The agriculturist who is in the mind to borrow from Denmark's experience wants to see Denmark for himself. Impressed by what had come under his eyes during a visit to the little State, Captain John Sinclair, member of Parliament for Forfarshire, conceived the idea of organising a party from among his constituents to study, with the facts and the practice before them, the root-causes of Danish agricultural success. The idea grew. What was a Forfarshire project developed into a project based upon a larger area of interest. The Secretary for Scotland was good enough to agree that a member of the Congested Districts Board and Crofters' Commission should be invited to join the party. Members of Parliament of both political connexions contributed suggestion and aid in the composition of the Commission. Landlords of extensive acres in some cases became members; in others, nominated their estate-agents; in others, gave the names of tenants. The Highland and Agricultural Society and the Scottish Chamber of Agriculture appointed representatives. From the Agricultural Colleges, East and West, were drawn several members of the teaching staffs. Apart from these, the larger number of the Commission were well-

known farmers hailing from all parts of Scotland, many of them with specialised interests such as dairying, poultry keeping, and cattle breeding. Nor were two overseers or grieves lacking to study Danish small farming with the practical intelligence of that labouring rural class in Scotland for which holdings of thirty acres and upwards would seem to provide the career not yet sufficiently available. It may thus fairly be claimed for the Commission that it applied many kinds of knowledge and experience to the question in hand—namely, whether Danish methods could with advantage be in any measure imitated on Scottish soil?

So well-known are the candour, the courtesy, the hospitality of the Danes, that it is almost superfluous to remark that everywhere the Commission had the best of welcomes. Doors were thrown wide; accounts were exposed; the personal and economic histories of farmer and farm were given. With admirable patience the people bore the inquisition. Every scene visited quickly became a scene of animated heckling. Not unnaturally the thought may arise that the representative men of Denmark would introduce the Commission only to what was best in their country. That could not happen. The Commission made many surprise visits, their choice of calls upon farmers or creameries being often a matter of fancy or of accidental neighbourhood. The extemporised "look-in" occurred on some days more frequently than the pre-arranged reception. Accordingly the Commission saw Danish agriculture in all its phases, good or bad, without any dressing up for inspection.

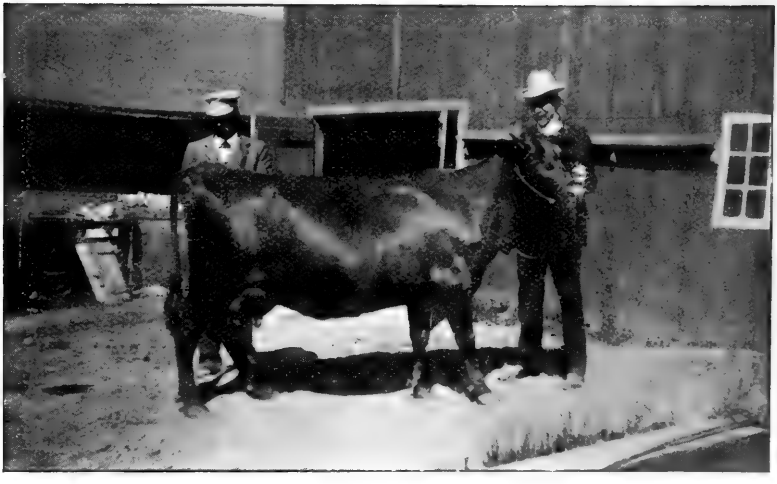
The map of Denmark and the diary, both given in the Report, will show the ground covered by the Commission. As the tour ranged over Zeeland, Jutland and Fyen, the party had the opportunity of observing the conditions on some of the worst as well as some of the best land in the country. To indicate the different classes of farms visited, it may be said that part of a day was spent on the estate of Count Moltke at Bregentved, which extends to thousands of acres, and includes a home farm, managed on the most modern principles. Part of another day was given to the estate of Count Wedell at Wedellsborg in Fyen, the Count himself most courteously acting as guide. These two estates are typical of what remains of the great landlord-held properties in Denmark. Of the class of farms running to several hundreds of acres, and cultivated by the owner, good examples were seen in Kolle-Kolle, near Lyngby, 300 acres, and Borupgaard in Jutland, 700 acres. The not very numerous group of tenant-farmers was well illustrated in Mr Soltoft of Stenballegaard, a man of marked individuality, who has lived and thrived apart from the co-operative movement. Visits too many for mention were also made to smaller farms coming under the category of peasant proprietorship, such as the farm of 100 acres near Horsens, occupied by Mr Svensdens, and the farm of Skipygaard, 130 acres, owned by Mr J. Rasmussen. The still smaller class of holdings in the ownership of the cultivator, and of a size anywhere between 3 acres and 40 acres, were abundantly seen.

The Commission are under more obligations for assistance and hospitality in Denmark than they can adequately acknowledge. Mr Harald Faber, the Danish Commissioner for Agriculture in London, is in the forefront of their many helpers. Mr Schou, the Adviser of the Board of Agriculture, placed his wealth of information ungrudgingly at their service. The same is true of Professor Bang, the world-wide authority on tuberculosis, and of his colleagues in the Royal Veterinary and Agricultural College, Copenhagen—Professor Böggild and Professor Marr. To the directors and teachers of the High School at Askov, who entertained the party at lunch and gave them a most interesting day, the Commission are particularly indebted. From Mr Grut Hansen, at Kolle-Kolle, and from Mr Hansen, the manager of the Horsens bacon-curing establishment, the Commission also had the proverbial hospitality of the Dane.

The Commission desire to record their sense of the courtesy shown them by Sir W. E. Goschen, K.C.M.G., His Majesty's Minister, in receiving a party at dinner at the Legation.

The Commission wish also to thank Mr J. M. Hodge for his labours in the preparation of this Report, and for his admirable services as organising secretary. Mr Hodge's arrangements left nothing to desire in respect of utility, comfort, and economy of time. Nor must recognition be omitted of Mr Porse, an intelligent young Dane, well versed in farming matters, who acted as guide and, when necessary, as interpreter.

A Summary of the Comparative Observations and Suggestions unanimously agreed upon by the Commission will be found at page 142.



UNDER THE CAMERA

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IN JUTLAND

DENMARK AND ITS AGRICULTURAL DEVELOPMENT

THE story of Denmark's industrial revival has often been told. It forms one of the most instructive chapters in the economic development of European States. Here there is no need to do more than indicate the main features, by way of casting a little historical light on the observations of the Commissioners. Broadly, what we see in Denmark is the successful application of intelligence, partly of popular initiative, partly State-directed, to the problem of converting a poor country into a rich one; a country with almost no external trade into a country whose exports in 1903 were valued at £19,585,558. The fact of immediate importance is that of this amount the agricultural exports form £17,500,000. Thus Denmark may not incorrectly be called an industrial unit—the industry being agriculture.

According to the census of 1901, Denmark, with an area of 14,848 square miles, was bearing a population of 2,449,540, of which 476,806, or nearly one-fifth, are absorbed by Copenhagen and its suburbs. Stated in another way, 936,565, or 38·24 per cent. of the total population, were living in towns; and 1,512,975, or 61·77 per cent., were living in purely rural districts. The dependence of the towns upon the rural parts is marked. Copenhagen has become a great entrepôt for the north of Europe, receiving at its free port for transhipment several millions' worth of imports in addition to the £24,702,778 of imports for Denmark proper, and carrying on numerous flourishing home industries, some of which are protected by a moderate tariff. But its prosperity is mainly based upon rural prosperity. Its most distinctive energies are exhibited in the collection, working up, and distribution of rural produce. It is the principal port of issue, Esbjerg being second, for the £16,594,565 worth of agricultural and other Danish-made goods for the British islands. The banking and legal houses, the commercial establishments, all the features that constitute it a capital, busy, affluent, and handsome, owe their chief strength to the activities of a race of farmers. The significant thing, however, is that the growth of Copenhagen and other Danish towns has not been achieved at the expense of the rural parts either as regards population or wealth. A migratory movement, both to the towns and to foreign lands, which excited alarm during some decades of the nineteenth century, seems to have been successfully arrested; while to the most superficial observer it is obvious that the farmer has contrived to retain a reasonable share of the fruits of his labour. Hard-working, thrifty

even to penuriousness, the man of few acres must be, reckoning up the minutiæ of income and expenditure; but he pays his way; his life is a self-respecting one; his home shows a sense of refinement as well as comfort; he is not sunk in mortgages, although his land may carry a loan. As for the farmer of 40 acres and upwards, he houses himself in a style that never ceases to surprise. Mulhall's calculation of wealth per head of population places Denmark second to Great Britain. Such a calculation hardly does justice to Denmark. In the nature of the case it takes no account of the diffusion of wellbeing. A minority of very rich, a majority with a bare living wage, and a heavy fringe of extremely poor, are lumped in the one statistic for Great Britain. Danish wealth is spread over a larger proportion of the people.

The ability of the Danish farmer to capture a good share of the produce of his industry; the how and why of his success in benefiting himself and thereby the State—that is the true subject of the following pages. But the feature of individual progress in Denmark is that, with few exceptions, it is bound up with the progress of the whole; the organised efforts on which progress chiefly depends are coextensive with the people; the efficient motive is national; the resultant lift is national. Usually, and no doubt truthfully, this movement of the State as with a single mind is attributed to one or two sharp shocks of experience. The Napoleonic wars had the effect of placing the Danes for a considerable time amongst the stationary races. The country was worn and waste. After a period the recuperative processes set in, one of the most deliberate attempts to reanimate the national spirit being the High Schools founded in 1845 by Bishop Grundtvig with their appeal to history, poetry, and music, and their care to lay a moral and religious foundation for character. Then there came the fateful year of 1864, the Prussian War, the loss of the Duchies, agricultural depression, commercial straits of every sort. Corn-growing, then the staple concern of Denmark, was seen to be incompatible with sound economic health. Radical changes were necessary. As part of a general movement of reconstruction after the war, Denmark's ruling minds began to foster some institutions of which the germs already existed and to plant some new ones. Increase of the High Schools and all other agencies of education, multiplication of small holdings, resort to co-operation, systematised Government assistance followed. In how far these things were in their beginnings experimental or resulted from a sagacious thinking-out of Denmark's possibilities need not now be asked; certain it is that they have rapidly and amply justified themselves. They have given to Europe a recreated Denmark.

Some of the elements that counted for success may here be briefly set down.

The Danes were a small family. It is easier to infuse with a common sentiment a population of two millions, to form the clannish spirit, so to speak, than it is to make a great population, with its clash of wills and medley of interests, think and act alike.

They were also set in a social structure of extreme simplicity. The conditions of one farmer were practically the conditions of all; the needs of one were the needs of all; the ambitions of one could be made the ambitions of all. A people with a great diversity of crafts could not have been so readily unified.

The Danes were also a most intelligent family, both by reason of native gift and by education. Denmark was well ahead of the rest of the world in enacting compulsory attendance in common schools. Accordingly, the soil was prepared for Bishop Grundtvig's idea of assembling young men and young women, the sons and daughters of farmers, during certain summer and winter months, to receive, in the residential High Schools, a physical, moral, and religious training—this at a stage of life when young persons in other countries, of more complex industrial structure, are engaged in wage-earning. Not the least of the blessings of these High Schools was the habit of mutual trust formed in their atmosphere. They made it possible for the banks of Denmark to grant on personal security, that is the security of character, the loans, without which the peasant farmers could not have erected co-operative factories.

Further, the tenure of land in Denmark had long had a bias towards peasant proprietorship. Away back in the eighteenth century the process of sub-division of estates had begun. The calamity of 1864, followed by the disappearance of profit from corn-growing, accentuated this process.

Given an intelligent people and land held in small lots by cultivating-owners, and we have the pre-conditions of successful co-operation. The application of this principle to agriculture with highest effect depends, it would appear, upon a multiplication of similar interests and desires; upon farmers working by the same means, aiming at the same ends, and numerously grouped upon a suitable area. The small-holding tenures preceded co-operation, and have grown concurrently with co-operation. The secret of the economic collection and distribution of produce into and from centres is also in the grouping of farms to which the geographical laying out of Denmark lends itself. Once the co-operative principle was set in motion and gathered force it became itself an instrument of education, the meetings of associations and committees quickening the mental aptitudes of the population, and rendering them responsive to the expert advice, theoretic and practical, disseminated by the State departments.

This action of the State, partly following up, partly originating, partly controlling, everywhere assisting, whether by counsel or by grants of money, is the only remaining element in Danish agricultural success that need be included in this general view.

Perhaps the effect of all this personal competence and this voluntary associated work combined with State-help may be most keenly realised by the British public in the following five years' statement of the principal articles of Danish agricultural produce imported into Great Britain :—

Imports into Great Britain from Denmark.

[From British Statistics.]

Principal Articles.	1899.	1900.	1901.	1902.	1903.
	£	£	£	£	£
Horses	25,636	17,820	17,236	40,211	89,448
Butter	7,553,436	8,029,625	8,950,497	9,302,362	9,572,439
Eggs	809,543	923,551	1,160,948	1,366,073	1,648,367
Lard	6,983	9,672	9,096	16,958	24,943
Bacon	2,945,757	3,058,782	3,234,456	3,749,108	4,294,017
Beef (fresh)	91,358	149,108	130,728	270,643	128,525
Mutton (fresh)	30,882	13,097	11,777	18,685	23,759
Pork (fresh)	20,339	29,892	7,586	18,974	7,076
,, (salted)	73,905	84,033	77,545	83,704	127,918
Unenumerated (salted or fresh)	29,885	44,679	50,708	89,074	87,462
Total of chief Agricultural Imports	11,587,724	12,360,259	13,650 577	14,955,792	16,003,954
Total of all Imports	12,432,977	13,187,757	14,234,102	15,856,780	16,594,565

The progressive value of the trade in Butter, Eggs, and Bacon will be observed; and the maximum is not yet in sight. The dependence of Denmark on the British market is also noteworthy. Of Denmark's total sales to foreign Countries all but £2,000,000 worth are of the agricultural class, and all but £1,500,000 worth of that agricultural class go to the British consumer.

A LUTHERAN CHURCH

EDUCATION

The Common School System

BJÖRNSTJERNE BJÖRNSON has said that the Danish peasantry are the most enlightened in the world; by their cultivated intelligence they have organised an agricultural industry which is the admiration of all.

The Commission, while mainly concerned with agricultural tuition, were not neglectful of the elementary, continuation and other schools in which the basis of general education is laid. As regards its common public school system Denmark has nothing striking or novel for Scottish eyes. Attendance is compulsory between the ages of seven and fourteen, but most of the children begin the school period at six. The schools are plain, substantial, and fairly well equipped. We were assured that, "Nothing can be too good for the children," but as taxes are heavy the burden of providing the essentials is enough. In Copenhagen, to meet the difficulty of insufficient accommodation, it is common to work the schools in two shifts, one set of children attending from 8 A.M. to 1 P.M., and another set from 1 to 6 P.M. This thrifty plan is characteristic of a thrifty people. No teacher works more than six hours a day, but these hours may be distributed over the two periods. In country schools it is usual for the older children during summer to attend school two days a week, and to help at home for four, whilst the younger attend school for four days a week and stay at home for two. During winter the proportion of time is reversed. The opinion, however, is growing in favour of full school attendance.

In the elementary schools the subjects of instruction are similar to those in our own country, and the advancement of the pupils at the various ages is not greater than in Scotland. Nature study is taken up much in the same way as in Scotland. There is, however, much more out-of-doors instruction, and the children are carried freely on the State railways to the country, where lessons are given direct from Nature, and history is taught in the scenes where national events took place. In connexion with a school recently erected in Copenhagen a garden has been provided for growing specimens useful in teaching. It was planted only two months before our visit, and arrangements were in progress to use a part as a nursery for elementary instruction in forestry.

In the towns a foreign language, usually German, is taught between the ages of twelve and fourteen. The number of Danes who speak good English points to efficient teaching of modern languages at a later stage.

In Copenhagen there is an officially organised system of

continuation schools, but in the country evening schools as a rule are private ventures, and it is common for university students to devote part of their time to giving free instruction in rural districts.

There are Training Colleges for teachers, and classical and other higher education is provided for by secondary schools in the more important towns, the University of Copenhagen (1300 students) being the centre of the system. It is quite common for peasants' sons to pass from the elementary schools, through the secondary schools, to the University with the assistance of bursaries. If Denmark puts her public schools to exceptional profit, it is not because they are exceptional institutions, but rather because the desire for education permeates the whole people.

The People's High Schools

These schools are Denmark's original contribution to the theory and practice of education. It is easy to see that they are a source of pride to the people, the teachers, the students themselves, and the State. Bishop Grundtvig (1783-1872), their founder, renowned as an historical writer, poet, churchman, educationist, obtains the veneration due to a great and good man and national benefactor.

The first of the schools was founded in 1845, but most of them sprang up as the result of a national movement after the disastrous war with Prussia, and the dismemberment of the kingdom in 1864. There are now over seventy schools of the type, attended every year by about 6,000 young people of both sexes, of ages between eighteen and twenty-five years, this being considered the best period of life for influencing the character. Over 10 per cent. of the population passes through these institutions.

They have been erected by private enterprise, sometimes by the peasants themselves, but many of them have been bought by the proprietors, and belong to an association established in commemoration of the late Bishop Grundtvig.

The Government has now taken them under its supervision to a limited extent, and gives grants in aid. There are no examinations, however, and, generally speaking, the course of instruction and the appointment of teachers are left to the management of the various schools.

The winter course for young men as a rule extends over six months, though some of the courses for young women are usually only of three months' duration, but in at least one (Askov) the course is extended over two periods of six months each.

The fee for instruction and board at these schools averages about nine to ten shillings a week, and this is paid by the students themselves; but where a deserving young man or woman is unable to pay for the course of instruction, the merits of the candidate's case are judged with others, by the (local) Education Board in conjunction with the County Council of the county in which the candidate resides. These County Councils levy a small rate for

SUMMER STUDENTS OF THE POPULAR HIGH SCHOOL, LYNGBY

the purpose of granting Scholarships in a High School for the education of deserving persons, and to this rate is added an equivalent grant from the State. A candidate who is granted a scholarship is not confined to one of the schools in his own county, but has the right of choice to attend any one of the High Schools in the country.

The idea of the founder was that all classes of society should mix at those schools, but they were at first mainly taken advantage of by the sons and daughters of the peasantry. Attendance at them has now, however, become somewhat fashionable, and at Askov were found many daughters of merchants and professional men from Copenhagen.

Although Denmark has become rich by producing butter, bacon and eggs, these schools do not teach how to make butter, to cure bacon, or to cultivate the land; their main object is to develop personal character, and to make the young men and women true and honest Danes. Stated more specifically their aims are: (1) to foster love of country and national feeling; (2) to educate the people to make proper use of the free constitution obtained in the year 1849; and (3) to prepare the young so as to give them a better chance in the fight for existence as it is now raging in all trades, and not least in agriculture; the whole school life being at the same time under moral and religious governance.

The ideal of the High School demands a close sympathy between the teacher and his pupils. The teacher's personality is of more importance than anything else. "On that very point where the ability of the teacher meets with the wants of the pupils there exactly lies the task of the school."

Hence great importance is attached to the "living word," and much of the instruction is given by means of lectures, the chief subjects being history and literature, while in some of the schools languages (English and German) are taught. To each of the schools is attached a well equipped gymnasium; and each lesson is opened and closed by the singing of a national song or hymn. No day students are admitted; all the pupils are boarders, and daily association in a cultured and humanising environment is regarded as an essential part of the system. On Sundays the homes of the teachers are open to the students.

The Scottish Commission visited the High Schools at Lyngby and Askov, and had the privilege of hearing their objects described at the former by Mr La Cour, and at the latter by Mr Appel. At both schools national part songs were rendered by the young women attending the courses. At Askov a class of over eighty young women students went through a long and beautiful series of evolutions and gymnastic exercises under the direction of Mrs Appel, the talented instructress. Obviously in these schools the conception of the healthy mind in the healthy body is faithfully striven after.

The following is the time-table for the first year's course for men at Askov, and for women at Odder.

Askov (Men)

Time.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
8 to 9	Ancient Scandinavian History and Language		History or Mathematics		Statistics	Ancient History
9 to 10	Danish		Norse History (Oral)	Danish	Norse History (Oral)	Danish
10½-11½	Physics		Lectures		Physics	
11½-12½	Gymnastics					
12½-2	Drawing					
3¼-3¾	Singing					
4 to 5	Universal History (Oral)	Arithmetic	English or German	Arithmetic	Universal History (Oral)	English or German
5 to 6	Geography	Mathematics (Cla	Geography		Physics (Oral)	Political Geography
6 to 7	Lectures		Norse History			

Odder (Women)

Hour.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
7½-8	Coffee and Prayers					
8-9	Geography	Geology	Geography	Geology	Geography	Mythology
9-10	Gymnastics					
10-11	Danish History	Physiology	Danish History	Danish History	Physiology	Danish History
11-12	Writing					
1½-2½	Chemistry	Arithmetic	Chemistry	Arithmetic	Grammar	Arithmetic
2½-3½	Grammar	Drawing	Grammar	Drawing	Singing	Drawing
3½-5	Sewing					
5-6	History of the World	Singing	History of the World	Chemistry	History of the World	
7½-8½	Reading aloud from various books					

From the description given it will be evident that while these High Schools have played an honourable part in the development of Denmark their system is not applicable elsewhere. They peculiarly answer to the conditions and fit the genius of the Danish people. Where young people of from eighteen to twenty-five years of age have a wage-earning opportunity they will not sacrifice it for a period of the year in order to attend such courses of education; but it is a question worthy of consideration whether the principles underlying the system could not be applied to a greater extent than now in the evening continuation schools so general throughout Scotland.

Certainly these People's High Schools make a deep impression upon the visitor. It is a wonderful thing to see, as at Lyngby, young women of the peasant class, who have quitted the farm and the field for three summer months in order to rub up their elementary school education, and come under the influence of history, literature, poetry and song. That the culture of the High School afterwards expresses itself in the home and the working life cannot be doubted. Living in association, under the guidance of teachers with whom the moulding of character is everything, the students must insensibly gain the taste for order and refinement, of which the evidences are never absent from the humblest Danish dwelling. Nor is the part the High School plays in the worldly success of the Danish farmer likely to be exaggerated. Sir Horace Plunkett quotes it as the opinion of Danes of all classes that the High School, with its general effect upon mind and character, is really more potent in the practical sphere than the school of specialised instruction. At any rate this may be said; if Danish industrial advancement reminds us that we cannot too much exalt the "technicalities," the High School reminds us that neither can we afford to depress the "humanities."

The Agricultural Schools

When first instituted the High School, in addition to the subjects already mentioned, took up land-surveying, agricultural chemistry, and other sciences underlying the practice of agriculture. As the latter developed and increased in importance this provision proved insufficient, and it became necessary to devote whole courses to such matters. Thus arose the "Landbrugsskole" or Agricultural School as a branch from the High School stem, obtaining its pupils and methods from the High School, but having agriculture and the natural sciences for its subject matter. As at the High School, the pupils are all boarders, pass no examination, and get no certificate. Like them also the schools are private ventures, now subsidised by the State, and in a number of cases the land attached to them is the property of the State, and is let to the schools for a nominal sum.

Of the Agricultural Schools fourteen are entirely separate from the High Schools, one is solely a dairy school, and twenty-nine are situated contiguously to the High Schools, and in the case of these

some of the teachers lecture in both schools. The students are from 18 to 25 years of age, and, as they have all had already a good practical training on the farms, the instruction given is purely theoretical, the aim being to connect the principles of agricultural science with practical facts, and to render their daily work more attractive to them than before by transforming their "knowing how" into "understanding why."

The Danes acknowledge a debt of gratitude to Scotland as

SUMMER STUDENTS OF THE POPULAR HIGH SCHOOL, ASKOV

having given them their first impulses to agricultural progress. Fifty years ago the first students were sent from Denmark to Scotland to study agriculture. Several came over thirty years ago, and it is still the practice for some farmers' sons to spend from six months to a year in Scotland, some as pupil-boarders with farmers, and others taking their places in the bothies and earning their living like ordinary ploughmen. In several respects, the pupil has gone ahead of the teacher.

The Commission visited the Agricultural Schools at Lyngby, Ladelund and Dalum. At Lyngby the school was not in session, so only the equipment was seen. Attached to the school here is a remarkable historical collection of agricultural implements and machinery, models, pictures, maps and charts demonstrating the developments of Danish agriculture and forestry.

There is also in a separate building a permanent exhibition of

the most modern agricultural implements to which agents and makers send samples with full particulars of price, etc. The specimens sent have to be left on show for a year at least, at the end of which period they may be left, taken away, or replaced by newer articles.

Dalum Agricultural School

At Dalum, the members of the Commission were favoured with an address in English by Mr Jacob Lange, who also supplied the following information regarding his school, which may be taken as a fair example of the others :—

The school was founded in 1886, and the present director and staff have wrought together almost from the start. It is private property owned by the director, but it was established by the financial aid of a great number of farmers, chiefly small proprietors, from the whole island, who felt the want of such a school. To further its work, the State and Local Council grant yearly subsidies. All the pupils are boarded and lodged at the school. It has two chief courses annually, one in Agriculture and one in Dairying, besides occasional short courses for special purposes. The pupils come from all parts of the country.

1. Agricultural Course.—This course extends over six months (November to April). There are about 140 pupils, mainly the sons of small proprietors, their ages varying from 18 to 35 years, the average being 23 years. Nearly all are pupils from the elementary schools, but the majority have spent five months at a High School before coming to Dalum.

For such subjects as Arithmetic, Drawing and Land-Surveying the pupils are divided into two or three classes, according to ability. All the other subjects are taught in common by means of daily lectures and frequent oral examinations, for which the pupils prepare themselves by means of text-books. There is no terminal examination and no leaving certificate.

The chief subjects taught are : (1) Physics, Chemistry, Geology (soils and their treatment); (2) Anatomy and Physiology of Animals; (3) Botany (including plant pathology), the cultivated plants and their culture; (4) Tending and feeding of stock; (5) Dairying; and (6) Agricultural Book-keeping. Besides these subjects, series of lectures (without examinations) are given in Political Economy, the History of Agriculture, and general History. The school day extends over seven to eight hours : 3-4, lectures; 1-2, examinations; 1, gymnastics; 2, land-surveying, arithmetic, etc. The State grant is £165 a year; the subsidies from the County Councils of Fyen amount to £60 a year. Some of the poorer pupils get about £8 (about half the expense incurred) from a Government grant distributed by the County School Boards. The cost of the course, including instruction, board, lodging, and the necessary books, amounts to about £2, 15s. per month.

2. Dairying Course.—This course extends over a period of

four months (April-July). There are about twenty-five pupils, of an average age of twenty-two years, who have been working from three to eight years in butter and cheese factories. Their previous education is similar to that of the winter pupils, and the mode of teaching is similar to that in the winter course. Besides Arithmetic and Writing the following subjects are taught:—

Physics (including Mechanics and Engineering Chemistry); Botany (including Elementary Bacteriology).

Anatomy and Physiology of Animals and their tending and feeding; Dairying (history and general theory); practical instruction is given in Milk-Testing (Fjord and Gerber systems), in general Book-keeping and differential Reckoning (Fjord system) for the paying of the milk according to the cream percentage.

A special subsidy of £110 a year is given by the Government for the dairying course. In connexion with the school a model dairy is maintained, to which the Government contributes £55 a year. The poorer pupils obtain grants of about £6 each through the local authorities, the total cost of the course amounting to about £10, 10s. Besides these two main courses the day school occasionally gives short courses (1-4 weeks in duration) for crofters and small farmers in milking, testing of milk, and the working of small farms.

3. The Farm.—The farm attached to the school is run on business principles and for profit, in such a way as to serve as an example to ordinary farmers. The pupils are made acquainted with the whole book-keeping of the farm, and are allowed to examine the stock and general work, but no practical farm work is directly taught in the school. The farm is 92 acres in extent, excluding the space occupied by buildings, garden, and football field. It is divided into nine fields of equal size (9½ acres), besides a field of permanent pasture. The soil is very variable. The following is the rotation of crops:—

1. Rye.
2. Sugar beets and seed mangolds.
3. Oats.
4. Mangolds.
5. Barley.
6. Oats.
7. Clover and grass.
8. Grass.
9. Mangolds and different forage plants.

The average yield per acre is about 50 to 60 bushels grain, 25 tons mangolds, and 15 to 16 tons sugar beets.

The stock consists of 30 milking cows, 20 bulls, heifers, and yearlings, 100 pigs, and about 150 fowls. The breed of cattle is the Red Danish.

In winter the rations of milking cows in full milk are 4½ lbs. hay, 11 lbs. straw, 80 lbs. mangolds, and from 7 to 11 lbs. cake. During the summer about half the daily fodder (cake and hay) is

given in the byre, the other half they get in feeding outside (tethered).

The average produce amounts to 8700 lbs. of milk or 340 lbs. of butter per cow. The pigs are sold when weighing about 190 lbs.

4. THE DAIRY.—As the dairy is intended to serve as a model, it contains more and larger machinery than is necessary for the working of the milk produced on the farm.

It is not likely that colleges of this type will be introduced into Scotland, but the colleges now established in Edinburgh, Glasgow, and Aberdeen are capable of development to suit the requirements of agriculturists. If those who intend farming would realise the importance of devoting, say at least two winters to the systematic study of Agriculture and the allied sciences at a properly equipped central institution, the number of colleges in Scotland would soon require to be increased. It is to be hoped that the interest of the agricultural community of Scotland in technical education applied to their branch of industry may soon be as general as we have found it in Denmark.

The Dalum Field Demonstration Station

Adjacent to the Dalum Agricultural School is situated one of the Demonstration Stations of which there are four in the island of Fyen alone, and others in Zeeland and other parts of Denmark. These stations have been organised by and are under the control of Agricultural Societies, and they are carried out under the supervision of one of the travelling experts or advisers who are specially employed for such duties. There is one such national expert on live stock, another on plant diseases, another on crops and plants, and so on. The Demonstration Stations in Fyen are all supervised by the expert on crops and plants. The costs are defrayed by the Agricultural Societies, which are assisted by grants from Government given for these purposes.

The Field Demonstration Stations differ from the ordinary Agricultural Experiment Stations in that no attempt is made on them at exact investigation, but they are used simply to show plainly to the eyes of visitors facts relating to cropping already known or anticipated. Thus on the Demonstration Station at Dalum there were plots of oats on some of which had been sown seeds of the runch (Raphanus raphanistrum), and the results gave a very effective object lesson on the damage done to crops by weeds. On other plots were shown in the cereal crops of 1904 the effects produced by various crops grown in the preceding year on the same land, while on other plots were shown a number of varieties of potatoes growing side by side under the same treatment. These stations are visited once a year or oftener by many farmers, and no doubt act as a very useful educational influence.

The Askov Agricultural Experiment Station

The Agricultural Experiment Station at Askov is the largest and most fully equipped in Denmark. It was founded in 1885, and it occupies an area of 40 acres. The staff consists of a director, who is also the owner of the land and the buildings, and five other members, of whom one is a botanist and one a chemist. The station receives an annual subsidy from the State of over £800, out of which is paid to the director a salary of £160, and to the other members of the staff from £50 to £100 each, out of which they have to provide their own housing and board. There is an annual inspection by the State, but otherwise the station is entirely under the control of the director. It is visited regularly by farmers to the number of about 2000 annually. The soil of the station is of variable character, one part consisting of medium and the other of very light land, while there is also a section of moor. The whole of it received a dressing of marl about twenty-five years ago. The field is divided for experiment purposes into a large number of plots, of which the largest are of the size of 1-60th part of an acre, while many do not exceed the 1-200th part, and some have an area of as little as 6 square yards. Many experiments are carried out, of which the following is a partial list:—

1. An experiment to determine the best time for the sowing of rye seed.
2. An experiment to determine the best quantity of rye seed to sow.
3. An experiment on the comparative merits of varieties of barley for brewing purposes and also for feeding.
4. An experiment to determine the effects of the growth of various root crops on the subsequent crops of a rotation.
5. A rotation experiment with manures to determine the best method of manuring for a five-course rotation.
6. An experiment on the autumn versus the spring application of farmyard and of artificial manures.
7. An experiment on the comparative merits of varieties of mangel.
8. An experiment on the comparative merits of rye.
9. An experiment on the comparative merits of varieties of potatoes.
10. An experiment to determine the best depth at which to plant potatoes.
11. An experiment to determine the best time at which to plant potatoes.
12. An experiment to determine the effects of methods of keeping on the composition and value of farmyard manure.

The Lyngby Agricultural Experiment Station

This Experiment Station was founded by one of the lecturers in the Agricultural School, who commenced on a small scale by comparing different varieties of seeds and plants. Subsequently Government recognition and support were obtained, and the station extended its area and its operations until at present a large number of experiments are being conducted on it. The land under experiment is divided into small plots of 1-500th part of an acre in extent, but to ensure accuracy in the results each experiment is repeated ten times on plots in different parts of the field. The chief experiments being carried out at the date of the visit of the Scottish Agricultural Commission were :—

1. Comparisons of varieties of oats.
2. ,, ,, ,, ,, barley (250 varieties).
3. ,, ,, ,, ,, wheat.
4. ,, ,, ,, ,, mangel.
5. ,, ,, swede with mangel as a root crop.
6. ,, ,, clovers grown from seeds obtained from different countries.
7. Tests of varieties of oats, barley and tares, suitable for winter sowing.
8. Tests of methods of destroying weeds.

Many results of great importance to Danish farmers have already been got at the station. Thus it has been found that English red clover seed produces plants too delicate to stand the Danish winter, and that Russian and Bohemian seed is preferable. It was also in evidence this summer that barley sown in the previous September was going to be ready for harvest at least a month earlier than the crop sown with the same seed in April. Much information of value has also been obtained as to the relative merits of the numerous varieties of the crops in general cultivation.

Royal Agricultural and Veterinary Institute (Copenhagen)

The Royal Agricultural and Veterinary Institute in Copenhagen is the supreme teaching body. This magnificent institution, which alike on account of its size, its revenue, its staff, its equipment, and the valuable contributions to agricultural and dairy science that have emanated from its research laboratories, forms one of the finest and most important colleges in the world, was established at the expense of the State for the purpose of training veterinary surgeons, teachers of agricultural science, agricultural experts and advisers, students qualifying for appointments as land agents or land stewards, and the sons of the larger farmers who desire to add to their knowledge of practical farming a complete course of training in the sciences related to it. The college buildings occupy a convenient situation in their own grounds at the outskirts of the city. They afford very ample and suitable accommodation. The main building forms three sides of a large quadrangle, and it con-

tains about ten lecture rooms and about thirty additional rooms occupied as laboratories and museums. The rooms are all large, lofty, and well-lighted, and the numerous museums are filled with immense collections of illustrations and specimens of surpassing interest and value. The veterinary department, in addition to its lecture rooms and museums, occupies a separate building in the fourth side of the quadrangle, which is separated from the main college building by a space of about 40 yards. This distance is found to be sufficient to prevent any nuisance from the live stock

AGRICULTURAL SCHOOL AND EXPERIMENT STATION AT LYNGBY

kept in the stables and hospitals. No live stock is kept in the college except what is required for the instruction of the veterinary students.

The total number of students attending the college during the past session numbered about 300, of whom about 130 were students of Agriculture proper, including Dairying, while the remainder were students of Forestry, Horticulture, Land-surveying, and Veterinary Science. The course of study in Agriculture extends normally over two years, but a supplementary third year's course is given, and is attended usually by a small number of advanced students who are qualifying for appointments as agricultural teachers. Of the total number of agricultural students, Professor Bang expressed the opinion that about one-half intended to return to farming, and the remainder were preparing themselves for various situations. The students, as in the Scottish universities and colleges, are non-resident, and provide their own board and lodgings in the city as they please. The fees charged for the regular courses of instruction are very low, amounting to not more than £3 to £4 each. No shorter courses of instruction are arranged than for a period of two

years. Formerly many students attended the classes for one year only, but now the great majority take the full two years' course. The veterinary student's course extends over four or even five years, and the full course is taken by all the students, as that is essential to enable them to pass the necessary examinations.

Alike in the agricultural and veterinary departments the subjects taught and the arrangements of the classes are similar to those in all similar institutions in this and other countries, and need not therefore be detailed. It is, however, important to note that no farm is attached to this great college, nor is any attempt made to teach the students any branch of practical farming. The instruction given is purely theoretical, and the students are expected to acquire a knowledge of the practice of agriculture—where alone it can be learned—on the farm itself. The staff of the college includes twenty-two professors and lecturers, besides twelve assistants and tutors, and contains in its ranks a number of able men, of whom Professor Bang has a world-wide celebrity on account of his important researches and discoveries in animal tuberculosis. Attached to the college are large research laboratories, which receive an annual subsidy from the State of about £7700 per annum, in addition to the annual subsidy of £14,800 given to the college. It is entirely due to this liberal support that the staff and equipment of the college have attained to such a high standard of ability and completeness, and that it has been possible to carry on these researches, which have produced results of such wide-reaching importance, not only to the dairy industry of Denmark and of the world, but also to the whole human race in those countries where tubercular disease has been for so long a dreaded scourge.

State Aid to Agriculture

The State aid to agriculture in the form of grants of money is, although not inconsiderable, less remarkable for the total amount than for its distribution in such a way as to foster a variety of related objects. Not agricultural education and research alone are assisted; subventions are given to encourage local associated efforts: cattle and poultry breeding societies, milk control unions, agricultural shows and similar organisations. Thus helped, small groups of farmers, taking the initiative, became increasing combinations, and group was rapidly added to group. For example, the first cattle-breeding society was started in 1886; a year later the State began an annual grant of £5 to each society; in 1902-3 these societies numbered 769. So with the milk control unions. Originated in 1895, there were in seven years no fewer than 308 unions, each in receipt of a subsidy of thirteen guineas. A like progress attended the formation of local agricultural societies, of which there are upwards of 100, receiving an average subvention of £90 per annum. The following list brings together the total yearly sum of the principal State grants of money to agriculture, direct and indirect, according to the latest available information:—

People's High Schools and Agricultural Schools	£7700
Bursaries	13,740
Royal Veterinary and Agricultural College	14,800
Experiment Stations and Demonstration Fields	3000
Research Laboratory attached to the Copenhagen College (including a grant for the State Butter Shows)	7700
Reclamation of Waste Land	6000
Local Agricultural Societies	9600
Horse-breeding Societies	2750
Cattle-breeding Societies	3850
Pig-breeding Societies	(?)
Poultry-breeding Societies	540
Milk Control Unions	2860
State Experts or Advisers	8300

A WAYSIDE COTTAGE

TENURE OF LAND AND SUCCESSION THERETO[1]

Up to the latter part of the eighteenth century the land in Denmark was, in the large majority of cases, held as in our own country, by the class of large land-owners, and at that time the life of the small agricultural tenant and labourer was far from a happy one. The country, however, awoke to the fact that something had to be done to improve the lot of this class so as to retain them on the land, and in 1787 a Royal Commission of Agriculture was appointed to inquire into the whole circumstances. This was the precursor of many enactments which have been passed, and which have proved themselves to be beneficial, not only to the class for whom they were intended but to the country at large.

This Commission did much good work, and was the means of instituting the system of leasing of farms to peasants, hitherto unknown, and thus to its credit must now be placed the initiation of that system which has proved so successful in the country—peasant proprietorship.

The Government, alive to the facts of the case, backed up the Commission in their endeavours, and created a fund from which loans were advanced to peasants to enable them to buy their farms on easy terms.

The stimulus once having been given there has been a gradual though increasing tendency to acquire land on the part of the farmer, and as a result the larger estates have been divided into smaller holdings. A further impetus was given in this direction by the formation in 1851 of certain mortgage companies from whom loans on landed security could be obtained on fairly advantageous terms. From time to time various Acts have been passed dealing with the land question, and these have culminated in the passing of the two important Statutes of 1899 and 1904, which will be referred to hereafter.

Generally speaking, in Denmark, as in Great Britain, we find a similarity in the laws relating to the possession of and tenure of land. Thus, we have the "Selvejergaard," corresponding to our fee simple or freehold land, on which there are no restrictions on the owner as to the manner in which he may deal with or dispose of his estate. Again, there are estates held under certain burdens and restrictions called "fixed lands" (Danish "Faeste"). These are, as a rule, held either under the common law of inheritance, or are entailed. The lands which are affected by such entails are:

[1] The Danish measurement is by tondeland = 1·36 acre.

(1) Those which are held directly of the Crown, and which have been granted for services to the State. Such lands are fettered by certain restrictions and limitations, and in the event of there being no heir entitled to succeed to them, they revert to the Crown. (2) Lands which have been entailed by the proprietors themselves under certain conditions. These are known as "Family Estates."

In many respects the law of entail is similar to that with which we are familiar in our own country. There is, however, this marked difference, that an heir of entail is not allowed to burden his estate for his widow's and younger children's provisions, or for any purpose whatever, beyond his own lifetime, unless it can be clearly shown that such a burden is to be for the improvement of the estate. In order, therefore, to secure provisions to his widow and younger children, the heir in possession must save this out of his annual income. He has, however, power to sell the estate, subject to approval of the Ministry of Justice, on the express condition that the proceeds from such a sale are invested in certain securities, defined by the Ministry of Justice, the interest from which only can be enjoyed by the heir in possession for the time. This practically means that the proceeds from the sale of the entailed lands are as rigidly fettered by the entail as the lands themselves were.

The succession to an entailed estate, whether it be the land itself, or the proceeds from the sale of an entailed estate, follows the well-known rules of primogeniture, and it would appear that the entail is perpetual, unless there be intervention under special Royal Authority. Since 1848 it is now no longer lawful to entail an estate.

Before dealing with the different kinds of tenure of land, it would be well to explain that for many years it has been forbidden by Statute to join several farms into one, and there is an obligation upon every farm which exists, or is about to be created, that it shall independently be provided with suitable houses and stock, and no one is allowed to work more than one, or, in case of a special grant being obtained, more than two farms on his own account. Thus, if any person acquires more than one, or two farms, as the case may be, these being either fixed or free land, he shall be obliged to let out the exceeding number of farms either in "Faeste" or in free tenure. In this way the large estates will by and by disappear, and give place to an increasing number of self-depending agricultural holdings. It is further impossible to create large properties, or to increase the large properties which already exist, if this shall be done in such a way so that existing farms and the existing farmers who cultivate the land on their own account should thereby be obliterated. These restrictions in conjunction with the laws relating to "Faeste" have been of the greatest importance in keeping up the system of agriculture to the extent now practised in Denmark.

The various kinds of tenure may be divided into three classes:—

1. Lease for a Fixed Number of Years

This applies only to what is known as "free land," and in form is similar to our ordinary Agricultural Lease, but the conditions would appear to be more stringent and binding upon the tenant than those we find in Scotland.

The duration of the lease is usually for as many, or twice as many years as there are fields on the farm, and may be said to be a lease on rotation of cropping. As a rule the lease includes not only the right to the use of the land, but also to the live and dead stock on the farm, which are the property of the proprietor. The latter are valued at the commencement and termination of the tenancy by mutual parties, any increase in value falling to be paid to the tenant on his quitting the holding, and any decrease having to be made good by him.

It is not uncommon to find a stipulation that a half-year's rent must be paid prior to the entry of a tenant to the farm. In another case the tenant is taken bound to deposit with the landlord a stated sum "As a security for the proper surrender in due time of the live and dead stock." This deposit is stipulated to be paid back by the proprietor at the termination of the lease, and interest at the rate of 4 per cent. is to be paid to the tenant half-yearly during its currency. The proprietor is, however, entitled to retain the deposit until a valid transfer has taken place, and to deduct therefrom whatever depreciation in the value of the stock, etc., may have taken place, and any arrears of rent which may then be due. In one lease a clause was observed giving the proprietor right to choose the heifer calves to be put into the stock to take the place of the cast cows. In many cases it is stipulated that the tenant shall submit for the approval of the landlord all seeds to be sown for the waygoing crop. Should these be rejected as being of inferior quality, the landlord may purchase his own seed and charge the cost against the tenant. No compensation is given for manure, hay or straw left on the farm. Compensation for unexhausted improvements and the doctrine of "cumulative fertility" are both unknown. The tenant must maintain the buildings on the farm during his lease, and hand them over at the termination in the same order and condition as that specified in a report and survey made at his entry to the holding. All public, parochial and ecclesiastical rates, as also premiums of insurance on stock and buildings, bailiff's fees and the whole expenses of the lease, including stamp duty, fall to be paid by the tenant. As a general rule the rent is paid partly in money and partly in grain, the grain being commuted into a money payment, according to the average price of each year. As security for the prompt payment of the rent, taxes, etc., and the due fulfilment of the terms of the lease, the tenant mortgages to the proprietor, with mortgage rights of first priority, his whole stock, crop and implements, and the amount of insurance on these goods, and binds himself to keep the mortgaged goods insured. For this purpose the lease is registered in the appropriate register as a mortgage.

BLACK AND WHITE CATTLE AT SKANDERBORG SHOW

The widow of a deceased tenant, should she so desire, may remain in possession of the lease, so long as she remains a widow and complies with its terms. His heirs, however, or his wife's second husband cannot claim a continuance of the lease.

2. Faeste Tenure

This tenure applies only to "fixed land," the nature and extent of which was ascertained more than 200 years ago. Fixed land may, however, by a Statute Law of 1861, be exonerated from this tenure if it had been owned and worked by the owner himself for a period of twenty years. The holdings must not be less than 12½ acres nor more than 150 acres in extent. The principle of this system is the payment of a capital sum down and an annual rent during the period of the tenancy. There are three kinds of Faeste: (1) Simple Faeste, which is a lease for fifty years; (2) Livsfaeste, which is a lease depending on the life of the tenant and his wife; and (3) Arvefaeste, which may be either a perpetual or a hereditary lease. In the case of Livsfaeste, if the peasant and his wife die before the expiry of thirty years, their estate is entitled to receive back as many thirtieth parts of the principal sum as the time of their occupation falls short of that period, unless the farm is relet to one of the heirs, who in that case arranges this matter with his co-heirs. The lease, which cannot be sold, is in this way equivalent to a Policy of Assurance over the life of the tenant and his wife, and provides a capital sum for their children in the event of the decease of the parents before the expiry of the thirty years. As the numbers of small holdings increase, the extent of land held under this tenure is decreasing.

Arvefaeste, when hereditary, descends according to the ordinary rules of primogeniture, and in the event of the failure of an heir, reverts to the proprietor. When perpetual, it is practically an out and out sale subject to a yearly rent, and the payment of a fine on each transmission of the property. Part of the capital sum payable for the lease is generally paid in cash, and the remainder is secured by mortgage over the property. The "Arvefaester" is always looked upon as the proprietor of the holding, and he may sell or subdivide the subjects within certain limits, but the consent of the proprietor has to be obtained to the apportionment of the rent and interest on the portion sold.

3. Peasant Proprietorship

This is, by far, the most important tenure in Denmark.

As before stated, up to the end of the eighteenth century, the land in Denmark was, in the great majority of cases, held by large proprietors, and the peasantry at that time laboured under most disadvantageous circumstances. They were obliged to take whatever land the proprietors might choose to give them, and often this was disjoined and of poor quality. They had also to labour the

proprietor's farm, the work on which had to be attended to before that on their own holdings, much to the detriment of the latter. Gradually, however, laws came into operation providing security of tenure and defining the work to be done by the labourer for his master. Systems were also introduced under State supervision for providing money on easy terms to peasants to enable them to become proprietors of their own holdings. Acts were passed by which entailed lands held by State institutions and other public bodies might be sold to the peasants, and as an inducement to the private owner to sell his peasant lands, he was permitted when he had sold nine farms to his tenants to incorporate into his own home farm as much as one-ninth of the total area which he had sold, which he was by an Act of 1769 prohibited from doing. This right, however, expired in 1900.

The most important Statutes dealing with the question of peasant proprietorship are the Act of 1899, by which for five years a yearly sum of £110,000 was to be provided by the State for the purpose of granting loans to agricultural labourers desirous of purchasing a small holding, and the Act of 1904, which is in similar terms, and by which a further sum of £166,666 is to be provided for five years from the expiry of the Act of 1899. Means have thus been put in the hands of any peasant, who has but little capital of his own, of becoming the proprietor of a holding should he so desire.

To carry out the working of the Act, the country is arranged into eighteen districts, and the money is divided among these districts, chiefly in proportion to the number of applications received from them. Should the number of such applications received in one year exceed the amount of the sum provided under the Act for that year, those who have been unsuccessful shall head the list of applications to be dealt with in the year following.

In each district a Committee is appointed consisting of three persons, one nominated by the Minister of Agriculture, who acts as chairman, and two by the Commune, one of whom must be a cottager. The duties of the Committee are to receive applications, make the necessary inquiries as to the applicants and holdings, and to assist in the providing of and supervising the allotments.

In order to obtain the benefits provided for under the Act, an applicant must conform to certain requirements, which are: he must be a Danish subject, be not under twenty-five and not, as a rule, over fifty years of age, nor must he on his own account be able to acquire a holding. He must be of good character, sober, industrious, and thrifty, and, for the five years immediately preceding his application must have worked as an agricultural labourer. In extent the allotments must not in any case be less than $2\frac{2}{3}$ acres nor exceed $10\frac{2}{3}$ acres of average land, or 16 acres should the land be of poor quality. The total cost of each holding, including buildings, stock, implements, furniture, etc., must not exceed £277, except in such districts in which the price of the land is exceptionally high. When the peasant has found suitable land, which the Parish Council must assist him in procuring, should that

be necessary, he then makes application through the Committee for State aid. Should they be satisfied with the applicant, and that the holding is sufficiently equipped with suitable buildings and stock, which they shall do by personal inspection, the applicant will be entitled to receive in cash, as a loan from the State, nine-tenths of the lendable value (the purchase price) of the property. This sum is secured to the State by mortgage on the property, including buildings, stock, etc., and bears interest at the rate of 3 per cent. per annum. During the first five years of the loan no repayment of capital need be made; after that period two-fifths of the loan shall be repaid in yearly instalments of 4 per cent., which also includes the interest on the loan; and when the two-fifths have been paid up, the remainder (three-fifths) shall be paid in yearly instalments at the rate of 4 per cent. A holder may, however, repay a larger amount of the capital in any year, provided that such repayment be not less than £2, 15s. 7d. (50 K.). No one may receive a loan from the State in connexion with more than one holding, and anyone who has transferred his property acquired under the Act to another person, shall not be entitled to make another application.

So long as the loan from the State has not been reduced to half of the original lendable value of the property, no other mortgage can be raised upon it, nor can distress be levied upon the holding, stock, etc., on account of the personal debt of the owner, or debt incurred by others on his behalf, without the previous consent of the Minister of Agriculture.

The allotments must be wrought as agricultural subjects, and must always have the necessary buildings and stock upon them. In order to ascertain that this regulation is being complied with, the Committee must make inspections at least once every three years. In the event of it being found that the holding is not being worked in conformity with the requirements of the Act, or that the buildings and stock are deteriorating, the Committee shall insist on the owner rectifying matters. The proprietor must also at all times keep the buildings, stock, etc., fully insured.

No part of the property is allowed to be sub-divided, or exchanged with other lands, until the loan to the Government has been repaid, unless with the express consent of the Minister of Agriculture, who shall be guided in this matter by the Parish Council. As a rule he will only give his consent to the sub-division or exchange when it is desirable for the better working of the farm, or when ground is required for the public benefit, such as the building of houses in a village, and the erection of schools or public halls.

Again, a peasant, whose holding does not amount to the maximum acreage as stated by the Act, may be desirous of acquiring more land, and this he is allowed to do, provided the whole does not exceed the statutory limit. In like manner consent to exchange may be given.

The proprietor may, if he wish, sell the property, provided that the purchaser fulfils the qualifications and conditions under the

Act. In the case of the purchaser being a son, son-in-law, or grandson, these conditions are somewhat modified.

The widow of a proprietor may remain in possession of a holding, if she takes over the liabilities of her late husband towards the State. Should she marry again, she may only remain in possession if her husband fulfils the conditions under the Act.

In the event of the holding being left by will of the proprietor to one of his children, the beneficiary, if he be a son, or in the case of a daughter, her husband, should he be in a position to comply with the requirements of the Act, shall take over the liabilities to the State. In that case the amount which the heir shall pay to the co-heirs in respect of the possession (of the holding), must not in the will be fixed at a higher sum than the deceased had paid as repayment of the mortgage. No joint ownership is allowed in any one holding.

Should the beneficiary under the will not desire to take up the holding, or should the deceased proprietor die intestate, any of the other heirs may arrange with the remainder of the family to take over the farm along with the attendant liabilities to the State.

In the event of confiscation of the property by the State, it may be sold free of the restrictions set forth in the Act.

It is interesting to note the increase in the number of freehold peasant farms during the last half century. In 1850 there were 66,841 peasant farms, of which 45,000 were freehold, and in 1895, the relative positions stood at 75,321 and 60,000. This, it will be observed, was prior to the passing of the Small Holdings Act of 1899, and since that date the number of allotments owned by peasant proprietors has enormously increased.

Regarding the acquisition of land for the purposes of the Act, in some districts there is no difficulty in obtaining it, while in others, such as the Aarhus District, where the value of land is high, it has proved to be a very difficult matter to get suitable land at a price sufficiently low to make the holdings pay. Generally the land has been taken from ordinary farms, several farms having been split up for this purpose into "State Houses" as they are called. The majority of the holders have succeeded extremely well, the very rare exceptions being those who were not capable men.

During the passing of the Act of 1904, there was considerable conflict between the Common House, which mostly consists of peasants, and the Upper House, in which the large land-owners have the majority, as to the maximum size of the farms. The aim of the Lower House was to create holdings of such a size that the whole time of the owner and his family would be taken up in the working of them, and that they would be thus independent of outside labour. On the other hand, the large estate owners wished to keep the maximum so low that the small proprietors would be compelled to depend on outside labour during the busy time of the year, and in this way provide a larger amount of labour, the scarcity of which is sometimes very much felt on the larger estates. The Lower House ultimately carried their point.

Law of Succession

As regards the general law of succession, a wife, on the death of her husband, is entitled to one-half of his whole estate, and out of the other half she takes the same as a child, but never more than one-fourth in the event of there being only one child, or one-eighth in the event of there being more than one child. The testator has only power to dispose of one-third of the half not taken by the widow (or one-sixth of his whole estate by will). An extreme case can easily be imagined in which, under the will of the testator, the wife receives the one-sixth of which the deceased had power of disposal, she being further entitled to the half and one-eighth under the marriage laws, thus bringing up the share of the estate to which she might succeed to nineteen-twenty-fourths of the whole. The amount left for compulsory division amongst the children would therefore be only five-twenty-fourths of the whole estate. Should, however, the widow re-marry, on her death the children can claim their proper share of the original estate. From the above it would appear that a great hardship might be done to the children. In practice, however, this does not take place, and it is far from uncommon to find that the father, who has absolute power over his estate during his lifetime, pays over to his children as much as they may reasonably expect to receive at his death.

Further, any owner of a farm may leave his entire fixed property to one of his heirs, subject to reasonable compensation being paid to the others. A disposition in such terms has, however, to be confirmed by the Board of Justice, it having to be proved to their satisfaction that such a disposal is for the benefit of the heirs as a whole.

The proprietor of a country seat has also the power of bequeathing one-half of his property to the heir who is to succeed to the landed estate. In this event, however, instead of having the absolute disposal of one-third of the remainder of his property as above stated, this is reduced to one-fourth.

Several special Acts have been passed regulating the succession to peasant farms. The most important of these is that of 1837, by which the proprietor may leave the farm by will to any one of his children, irrespective of age or sex, subject to a moderate consideration being given to the others, the extent of which is left entirely to the discretion of the testator. The consent of the wife to such a disposition is necessary. Should a peasant be the proprietor of more than one farm, he may not leave the whole to a single heir, but they fall to be divided amongst as many of the heirs as there may be farms.

Registration and Sale

The system of registration in Denmark seems to be simple and effective. The lands are entered in the State registers under their proper descriptions. All burdens and mortgages affecting the lands are also detailed in the register. On a transfer taking place, or a

TETHERED COWS: SKANDERBORG SHOW

BLACK AND WHITE COW: SKANDERBORG SHOW

new mortgage being put upon an estate, this is noted in the column for that purpose; and upon the transaction being completed, the purchaser or lender receives a certificate by the registrar, stating that all necessary requirements have been complied with, and that he has been entered as the owner of the subjects, or as a holder of the mortgage over them. It can thus be seen at a glance how matters stand with regard to any particular property.

The fees attending the purchase of an estate are relatively much as we find them in Scotland. Thus the cost of the transfer of a property, the purchase price of which is, say £600, amounts to about £13.

The Small Holdings Act of 1904, however, contains special exemptions regarding contracts of sale, or deeds conveying land to agricultural labourers. These only require to be impressed with a stamp of the value of 1s. 1½d., while mortgages to the State do not require to have a stamp affixed to them, and no charge is made for registration or similar services.

Debt on Land

Having described the various tenures and modes of succession to land, it may be well for a moment to consider the aspect of the indebtedness of the landed proprietor in relation to his property. As it would be premature at present to speculate with any degree of certainty upon the effects of the two important Statutes recently passed, we will therefore only speak of matters as they stood before 1899.

In the beginning of the nineteenth century the debts affecting the landed estates in Denmark amounted to about 40 per cent. of their value. Towards the middle of the century a rapid increase took place in the value of lands. The debt, however, as is usually the case, moving more slowly than the increase in value, did not at once appear in the same ratio. Thus we find that about 1850 the debt appearing as affecting landed estates in Denmark did not exceed 25 per cent. of the value, and it was not until the sale of the farms that the true relation was disclosed. This rose to about 43 per cent. in 1884, which may be taken as the normal state of matters. A period of depression set in at this time, and was naturally attended by a deterioration in the value of landed property. The debt, however, did not decrease in relation to the fall in value of land, and in the year 1899 we find it amounting to about 50 per cent. of the value.

In very few instances can the cause of debt be attributed to the fact that the owner has been living beyond his means. The chief reason should rather be ascribed to the above circumstances: the rise in the value of land necessitating a larger purchase price, and consequently, as a portion of this is almost invariably allowed to lie as a mortgage on the estate, an increase of debt on the estate in proportion to its value.

Inherited properties burdened with provisions to the younger members of a family have been affected in the same way.

At the first glance it would seem that this indebtedness is abnormally high, but, on further consideration, it is doubtful if it exceeds that which at present exists in our own country.

It would seem that the effect of the Small Holdings Acts of 1899 and 1904 must, at least for a certain number of years, be to increase the present indebtedness to a very appreciable extent. It is possible, however, that the enormous increase in the trade of the agricultural produce of the country, should that continue, may help to counterbalance this.

There can, however, be no doubt that in Denmark the Government, by the promulgation of the many laws so beneficial to the agricultural community, have attained the object which all along they have had in view, namely, the arresting of the depopulation of the country, which was fast taking place, owing to the difficulty in finding employment, and the consequent migration to the towns, and emigration to foreign countries. As the result of such a policy, in conjunction with the excellent methods of education and co-operation so systematically carried on, we find a contented, intelligent, and patriotic peasantry.

Woods and Forests

In Denmark, as in most of the European countries, much attention is given to the woods and forests, and many Statutes have been passed dealing with these. In many cases it is obligatory that forest lands shall be kept as such, and these must not be subdivided into parcels containing less than 175 acres. By an act of 1805 a proprietor is not allowed to cut down his timber unless with the previous consent of the State, which will only be given on his planting an extent of at least as great as that which has been cut. Assistance, however, is given by the Government in the way of expert advice, and in supplying young trees for planting.

CO-OPERATION IN GENERAL

It is freely admitted by those who have studied Danish agriculture that much of its success is due to co-operation. There is not a branch of agriculture it has not touched, and there is not a branch it has touched that has not grown. These figures tell their own tale :—

Co-operative Societies for purchase and distribution. Members.	Co-operative Creameries. Members.	Co-operative Slaughter-Houses. Members.	Co-operative Egg Centres. Members.
200,000	150,000	67,000	65,000

The turnover of these societies since 1901 has been as follows :—

1901, . .	£12,080,000
1902, . .	£12,890,000
1903, . .	£14,214,000

The total exports of Denmark proper in 1903 amounted to nearly £20,000,000. Of this, £11,414,000, or 57 per cent., came from co-operative societies.

Denmark exists mainly for the purpose of supplying butter, bacon and eggs, and it is with these commodities that co-operation has had most to do, though its operations are not confined to them. Let us see what progress has been made in Denmark since the co-operative movement began in connexion with these industries.

The Creameries

Take, first, the creameries of Denmark. The first co-operative creamery was started in Jutland in 1882. It should be pointed out that from £1200 to £1500 is required to start a creamery, but that no share capital is subscribed; the banks or loan companies advance all the money, the members, however, pledging themselves to dispose of all their milk through the creamery, and be responsible, jointly and severally, for all its liabilities. The country, in 1882, when the first creamery was started, was producing something like 57,600,000 bushels of roots, wherewith to feed its farm stock. In 1896 it was producing 155,825,000 bushels of roots. Alongside this increase in the production of roots, there was also, but not anything like so great, an increase in the quantity of grain and hay, which shows that the farmers of Denmark, while changing their crops from cereals to roots to suit their new industries, were also cultivating their land to much better purpose than before. Moreover, the increased production of roots gives some indication of the increased dairy stock of Denmark,

for the roots were grown for the purpose of feeding stock, and the stock of Denmark consists mainly of cows. The development of the dairy trade, however, will be more clearly seen by an examination of the imports and exports of butter. These are some of the figures :—

	Imports.	Exports.	Excess of Exports over Imports.
1882,	69,149 cwts.	291,382 cwts.	222,233 cwts.
1896,	323,492 „	1,210,568 „	887,076 „
1903,	415,000 „	1,948,000 „	1,533,000 „

In 1903 there were 1057 co-operative creameries in all, with a membership of 150,000, handling milk weighing 42,500,000 cwts., drawn from 750,000 cows, more than two-thirds of all the cows in Denmark. In that year the money value of Denmark's export of butter produced in the country was £8,400,000, and the output of the co-operative creameries, which of course is different from the export, also amounted to £8,400,000. The following figures will give some idea of the development of the co-operative creameries. They represent the annual output.

Year.	Cwts.	
1901,	1,370,000	£7,300,000
1902,	1,470,000	£7,776,000
1903,	1,580,000	£8,400,000

It should be mentioned that there has been an improvement in the quality as well as an increase in the quantity of butter produced by the co-operative creameries. At the Royal Danish Agricultural Society Show at Odense in 1900 the co-operative dairies secured all the 46 silver medals and 202 out of 210 bronze medals, which speaks volumes for the quality of the butter produced by the co-operative dairies.

These co-operative dairies, which play such an important part in Denmark's trade, form in many cases federations for the express purpose of disposing more profitably of their butter. There are eight such federations in Denmark: the Farmers of Denmark Butter Export Association, which was started in 1888, and is composed of the members of eighty-four creameries; the South Fyen Farmers Butter Export Society, founded in 1895, and composed of twenty-five creameries; the Danish Co-operative Butter Factories Association, dating from the same year, with a membership of twenty affiliated creameries; the Mid-Jutland Butter Export Society, started in 1898 by the union of ten creameries; and the Aalborg Counties Co-operative Butter Export Society, being the union of eight creameries. Besides these, there are two federations at Viborg and one at Rinkobing.

Bacon-Curing Factories

The pig-rearing and bacon-curing industry may be said to be the result of the development of dairying. Pigs were reared to get rid of the refuse of the dairy profitably, and they are fed, in

part at least, on separated milk, which the farmers of Denmark have found exceedingly suitable for this purpose. At one time, Danish pigs were sent to Germany, France, and elsewhere. Subsequently, proprietary bacon-curing establishments were started in different parts of Denmark, and these competed with Germany for the home-reared pig. The farmer, it must be admitted, favoured the foreigner, not because he had any prejudice in the matter, but solely on account of the fact that the Germans took fat pigs, and the bacon-curers in Denmark, finding that the taste for these was diminishing, preferred the younger and leaner animal. The Dane was of opinion that the profit to him was made between the age of the pig when the bacon-curer wanted it and the age when the less fastidious German took it, and so he had a very natural preference for the German. This continued till 1887, and in that year there were 232,000 pigs exported, to the value of £833,300, and bacon and ham were exported to the value of £666,700. One million and a half yearly was a good return from pig-rearing; 1887, however, saw the end, meantime, of the keen competition, for swine fever broke out in Denmark, and the German ports were closed in the face of the Danish exporter. The export of swine at once fell from 232,000 to 16,000 per annum. This misfortune to the farmer of Denmark put him in the way of making, if not a fortune, at least a competence. He went on rearing pigs as before, only more of them. In 1888, he had 770,785; in 1893, he had 829,131; and between 1891 and 1895 the export trade in pork had reached annually the considerable sum of £1,722,200; and Germany, which had again thrown open her gates, was receiving live pigs to the tune of £555,600 a year. But in 1896 Germany again prohibited the importation of swine. Denmark, however, had made provision for this. When it occurred in 1887, the Danish farmer started co-operative slaughter-houses and bacon-curing factories all over the country. The factories were floated in the same way as the creameries had been floated. The members agreed to send their pigs to the factories and to become responsible, jointly and severally, for the liabilities. The essence of this method is, that every member is known to every other member. This was possible in the case of a creamery catering for the milk of a limited district. In the case of a slaughter-house and bacon-curing factory, however, which had a much wider area, it was impossible that there should be that personal knowledge which was so essential. To get over this difficulty, the members in a parish agreed to supply a certain number of pigs, and become jointly and severally liable for the sum which the bank was ready to lend to that parish. Slaughter-houses soon sprung up in different parts of the country, and bacon-curing became one of the great trades of Denmark, and to-day most of the trade is in the hands of the co-operators, for, of the fifty slaughter-houses in the country, thirty are now co-operative. In 1901 there were 64,800 members of co-operative slaughter-houses, and in 1903 the number had increased to 67,200, and the number of pigs killed had risen from 651,261 in 1901 to 928,850 in 1903.

TETHERED DANISH RED CATTLE

Federation of Bacon Factories

The co-operative bacon factories of Denmark are also federated. The headquarters are at Copenhagen, and the federation is composed of the managers and representatives of all the co-operative slaughteries in the country. The Chairman is furnished every week with returns of the business transacted at the co-operative factories, showing details of the cost of production, and the market returns for bacon sold. This information is embodied in a private circular which he sends to all the factories. The federation is a stimulus and an incentive to better work, and it tends towards the more successful development of the industry.

Poultry Keeping

Poultry keeping is a comparatively neglected department of farm work in Scotland, but that is not so in Denmark. It is only less important there than the butter and bacon trade, while its organisation on the co-operative basis is as complete and as effective to-day as the organisation of any other department of Danish agriculture. The headquarters of the egg trade are at Copenhagen, where the Danish Co-operative Egg Export Association carries on its work. But there are eight branches in other towns of Denmark. There are 500 Societies affiliated to the Central Society in Copenhagen, with a membership of 30,000. If the operations carried on in the egg trade by the different bacon-curing establishments are taken into account, there are 65,000 co-operators altogether, and in 1903 they exported £436,000 worth of eggs.

Societies for Improvement and Insurance of Stock

Co-operation in Denmark, however, did not stop when it had encompassed the dairy, bacon, and egg trades of the country. There are co-operative societies for almost everything—for the improvement of the breed of horses, cattle, pigs and poultry, and for the insurance of live stock. There are four co-operative societies for the insurance of stallions alone, and more than a dozen for the insurance of live stock generally, all working on the principle that the members are jointly and severally liable for all losses by accident or death. There are sixty bee-keepers' societies with a membership of 5000. There are societies for the purchase and distribution of seeds, manures, and agricultural machinery. And all these societies are managed by separate bodies, though oftentimes composed of the same men, with the result that a farmer may be a member of half-a-dozen or more. But they have a working arrangement by which the debts due by a farmer to one society may be paid by a balance standing at his credit in another. This kind of settlement, however, does not seem to be much resorted to. The societies pay cash, or arrange monthly settlements, and the farmer, as a rule, pays cash too. The different

societies usually belong to federations. In the earlier days of the movement the needs of the farmer were supplied by the establishment of co-operative societies in his own district, each society purchasing from seedsmen and manufacturers on its own account. The advantage of federation soon became evident, and the societies became affiliated, the federations covering a large section of the country, and providing for all the societies. There are over twenty federations in Denmark. The principle on which they work, almost invariably, is that the members of the different societies bind themselves for a period of years to carry out all purchases or sales through their own society, and become jointly and severally liable as guarantors for its finances, exactly the same principle upon which the co-operative societies themselves are run.

A Network of Federated Societies

It is not necessary to mention all the federations, but a few may be given as examples. There is the United Co-operative Supply Association of Denmark, with its headquarters in Copenhagen. It has a membership of over 800 affiliated distributive societies, divided into twenty-one districts. A Committee is appointed, consisting of one man from each district, and the Committee elects an executive council, consisting of five members. Each society guarantees a minimum sum of 100 kroner for every twenty members on its register, and the members, jointly and severally, guarantee the payment of all purchases made by the members. This federation has stores in eight different towns in Denmark. Its capital is £22,000, and its reserve fund £27,500. It is the owner of the Experiment farm at Lyngby, which exists for the purpose of testing seeds and ascertaining the best varieties suitable and profitable to the climate of Denmark. There is the Danish Farmers Co-operative Purchase Federation, which supplies feeding stuffs, seed, manures, etc., to its members. It also disposes of its members' produce in the towns and villages of Denmark, and members are bound to purchase all their requirements from the society. There are over 5000 members, and the capital is £18,200. Depots have been established at Odense and Nykobing. There are three federations in Jutland: The Jutland Co-operative Feeding Stuff Society, a union of 250 local co-operative dairies, with a membership of 13,000, and a turnover in feeding stuffs of £272,000; The Jutland Co-operative Manure Federation, with a membership of 3370 and a turnover of £5500; The Jutland Federation of Labourers' Association, with nearly 150 branches and a membership of 6600. There is The Danish Co-operative Manure Supply Federation, consisting of a union of twenty-two agricultural societies, and with a turnover of £40,000; The Co-operative Feeding Stuffs Society for the Islands, consisting of the union of sixty creameries, with 3000 members, and a turnover of £110,000. In the Islands there are also 126 associations of agricultural labourers, with a membership of over 6000. All the labourers' societies of Denmark are united in one federation,

which embraces the whole of Denmark, and all with one object—to encourage industries suitable for the labourers' gardens and allotments. Besides these, there are many federations in the islands of Denmark. The reason for this is obvious. It would be inconvenient for a society in one island to be affiliated with a central institution in another island. The result is that the co-operative societies on an island are generally affiliated with a central institution also on the island, and this, to some extent, accounts for the perplexing number of societies and federations. There is, for example, The Fyen Co-operative Feeding Stuff Society, composed of forty-seven co-operative dairies, with a yearly turnover of £83,000; The Laaland Creamery Members Co-operative Federation, consisting of thirty-five creameries, with a turnover of more than £50,000 in feeding stuffs, seeds, manure, and coals; The Falster Co-operative Purchase Society, being a federation of local societies for the purchase of their agricultural requirements, and having a membership of 1250, with a turnover of £14,000; The Samso Co-operative Supply Federation, which includes the whole of the island, and deals in manure, seeds, feeding stuffs, and coals—its turn-over in 1902 was over £10,500; The Bornholm Co-operative Manure Society, a federation of the agricultural societies in the Island of Bornholm.

Agricultural Societies

All these Societies and Federations, however, do not exhaust the list of societies that are run on co-operative lines in Denmark. They are too many for enumeration. Suffice it to mention one other class, namely, the agricultural societies, because they are different from any of those yet referred to. There are more than 100 of them. They do not confine their energies to any one branch of agriculture, they take a general supervision—general enough when their work includes organisations of cattle, sheep, and swine shows, distribution of prizes to labourers in connexion with the management of their allotments, excursions of farmers to different places, both in and out of Denmark, establishment of field experiments, assisting Government experts in different parts of the country, improvement of live stock, and the like. All these societies and federations are encouraged by Government, and many of them are materially helped. But there is no doubt of this, the Dane has materially helped himself. Self-help is a foreword in his vocabulary, and he may himself take credit for much of his prosperity, and for the marvellous co-operative organisation which has made that prosperity possible.

FARMING, STOCK BREEDING, AND ROTATION OF CROPS

In undertaking a survey of the main features of the general farming of Denmark we have to keep in view that we are dealing with a country not only less than half the size of Scotland, but with one that has been, on the whole, poorly endowed by nature. The sandy detritus of the ice age, the scrapings of hard crystalline rocks, has given Denmark more poor than good land, and much of it we could know by no other name than a "hungry soil." Nor is the climate congenial. The situation is insular, but the islands and peninsula constituting the country are in proximity to the cold German Ocean on the one hand, and the icy Baltic on the other, while they are near enough Finland and Russia to come under the influence of the rigorous cold of a continental winter. As the country is low lying, and either flat or undulating, there being no sheltering hills—the highest point above sea level is 550 feet—the country must often be exposed to the fury of harsh, sweeping winter winds. The summer, although very good, is so short and dry that oats have scarcely time to grow and mature an abundant crop, and one of the problems engaging the attention of Experiment Stations in Denmark is to find a variety that can be sown one year and harvested the next; while farm live stock have to be comfortably housed and tended within doors for the greater part of the year.

In considering the transition during the last thirty to forty years of Danish agriculture to its present state, one is forcibly struck with the fact that while agriculturists in our own country have tried to meet the exigency of the times by laying land down into grass, and have sought retrenchment by the economy of reducing the labour on the land, the Danish farmer has found prosperity entirely in the opposite direction. The Danes have their land and little else, and, poor though it be, they have bravely undertaken the task of making it keep the Danish people. What legislation could do to foster agriculture, the one industry of the country, has been done. Government assistance, improved land laws and systems of land tenure, expert guidance and control in the management of farm affairs, along with education and co-operation, have gradually changed Denmark and its agriculture from a distressed condition to one of prosperity. Large estates have been very generally converted into small farms held by peasant proprietors who till their own land; the easy going methods of former days have given place to carefully directed intensive and skilful farm-

ing, especially in the management of live stock; beef-producing races of cattle have been almost entirely discarded to make room for cows, and cows only; and co-operation and skill in the management of both them and their products have brought success to the Danish farmer. Dairying is his mainstay; to this he has added pigs and poultry; thus devoting his whole energies to the production of the three requisites of the breakfast-table, butter, bacon and eggs.

At the outset it is important to observe the extent to which the partitioning of land has been carried :—

Estates.	Number.	Total Acreage.	Average Size.
¼ to 6 acres	92,656	155,766	1.6
6 to 24½ „	66,491	836,658	12.6
Over 24½ „	73,889	5,514,978	74·7
	233,036	6,507,402	

From these figures it will be seen that there is a total of six and a half million acres divided into nearly a quarter of a million estates, and 90 per cent. of the occupiers are proprietors. It must not, however, be inferred that there are no large farms in Denmark. In conducting our investigations a considerable number of farms, hundreds of acres in extent, were visited. Some of these were in the possession of noblemen and some were held on lease by ordinary tenant farmers, very much the same as farms are held in this country. Indeed, statistics show that in Denmark between forty and fifty farms over 294 acres in extent change hands by sale annually.

The Farm Steadings

The farm steadings are mostly situated in central positions, and the arrangement of the buildings is very similar everywhere. They are usually laid down in a square, but on the smaller farms the square is incomplete, being in the simplest form, reduced in many cases to two rows of buildings set at right angles to each other. In the square farmstead one side is given up to the dwelling-house, and although this generally faces the approach road, the door is no doubt for convenience at the back, looking towards the square, but the most modern houses on holdings of 100 acres or upwards have also an end entrance. The other buildings are set out in the following principle. The house occupies one side of the farmstead. Generally opposite the house is the hay and straw barn. On one side are the stables for the horses and the barn with the thrashing machine, and opposite these again the byres and pigsty. Outside the square near the byre and the piggeries are often placed the manure pits, one usually a hollowed-out stance for the dung, and the other a large well constructed for the liquid manure.

BLACK AND WHITE BULL: SKANDERBORG SHOW

BLACK AND WHITE BULL: SKANDERBORG SHOW

The Cow Byre

The cow byre is the only part of the steading specially worthy of our attention. The principle universally adopted in its construction is to have two passages, one before and the other behind the cattle, and a favourite arrangement where the byres are large is a double byre with the heads of the two rows of cattle towards a feeding passage which has its floor raised to the level of the upper edge of the feeding troughs.

The width of the building is about 33 feet, which is apportioned as follows: In the centre is the feeding passage, about 4 feet wide. On both sides of this passage are the troughs. These troughs are each about 9 feet long, and are partitioned so as to allow a portion for each beast. There are stancheons between each stall, and the standing place for the cow is 6 feet long and is arranged to slope so that all liquids quickly drain into the gutter at the back of the stalls. The gutter is about $1\frac{1}{2}$ feet wide, and the bottom of it is about 9 inches below the level of the stall. Beyond this gutter running up to the wall of the byre is a passage for the attendant to remove the dung and to pass behind the cow. This passage is about 5 feet wide and slopes towards the gutter. The liquid manure collected in these gutters is taken away by pipes to the liquid manure tank.

One sees here and there an ingenious labour-saving contrivance. It may be to facilitate orderly feeding by keeping back the whole row of cows till all are supplied with food, or for watering, which is frequently done by gravitation controlled by one trough and automatic arrangement for having the water stand at the same level in all the stalls, but nothing in the structure of the byre is of special interest excepting perhaps the great byres which were seen at some of the model farms.

On entering an ordinary Danish byre we first notice the low ceiling occasioned by the fodder loft above, for, at many of the farms, this is the arrangement; then the small cubic space per cow; and in a summer day the warm unwholesome atmosphere, should the cattle happen to be in their stalls, as is frequently the case, the soiling system being more or less practised every season on most farms in Denmark. The byres internally are no better kept than our own, and they in some cases fall short of our ideas of air space and sanitation.

The Cows

Next the cows come under review. They are not much to look at, but they do look like the purpose they are there for, which cannot be said of many that are kept nearer home. The Danish farmer believes in the gospel that, "cows are for giving milk," and his success in realising this forms an object lesson worthy of very careful consideration by all breeders and feeders of dairy stock. At the head of each cow attention is attracted by a small

black-board with a few cabalistic writings in chalk. It is here that the farmer from this country begins to realise how careful and painstaking the Danes are, and how far ahead of us they are in the breeding and management of their cows.

We here reproduce one of these blackboards :—

Nyborg.		2.
	21A	
	5AAR	
7420	4.02	334
9450	3.63	383
K28/11		L4/3D
49	27/4	36
	Klass II.	

The writings on it when properly interpreted give reliable information at a glance on the following points :—

1. The sire of the cow, and her number in the byre.
2. The cow's number in the Herd Book or the Kontrol Society's Books.
3. The cow's age.
4. The quantity and quality of milk by the sire's dam, the percentage of butter fat which it contained, and the quantity of butter, all in Danish pounds.
5. The cow's yield of milk for the last season, the percentage of butter fat which it contained, and the quantity of butter.
6. When the cow calved, and when she is expected to calve again.
7. The highest yield of milk the cow has given since she calved last—49 lbs. in this case—and the date when this maximum yield was obtained, and also the present yield (36 lbs.). The latter on some farms is ascertained and recorded daily, on others periodically.
8. The class into which the cow's present yield of milk entitles her to be placed. (The cows are fed according to the class in which they are placed in, or, in other words, according to their yield of milk.)

Thus the Danish farmer has continually in view, for the guidance of himself and his servants, information of great value in the economic management of his stock. He always keeps his object before him. Ask him about the breeding of his stock, and you

are promptly informed that the sire's dam had a record of about 900 or 1000 gallons of milk containing 4 per cent. of butter fat and something similar to that of the mother of the cow. The Danish farmer breeds for milk; his idea of pedigree is utility and profit. This he measures daily, and anything found wanting is speedily discarded. Bulls that prove getters of profitable progeny are not disposed of after two or three years' service. They are not only retained till they see the good old age of twelve or fifteen years, but a bull that has proved his excellence is carefully reserved for mating with the most profitable cows. This policy in breeding and selection, pursued with remarkable perseverance in Denmark, has been crowned with great success. Average yields of 800 gallons of milk are quite common, while a scrutiny of the carefully kept records seldom discloses a cow, the milk of which falls below our 3 per cent. standard of butter fat. Indeed, many have a record of over 4 per cent., and the Danish farmer counts on getting a pound of butter from $2\frac{1}{2}$ gallons of milk.

The Milk Records

That the milk-producing capacity of the Danish cattle has been enormously increased during recent years is a matter beyond doubt. Of this there was abundance of reliable evidence at many of the places visited. The carefully kept records over a number of years show how the average milk yield has increased at some of the best managed farms a hundred or more gallons in a few years. Kolle Kolle, one of the farms visited, may be cited as an illustration. Here the stock is under skilful management. Every care is exercised to select and breed profitable dairy cattle. The cows are carefully selected and mated with bulls of good reputation. At the time of our visit one of the bulls was 13 years of age, and another choice young bull, 4 years of age, out of a cow with a record of 9134 lbs. or nearly 900 gallons of milk, containing 4·29 per cent. of butter fat, was ready to take his place at the head of the herd. The Essex Farmers' Party visited this place in 1900, and recorded the average milk yield as 7150 lbs. (about 700 gallons); last year it reached 8847 lbs. or about 824 gallons.

The following tables are instructive:—

VEJEN AND OMEGNO MILK RECORD ASSOCIATION.

Average Yield of all Cows in each Herd from 1895 *to* 1903.

FARM	A.		C.		E.		I.		K.		N.		P.		R.		S.		Average of all Cows in the Association from the beginning.			
YEAR BEGAN	1897.		1897.		1897.		1895.		1895.		1897.		1897.		1895.		1895.					
	Lbs. Milk.	°/₀ Fat.	Lbs. Milk.	°/₀ Fat.	Lbs. Milk.	°/₀ Fat.	Lbs. Milk.	°/₀ Fat.	Lbs. Milk.	°/₀ Fat.	Lbs. Milk.	°/₀ Fat.	Lbs. Milk.	°/₀ Fat.	Lbs. Milk.	°/₀ Fat.	Lbs. Milk.	°/₀ Fat.	No. of Cows.	Lbs. Milk.	°/₀ Fat.	Lbs. Butter.
Average of first two years	5991	3·28	6175	3·27	6459	3·22	5681	3·00	4811	3·32	6141	3·25	5286	3·39	6161	3·41	4390	3·35	298	6162	3·30	226
Average of 1902	6232	3·29	6255	3·50	7573	3·41	7234	3·39	5856	3·36	6373	3·36	6573	3·41	7629	3·41	6480	3·39	494	6656	3·42	253
Average of 1903	6884	3·31	6906	3·52	6817	3·43	7976	3·37	6662	3·46	6877	3·41	7691	3·28	7404	3·32	6995	3·43	495	6716	3·42	255
Increase of 1903 over 1895	893	·03	731	·25	358	·21	2295	·37	1851	·14	736	·16	2405	– ·11	1243	– ·09	2605	·08	197	554	·12	29
°/₀ Increase over first year	13·	·9	10·	9·6	5·	6·5	44·	12·3	38·	4·2	12·	4·9	45·	– 3·3	20·	– 2·7	59·	2·4	66·	9·	3·6	12·8
Increased value of last year	44/6	...	36/6	...	18/4	...	114/6	...	92/6	...	36/9	...	120/	..	62/	...	130/	...	...	27/9	...	29/

The weights given in this table are in Danish pounds. For convenience in calculating 103 Danish pounds weight may be taken as = 112 Imperial lbs.

A gallon of milk weighs about 10¼ lbs., so that 10 lbs. Danish are about 1 gallon Imperial.

The increase is calculated at 6d. per gallon for the milk, and 1s. per lb. for the butter.

INCREASE IN YIELD OF MILK AND BUTTER IN VARIOUS STOCKS IN DENMARK SINCE PUBLIC MILK RECORDS BEGAN.

Supplied by Axel Appel Statskonsulent i husdyrbrug.

AARHUS.

STOCK A.

Year.	Number of Cows.	[1] lbs. of Milk.	[1] lbs. of Butter.
1900	71	6153	217
1901	69	6353	228
1902	70	6439	233
1903	73	6500	239
		Increase, 347 lbs.	22 lbs.

STOCK B.

1900	11	6095	216
1901	9	7000	264
1902	11	6418	259
1903	11	7444	292
		Increase, 1349 lbs.	76 lbs.

STOCK C.

1900	15	6375	229
1901	15	6509	243
1902	15	6632	255
1903	16	6901	269
		Increase, 526 lbs.	40 lbs.

AVERAGE OF ALL THE COWS IN VARIOUS ASSOCIATIONS FROM 1898-99 TO 1902-03.

		lbs. of Milk.	lbs. of Butter.
A.	Increase in 5 years =	614	29
B.	,,	968	40
C.	,,	667	33
D.	,,	1048	45
E.	,,	1189	50
F.	,,	1286	57
G.	,,	1366	50
H.	,,	1264	39
I.	,,	985	44
	Average increase =	932	43

Selection and Feeding

The main factor in establishing these wonderful milk records has been selection and breeding, but with this has been coupled judicious and skilful feeding. The necessity for producing milk

[1] The Danish lb. is about 1-20th greater than the Imperial lb.

capable of being made into superior dairy products, and the stringent rules in regard to feeding imposed by the co-operative creameries, have no doubt been factors in making the Danish farmer an eminently skilful feeder of cows. The system adopted is to feed according to the cow's capacity to produce milk; and in order to simplify this, the Danes have adopted the system of reckoning the food by standards.

One standard of fodder is:—

10 Danish pounds Beetroot[1]	=	11 lbs. imperial.
or		
$2\frac{1}{2}$ Danish pounds Hay	=	$2\frac{3}{4}$ lbs. imperial.
or		
1 Danish pound { $\frac{1}{2}$ Oilcake[2] / $\frac{1}{2}$ Bran and Oats }	=	$1\frac{1}{10}$ lbs. imperial.

Four standards of fodder, with a small allowance of straw, is considered sufficient for the maintenance of a cow's body in good condition, and one standard for each three Danish pounds (3·3 lbs.) of milk produced. Thus a cow that produces thirty Danish pounds (33 lbs., or nearly $3\frac{1}{4}$ gallons) of milk would be fed on fourteen standards of fodder, which might consist of:—

40 Danish pounds	(44 lbs.)	Beetroot	= 4 standards.
$7\frac{1}{2}$,,	($8\frac{1}{4}$,,)	Hay	= 3 ,,
7 ,,	($7\frac{3}{4}$,,)	{ Oilcakes / Bran and Oats }	= 7 ,,
			14 standards.

This system of feeding according to milk production is highly commendable, being eminently scientific, economical and profitable. Indeed, the bran mash, the mealy drink and the little extras that many of us have seen the new calved cow, or the cow in full milk, favoured with by our mothers and grandmothers, endorse it. But it cannot be said that it is practised in our country with the care it deserves, if, indeed, it receives much attention at all.

The advisability of regulating the food according to the milk production seems so obvious that it should require no advocacy. The only objection with a show of feasibility that might be raised against the system is the extra trouble in carrying it out. But this is often very much exaggerated. It must not be supposed that the Danish farmer laboriously weighs out all the food, or each animal's portion. All that is done, or, indeed, it is necessary to do, is to acquire an intelligent idea of the quantity of food that is being handled. *A sine qua non*, however, is an interest in the work, and this, with a knowledge of the capacity of the ordinary utensils used, a little care in measurement, and the controlling influence

[1] Or an equivalent quantity, according to composition, of other roots such as turnips, mangels, koll rabi, carrots.

[2] Oilcake does not here mean linseed cake as in Scotland, but applies generally to such foods as rape cake, cotton cake, sunflower cake, etc.

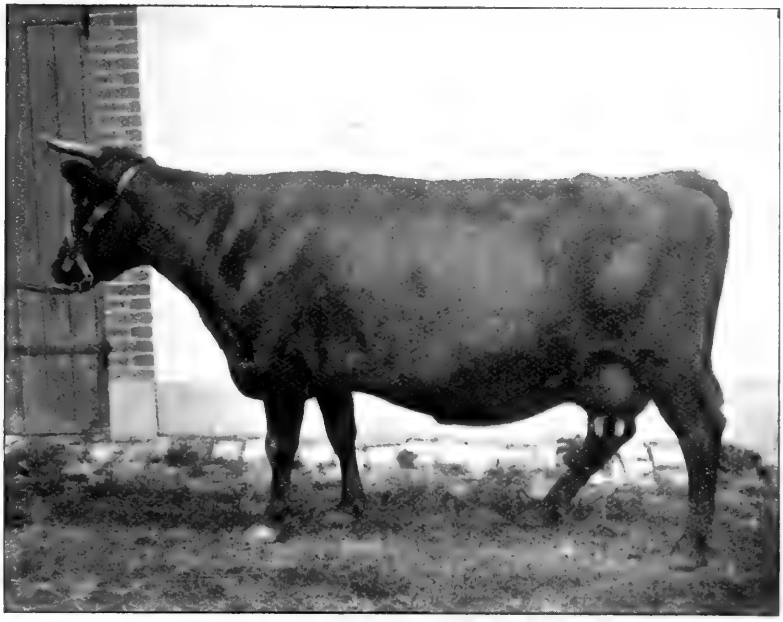
of an occasional weighing, makes it easy to deal out with a wonderful degree of accuracy the rations of farm stock. But unless the head of the establishment displays some interest in the matter, and spends time and thought in systematising and initiating the work, the attendant can hardly be expected to undertake it with good grace; nor can he be accused of being too apathetic to execute it skilfully. In Denmark, the blackboards at the cows' heads tell at once not only the quantity and the quality of the milk, but also the class the cow occupies, and consequently the quantity of food she is entitled to receive. Hence feeding according to milk production becomes a simple matter.

The average number of cows kept on the larger farms appears to be one cow to less than three acres, but on the smaller farms the stocking is very much heavier. On the smaller holdings the production of milk pays, and it is a means of providing much labour on a few acres; consequently the small holder strives to keep as many cows as possible by purchasing greater quantities of artificial feeding stuffs. Besides the cows and the heifers there are a few calves; but only a very well-bred bull calf is kept, and only those calves out of cows of a very good milking strain, the remainder being fattened when young and sent to the butcher. Cattle carefully bred are eagerly sought after, and command fancy prices.

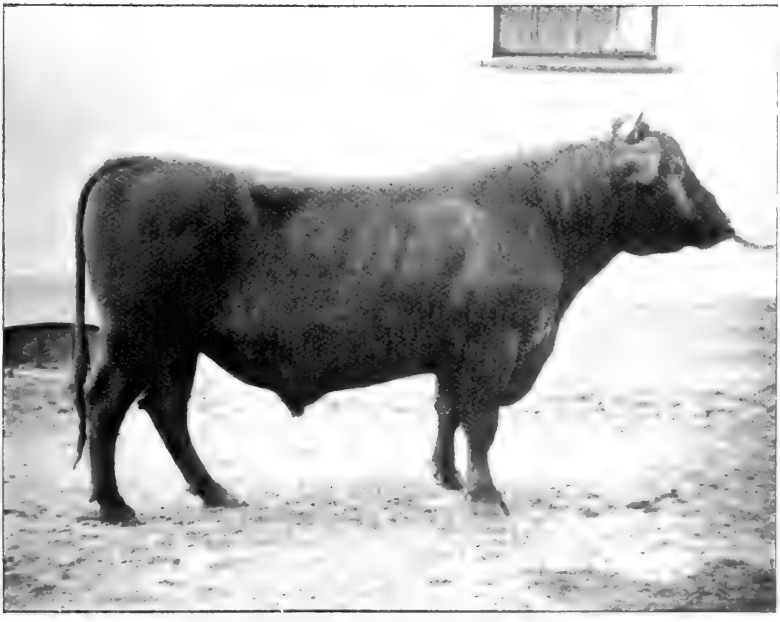
The attention given to the cows, and, indeed, to all animals, is very marked. The cows are very gently handled and kindly treated everywhere, and on many farms they are groomed several times weekly. This not only keeps them clean, but tends to improve their circulation, and this, it is said, gives an increase of the fat in the milk. Every care is taken to keep the cows comfortable. The byres on well-managed farms are kept at a temperature of about sixty degrees, so that there may be no undue waste of food in keeping up the temperature of the animal's body; and on some occasions the cows were seen grazing during the cold stormy days in the end of June protected by a cover or rug made of sacking. Indeed, the Danes grudge no effort that is likely to keep the milk machine working at its highest capacity.

The Danish Red Cow

To a reflecting farmer this rearing up of a dairy breed with fixed records and tangible results in the way of profits is one of the wonders of the agricultural world. Previous to 1870 a breed of rather scrubby red cattle, common also to Norway and Sweden and Northern Germany, existed in Zeeland and the Islands. These, by careful selection and breeding, have been changed to a breed of fixed type, with milking records almost equal to the Ayrshire both in quantity and quality. In similar manner the large-framed black and white cattle of Jutland have been bred into dairy cattle. These latter are of great interest to Scotch breeders, as exhibiting how beefing cattle can be improved as a dairy breed, while weight and substance are maintained. These black and white Jutland



DANISH RED COW: KOLLE KOLLE FARM



DANISH RED BULL: KOLLE KOLLE FARM

cattle were greatly fancied by members of the Commission, no doubt on account of their resemblance to our beefing breeds, but the Danish red cattle are quite as good milkers. Both breeds have their good points, and naturally each district stands up for its own. In both cases there is thorough uniformity of type. The Danish red cattle are all red, the shade of red being unimportant, with dark muzzles and heads. The absence of black points is considered objectionable as showing the presence of an out cross. The head is somewhat heavy, with short curved horns. The back is inclined to slackness, but the body is deep and well chested. From a dairyman's point of view the cattle are thoroughly suitable, having the fine skin, well developed milk veins, large opening for the veins, udders of ample capacity, and slackness of bag under the tail, all of which bespeak the milker. Various attempts to improve the breed up to 1870 had been tried with small success. These experiments, however, showed that the allied race of cattle in Schleswig would probably suit, and from then onwards large numbers of Schleswig bulls were imported. These races of cattle are practically one, only different in type, and the cross has produced this wonderfully hardy, good-milking breed. A certain amount of close breeding is being practised, but not to any great extent. A bull is selected whose ancestry shows big milking records with a large percentage of butter fat. If you ask a man, "Is this bull well bred," he will answer, "Oh yes, very. His mother had a milking average of 9000 lbs. with 4 per cent. of butter fat." If two bulls were offered with ancestry of about equal milking records, the best individual would of course be selected. The heifers are usually all kept and served at thirteen to fifteen months of age. The bull calves are nearly all sold for veal at varying ages up to six weeks, the price being from 5s. 6d. to 21s. 6d. Of the bull calves in select herds, a few are retained for breeding purposes, and all the others are slaughtered for veal. Young bulls from well-known stock in good herds have been sold within recent years as high as £60. Cows that will not breed are fattened off; but little attention is paid to this, the great object being milk.

The Black and White Jutlander

The black and white cattle of Jutland have been bred up in a similar way. The breed has been improved within itself, so to speak, with an occasional introduction in some cases of Dutch blood. These cattle look larger than the Danish red. They are somewhat prominent in the shoulder bones, bare on the fore rib, inclined to slackness of the back, and rather deficient in fore part of udder. In the northern part of Jutland the shorthorn found a foothold in the days when beef was wanted. It is doubtful if that breed is now holding its own in face of the great demand for dairying cattle. Few, if any, have been imported in recent years. Dutch and other breeds, such as Jerseys, are also met with, but for all practical purposes the red Danish, and the black and white of Jutland, may be looked upon as the cattle of Denmark. They suit

the climate and the purpose. All these breeds, however, receive the support and encouragement of Government.

A Country Show

At Skanderborg show visited by the Commission, where 240 head of stock were on exhibition, there were 84 bulls. Of these about one-third received premiums ranging from £4 to £5. These premiums are given to all bulls of a certain standard, and carry no restrictions as to fees or service. In the younger classes, bulls are judged by their individual appearance only. In the older class above three years, while judged 1st, 2nd, 3rd, etc., for individual appearance, the premiums are granted to bulls according to their progeny, those of five years and over must have three years' stock, ten from the first season, twelve from the second, and fourteen from the third. These are judged before the show, and premiums awarded accordingly. In this class we saw some very old bulls shown and getting premiums on account of the quality of their stock. The first prize bull in this class was an excellent animal. These old bulls are shown in what is known as the State class. The premiums are given by Government, and the bulls come from all over the country or province. In the younger class only local exhibitors compete. Half the prize money is given by Government, and half by local contribution. The cows were shown in groups of two and five in a lot, and premiums given according to size of farm to the best lots, for the encouragement of breeding. The cows were quite true to type, but none of those shown on this particular occasion were recorded in the Herd Book. Nor is any bull allowed into "the Herd Book until he produces stock. The cattle were all shown in natural condition.

The Stimulus of Co-operation

The development of cattle for milk production began with the introduction of creameries, some thirty years ago. The lead in the movement was taken by the larger farmers, but the impetus to breeding in all departments given by co-operation is one of the features of Danish life which impressed us greatly. It operates powerfully in improving the class of stock bred, especially by the small holders. A body of these small farmers desire to have a good bull. They approach the Government stock expert in their district, and on his advice a bull is selected. Each member of the union contributes so much per cow. The bull is placed at a convenient centre, and the farmer there paid for his keep. The service for a cow to any outsider, if allowed, is about 2s. to 2s. 3d. The effect of this system has been to greatly improve the cattle on small holdings, where an average of 7000 lbs. (or 700 gallons of milk) per annum per cow is no uncommon thing. From 74,600 cows in Fyen last year the average yield was 5500 Danish pounds of milk, each 26·2 lbs. of which gave 1 lb. of butter.

Disease

Under the careful Government inspection that exists any outbreak of disease is soon discovered, and every effort is made to eliminate the trouble. The country, however, is not entirely free from foot-and-mouth disease, and tuberculosis is also in existence. Dairy stock being rather susceptible to tubercular disease, great efforts are made in Denmark to prevent it affecting the human subject. At the dairy companies and creameries milk is pasteurised, and vast sums are spent in efforts to destroy disease germs in milk. Professor Bang, one of the greatest living authorities on this subject, gave a short address to the Commission, in his class-room at Copenhagen, on his experiments amongst cattle and the results. The keynote of his system is isolation. His method, briefly stated, is as follows: Given a herd of cows, they are first of all subjected to the tuberculin test. This is done in Denmark, free of expense, by a Government expert, subject to the conditions laid down by Government for complete isolation and disinfection. Cows failing are separated generally in a building by themselves. These are ever afterwards kept apart, and not tested again. Buildings where affected cows have been are then thoroughly cleaned and disinfected before sound cattle are admitted. The sound cows continue to be tested every six months, and any cow reacting is at once transferred to the isolated lot. On a number of farms where this plan has been carefully followed the results are gratifying, the disease having been completely eliminated in a few years. These herds continue to be tested every six months, but seldom have a reaction. Professor Bang does not think that the reacting cows should be slaughtered, but kept separate. He would have no fear of the calves from these cows, but the calves must be separated at birth. Even though the cows react, Professor Bang would continue to use the milk without hesitation, so long as the udder is not affected. The young calves in Denmark are fed by hand. They may get their mother's milk even though affected with the trouble, so long as the milk is pasteurised; but preferably sound cows' milk should be used. The risk by contagion from animals going in the field is small compared with those tied up together in byres. The risk from affected beef the Professor thinks small. If the affected part is cut out he would allow the use of the carcase for human food. A reacting bull with tuberculosis should be kept by himself, but may continue to be used with every safety. Isolation as soon as possible, and as far as possible, is the wise and common-sense teaching on this subject by Professor Bang. Several of the herds visited had, under his direction, been cleared of the disease. In more than 90 per cent. of the cases treated the test has proved reliable. The adoption of this system in Denmark is by no means universal, but, where carefully applied, seems to have produced satisfactory results.

HORSES: A SECTION OF THE AGRICULTURAL SHOW AT SKANDERBORG

The Horse

Horses were found in far greater number on every farm than would be considered necessary in this country, and at first we had some difficulty in understanding what they do with them all. But we could see that they were neither fed nor worked so well as ours, and that they were all of the light-legged type, and worked mostly two abreast in all harness, and on the road were driven at a trot. The Danes load their horses lightly, and at several places we found that they fed them during summer chiefly on a ration of chopped straw and grass which were mixed together in a heap long enough for the green succulent grass to render soft and palatable the less attractive straw. But although this seemed to be somewhat thrifty feeding, the horses were in splendid condition; in fact in many cases they were fat. We ultimately found that a considerable number of horses are bred and exported to Germany, and also that the Danes, like Englishmen, appreciate horse flesh, but from a very different point of view. It may be mentioned here that horses in Denmark sometimes suffer from tuberculosis. This Professor Bang attributes to the use of separated milk to fatten them for human consumption.

The Danish horses are generally docile animals, easy to feed and handle, with plenty of rib and constitution about them, set on rather straight legs of round bone with small deep feet. The big feet of the Clydesdale do not find favour in Denmark. Pedigrees are carefully kept and recorded in a Government stud book. Horse Improvement Societies are subsidised by Government at certain shows, and premiums for stallions are also given. Stallions holding a Government premium are expected to serve at least ten mares in their districts, the terms being somewhat similar to those common in this country. A carefully organised effort is made by Government for the improvement of the horse on similar lines to that adopted for cattle. That this is having an effect may be judged by the increased exportation, which amounted to over 23,000 head in 1903. The general appearance of the draught horses in Denmark is not unlike a small Suffolk Punch, having a good round barrel and legs bare of hair. A horse weighing 1700 lbs. is considered a big size, but the average weight would be from 1000 to 1200 lbs. Scotchmen might easily at first sight under-estimate the qualities of the Danish horse. The breed experts are manifestly working for what best suits their food, climate, and sandy soil. There are altogether about half a million horses in Denmark.

Sheep

Sheep are seldom seen in the cattle districts of Denmark, although there are over one million in the country. Judging by the specimen of a cross-bred sheep shown at Skanderborg, attention is being given to this department also. In passing it may be noted that the show sheep were clipped, with a small tuft of wool left on the shoulder to show the quality of the wool.

The Pig

Pigs form an important part of the live stock of Denmark. Pig-keeping has arisen almost as a necessary adjunct to dairying, and if dairying is the mainstay of the Danish farmer, pig-keeping forms a worthy prop. Pig-keeping has been found remunerative, and every one keeps pigs, and usually as many of them as possible, with the result that in ten years the pig population has increased by a half, and there is now considerably over a million pigs in Denmark—fully half a pig per head of population. Indeed, as the following figures from the Irish Report of 1903 will show, Denmark possesses a very large number of pigs per inhabitants :—

	Pigs per 1000 Inhabitants.
Denmark	503
Prussia	295
France	195
Sweden	160
Great Britain and Ireland	93

Great attention is paid to pig-breeding. There is evidence of this in the gradual increase in the value of the cured bacon during this last ten years. The statistics relating to the export of bacon show that it has risen from 41s. 4d. per cwt. in 1891 to over 50s. in 1900, or in other words it has increased about 20 per cent. in value. But although pigs are carefully bred, few farmers keep their own boar. The Danish farmer very much prefers becoming a member of a pig-breeding society, and for a moderate premium obtains the service of a first-class boar. Moreover he prefers expert advice as to which boar the sow should be taken to, with the result that his pig-breeding, like his breeding of cattle for milk, has, in the opinion of outside observers, reached a stage of almost fine art. Indeed, the reliance the Danish farmer places on the guidance of experts in many things pertaining to his calling is remarkable, and the way in which he co-operates with them and the Government, readily volunteering full information about everything affecting pigs, and especially in preventing and eradicating disease, forms a splendid object lesson to us in this country. Swine fever is now unknown, and the pig industry has hardly suffered from the disease since early in the eighties, when it was most effectually stamped out, and the system of farm inspection begun, which prevents the spread of contagious disease either in swine or other farm animals. The live-stock expert, the Control Society inspector, and others holding similar positions, call at the farms regularly, and are received as valued and respected friends.

The Breed of Pig

Pigs are mostly a cross of the old native breed. A standard size is aimed at. The weight, 120 to 190 lbs. dead-weight, is determined by the market, which is Great Britain. An excellent pig for the purpose is got by the cross between the large Yorkshire

boar, and the old native Danish bred sow. It is now thought that an even better cross will be obtained from boars bred in Denmark from imported parents. This cross seems to work well, giving a good mixture of fat and lean meat. The pig produced is very like the ordinary Yorkshire white. Under Government supervision fresh blood is occasionally introduced from England. In 1903 seventy-three pigs were imported for breeding purposes. They are chiefly fattened by the farmers themselves, and not at the creameries as in some countries. The separated milk is pasteurised and resold at 1d. per gallon to the farmer for feeding purposes. Where cheese is made, whey is also used for feeding. The Commission saw several large well-appointed piggeries, but were equally impressed by the excellent pig accommodation provided by the small holder. The pigs were mostly kept inside.

Cultivation of the Land

Much of the land in Denmark is, as we have said, poor; and, although the Danes bestow a considerable amount of care on its cultivation, the Scottish party were not impressed with the idea that much was to be learned from them in this department. At one time Denmark was regarded as one of the chief grain-growing countries in Europe. At that time the fundamental principle of the farm practice was bare fallow as a preparation for autumn sown cereals, with the result, there is much reason to believe, that the land some forty years ago was left in a somewhat exhausted state, and in this way contributed to the crisis in the history of Denmark, which marks the great turning-point in the fortunes of the agricultural community and the foundation of the general prosperity of the country. It is not necessary here to enumerate the patriotic and able men like Professor Segelcke, who laboured till they were almost wearied in guiding their countrymen through this trying time. They ultimately succeeded in inducing the farmers to give up grain-growing, which had reduced both them and their land to a state of poverty, and not only to adopt dairying but to organise and conduct it with such systematic precision and success as to make their practice the admiration of all who have seen it.

Change of Practice

With the adoption of dairying the whole practice of farming has become modified for this purpose. Green crops have to a large extent taken the place of the bare fallow, for which the light land of Denmark is ill suited. Now a great variety of root crops are successfully cultivated, such as sugar-beet, turnips, swedes, mangolds, kohl rabi, to provide winter keep for cows; the farmers fully recognising that a supply of milk all the year round is more profitable than having abundance during summer. Indeed, the aim is to have a larger supply in winter than during the summer months, and the crops are arranged with this object. The

statistics relating to crops show that the area devoted to roots has greatly increased since 1860, while that devoted to grass and grain has declined. Another feature with the same object is the area devoted to fodder plants, mixtures of barley and oats, peas, lucerne, rye, etc., which are mostly cut green and used for stall feeding the cows. As much as a seventh of the farm may be devoted to these crops.

Rotation of Crops

The seven course rotation of crops is the one almost universally adopted.

First year—Rye. The seed is sown about the middle of

A WINTER BYRE AT DALUM

September at the rate of about three bushels per acre. Usually part of the land planted with the rye has been subjected to fallow, but the tendency is to have as much as possible of it occupied during the summer months with crops which are removed as soon as the flush of the grass is off for stall feeding. Indeed these crops form a greater part of the cow's food during July, August, and September. This land is dunged during summer at the rate of from 12 to 15 tons per acre, with the exception that the part that has borne peas or any other leguminous crop that season or the previous one is considered sufficiently enriched by this crop and receives none. Magnificent crops of autumn sown rye are grown.

Second year—Roots. During winter or in autumn after the rye has been got in, from 12 to 15 tons of dung per acre are applied, and the land ploughed as a preparation for this crop. The seed is,

according to circumstances, either sown in rides 24 inches between the crests or on the flat in rows 19 inches apart. The plants are thinned so as to leave 8 inches between them, and the crop weeded and cleaned once or twice as may be required. A considerable part of the area is devoted to beetroot and comparatively little to turnips. This is necessary on account of the desire to produce food that will not taint milk, and the stringent regulations with regard to feeding which the Danish farmers have adopted through their creameries. The proportion devoted to each crop, for example at Kolle Kolle, a farm of 290 acres, is about:—

25 acres beetroot.
1 „ carrots.
7 „ mangold and turnips.
5 „ potatoes.

In addition to dung the turnips usually receive some artificial manure, consisting of nitrate of soda and superphosphate, 80 lbs. of the former and 150 of the latter per acre. This seemed to us to be relatively a small quantity of super-phosphate, but as far as could be ascertained splendid crops are grown; on some of the farms another crop of cereals is taken before the roots, thus making the rotation one of eight courses, and when this is the case another light dressing of dung is applied to this crop. But as has been already pointed out the tendency is now to grow less cereals and more forage and root crops.

Third year—Barley (sometimes oats) planted at the end of April with four bushels per acre, and sown out with a mixture of grass and clover seeds which, to some extent, varies at different farms, but the following may be taken as typical:—

6 lbs. Common red clover.
4 „ Late clover.
2 „ Alsike.
2 „ Timothy.
2 „ Brome grass (Bromus arvensis).
5 „ Dogsgrass (Cocksfoot).
5 „ Drap oat (Tall oatgrass = Avena elatior).

26

Fourth year—Clover and grass.

Fifth year—Clover and grass.

Liquid manure from the urine tank is applied to the grass in both October and April, and a considerable part of the grass in both years is mown for hay and the remainder grazed. The cows on the grass are usually tethered as there are very few fences, and moved forward in line daily to consume the crop, which is very often in flower before it is eaten. But notwithstanding this the grass is very completely and evenly taken off the field by this method of grazing, and it is claimed that by its adoption more cows can be kept per acre than when the grass is kept short by grazing. As to how far this theory has been demonstrated by

TETHERED DANISH RED CATTLE WITH HERD RIDING ON THE BULL

experiment no information was obtained. Careful examination of it in the light of science supports the view that a greater growth can be obtained in this way, but whether the increase of crop will be sufficient compensation for the extra labour in watering and tending the stock must depend on circumstances. The system of allowing the grass to become full grown before eating it down certainly militates against the formation of fine pasture comparable to what we find in a well grazed field in this country. Indeed good close bottom pasture fields are conspicuous by their absence in Denmark.

Sixth year—Oats. The land is well ploughed in autumn as a preparation for this crop, and the seed sown about the end of April. It may be remarked here that spring sown cereals did not appear to be a great success. This, no doubt, is due to the dryness and shortness of the season. But the scientists of Denmark are evidently trying to meet the difficulty, for we saw at one of the Experiment Stations experiments in progress for the purpose of discovering varieties of oats and barley hardy enough to stand the winter, and thus permit of autumn sowing as is done in the case of wheat and rye.

Seventh year—Fallow. But only those parts that are infested with weeds, and are requiring special treatment, are left uncropped. The greater part of the break is used for growing such crops as peas, six-rowed barley, mixtures of peas and cereals which are used partly as green fodder and partly as hay.

It may be mentioned that the Danish farmer does not grow potatoes for the market. He uses very little artificial manure, in many cases none at all. His dairy practice is so profitable that his great aim is to keep as many cows as possible. This entails, in addition to consuming much of his grain on the farm, extensive purchase of feeding stuffs, with the result that the manure heap is greatly augmented both in quantity and quality. This dung, both liquid and solid, is usually very carefully looked after, and is often more than sufficient, with little or no assistance from artificial manure, to maintain the fertility of the land.

Farming suited to the Soil

It would be difficult to conceive a system of farming more suited to the soil in Denmark than that in practice at the present time. The policy of keeping as many cows as it is possible to keep, and the production of a large quantity of farmyard manure, which is carefully husbanded and applied in small dressings frequently during the rotation, is on many of the farms in Denmark effecting a gradual improvement which could not be accomplished by the use of artificial manure. Especially is this true of the small farms of the peasant proprietors, for it is on them that, owing to the desire to find profitable labour on the holding for the peasant and his family, the greatest effort is made to stock heavily and to practise intensive farming. The soil being chiefly sandy in nature and liable to suffer from drought, dung is the best and

most effectual manure for maintaining the fertility, as it not only supplies the necessary manurial material, but provides substance and ability to retain moisture so essential in a country with a warm dry summer.

Manure

The Danish farmer fully realises that the manure is a very important asset, and a considerable amount of capital is often expended in order to conserve and keep it. The liquid manure is conveyed from the channel behind the cows, where it collects, through traps, to a pipe which flows into a liquid manure tank. These tanks are made with the object of storing the liquid manure of a whole winter season, so that it may be applied to the grass land in spring. Similarly the summer accumulation is kept and applied in autumn. This is accomplished by using very large underground tanks, which are built of brick and cement, and which are usually circular in shape. If the farm is situated on sloping ground the tank is placed at the highest possible point which will admit of it taking the urine from the byre. A pipe is then run underground from the bottom of the tank till it comes out on the surface of the lower ground, and the earth is cut away at that point so as to admit of a cart being placed underneath the tap. Where, however, no fall in the ground can be utilised to save labour in this way, a pump has to be erected over the tank and the manure pumped into the cart. The liquid manure is applied in no haphazard fashion, but is used to cover a definite part of the farm every year just in the same way as a farmer in this country applies his farmyard manure regularly to certain of his crops. The dung is collected carefully in another pit which has sides and bottom so sloped that any liquid collects in a sump, and can be pumped out and used as required. These manure pits are often covered with a roof to prevent the manure being wasted and diluted by rain. The usual method of applying the dung is to spread it over the land during the early months of the year and carefully plough it in. It may be added that there is always available locally considerable quantities of creamery and bacon factory sewage which are readily purchased by the farmers for manure, the ready removal of the sewage in this way being a great advantage to these institutions.

Implements of Husbandry

With implements of husbandry the Danish farmer is well supplied. At agricultural shows and elsewhere a great variety of both home and imported machines of all sorts were seen. The most striking feature of this display is the way the small holder is catered for, the demand having evidently fostered ingenuity and enterprise to produce a great variety of implements on a scale never seen in this country. The most noteworthy of these are the one-horse implements, especially the ploughs. The Danish

peasant proprietor, although a great co-operator in most of his concerns, does not appear to apply co-operation to the working of his land. He prefers, whenever it is possible, to plough his land with his one-horse rather than unite with his neighbour to run a two-horse yoke. This is an interesting circumstance, as combination for ploughing and other two-horse operations is one of the recommendations of the advocates of small holdings in this country, and also, there is some reason to believe, one of the difficulties in practice. The Danish farmer has met this by relying on his own independence. But it must be pointed out that he is greatly facilitated in this matter by the lightness of his soil and the ease with which it can be ploughed. In this country, while it would be possible with appropriate implements to contrive to do with one horse many of the operations in the cultivation of the land usually done with two, it would not be possible to till satisfactorily our soil, which is more difficult to work, with a one-horse plough.

ON EXHIBITION AT SKANDERBORG

DAIRYING

In round numbers there are 200,000 farmers in Denmark engaged in milk production, 2000 of whom have each 100 cows and over, a considerable number have from 12 to 100 cows each, while the small holders have 4 to 12 cows each. The total number of cows in stock was put in 1893 at 1,011,980, in 1898 at 1,067,265 head, and at 1,089,073 in 1903.

As an indication of the enormous growth of the butter industry, a glance at available statistics shows that the total output of butter from co-operative dairies from 1876 to 1880 was only £1,116,000; from 1881 to 1885 it was £1,255,000; from 1886 to 1890 it reached £2,411,000; and from 1891 to 1895, £3,900,000; whilst in 1896 we find the export up to £4,600,000; in 1897, £5,005,000; in 1898, £5,400,000; in 1899, £6,050,000; in 1900, £6,084,000; and from the still greater increases shown in more recent Board of Trade returns, the total export of butter produced in Denmark for the past year may be put at fully £8,400,000 sterling. About 98 per cent. of this total export is shipped to Great Britain, and is for the most part consigned to the ports of Grimsby, Hull, Parkeston, Newcastle, and Leith. This enormous and ever increasing export of dairy produce is most remarkable, when we consider that the total area of the country, exclusive of lakes and rivers, is only 9,373,270 acres, and that every available acre is under cultivation, and being made the most of. What is the secret of this conspicuous success? As must appear on every page of this Report it is education and co-operation, along with peasant proprietorship, without which co-operation could not be the success it is. One of the educational authorities in Denmark in discussing the progress of his country said, that "the mainspring of their success was the policy of 'moving together,' all for each and each for all. Our advance is a movement of the people, the leaders being found in all ranks, from the largest proprietor to the smallest crofter." All ranks and classes feel keenly interested in the success and commercial supremacy of their products. Further the Danes have shown a ready adaptability to circumstances; they do not cling to ancient customs and methods, merely because they are ancient; but with commendable zeal and unremitting industry, they resolutely address themselves to changing conditions, and with alacrity adopt any innovations which their teachers of science or Government experts may advise as calculated to ensure efficiency.

The Co-operative Creamery

For the better understanding of the system of associated dairying, it may be well to give here a brief account of the conditions

observed in the starting of a creamery. The first necessary preliminary is to ascertain the quantity of available raw material in the shape of milk in the particular district, and the extent to which farmers will be prepared to pledge themselves to secure the requisite capital to enable the business to be carried on successfully. It is further necessary that the farmers forming the membership pledge themselves to dispose of their whole milk through their own Society. Briefly the obligation on members is threefold; for (*a*) Supply of milk; (*b*) the original loan; (*c*) conformity to certain prescribed rules regarding feeding of cows, and treatment of milk and milk utensils. The members appoint a Directorate from their own number, usually five to nine, who in turn appoint a chairman, secretary and treasurer, but these offices must never be combined in the same person. The Directorate is authorised to contract a loan for the erection of the dairy and the purchase of the necessary plant. For the repayment of this, every member is held liable in proportion to the number of his cows, for which he has signed an agreement, until the loan has been repaid. The period for which members usually pledge themselves is ten years, but in some cases seven years is the period agreed on. Failure on the part of the members to fulfil their obligations in this respect is of exceedingly rare occurrence. At the expiry of the prescribed period it is found that the original loan is invariably wiped out, and a substantial sum lying at the credit of the Association. Any member wishing to retire from the membership of the Society during the first year of its existence pays 20 kroner per cow and 2 kroner less per cow for each year which has expired since the creamery was started. When a farm changes hands, or has been sold, the successor or purchaser invariably takes over his predecessor's obligations and privileges in connexion with the creamery. After the original debt on a creamery has been paid off, new members joining are required to pay 10 kroner per cow for each cow for which they sign an agreement, in addition to a subscription corresponding to the amount per cow of the debt paid off. All milk is weighed at its arrival at the creamery, and paid for according to the butter fat it contains. Tests are regularly made to ascertain the fat contents, and payment is made according to the Copenhagen butter quotation.

Different creameries have different regulations. Some pay at the rate of 1 lb. of butter for every 32 lbs. of milk delivered, others for every 27 lbs. of milk, the idea being to leave a working margin between what is the actual value of the milk and the sum paid to the producers at the end of each month. The profits, after providing for payment of instalment of loan, depreciation on plant and buildings, etc., is divided proportionately at the end of each financial year. The annual general meeting is usually held on the same day as the profit-sharing day, and is usually observed as a sort of festival. Ninety per cent. of the separated milk is taken by the farmers for calf and pig feeding, at an agreed on price, usually $\frac{1}{2}$ to $\frac{3}{4}$ of an ore per lb.[1] It is enacted by law that this milk must be

[1] In Danish money 100 öre = to the krone. The krone is of the value of 1s. $1\frac{1}{3}$d., or about 18 kroner to the pound sterling.

pasteurised by being heated up to 180° F. before leaving the creamery. Creameries provide the necessary milk cans for conveying the milk to the creameries. Milk vans are also provided, and the conveyance of the milk is let to contractors. These milk vans pass along the principal roads, and collect the milk from the farmers, who are bound to bring it to the main roads. In some cases the farmers combine and cart their own milk, and in such cases they are allowed the sum that the creamery would in ordinary circumstances deduct for cartage. In summer the milk is delivered twice daily, and in winter once a day. Refrigerators are provided by the creameries for the purpose of cooling the milk at the farms, but in no case must different milkings be mixed, as this seriously interferes with successful butter-making.

Stringent rules are laid down by the creamery directors as to the feeding of the cows, and all foods calculated to impart an objectionable flavour to the milk are strictly forbidden. The milk of newly-calved cows must not be sent to the creamery until three days after calving, and in some cases five days; and the milk of cows suffering from any disease must not be delivered at the creamery unless accompanied by the certificate of a veterinary surgeon. Severe penalties are imposed for non-observance of these and other rules. Cards are circulated amongst the members containing the printed instructions to be observed both as regards the feeding and general treatment of the cows, and also the milking of them. These cards are invariably found suspended in the byres. To the credit of the Danes it must be said that seldom or never have these penalties to be imposed, the loyalty and fidelity with which they carry out the rules of their own organisation being a strong feature in their system of co-operation. Their welfare and prosperity as a nation and community depend on the successful development of their respective industries, and any member attempting fraud or found guilty of carelessness, to the prejudice of his fellow-members, would more than likely have a rather unpleasant experience. In this way it is claimed that co-operation is doing much towards developing Danish character.

Apart from the great creamery at Trifolium, the capital required to start an average Danish creamery is from £1200 to £1500, including buildings, manager's house, plant, etc.; and the average turnover will be, roughly, the milk of say 800 cows. In many of the co-operative dairies the management is farmed out to the manager: thus a gross sum is paid to him, calculated on the turnover, out of which he pays the wages of the other employees, the balance, together with house, coal and light, going to make up his own remuneration. There are, however, obvious objections to this plan, and amongst thoughtful men the system is not considered quite satisfactory. From figures obtained it may be gathered that about 25·5 lbs. of milk produce a pound of butter, and the price paid to the farmers for their milk would be 4·17 öre per lb., or almost 6d. per gallon all the year round exclusive of profits. The charge for cartage of milk to the creameries varies considerably, according to the situation. In some cases it was found to be ranging from 5 öre

to 10 öre per 100 lbs., and in one case it was 25 öre per 100 lbs. These charges, of course, include the taking back of the separated milk. At one typical creamery it was found that the price realised for butter worked out at an average of 1s. 0¾d. per lb., and the working expenses at 7·75 per cent. on the total turnover.

Periodical Conferences and Exhibitions

As already mentioned, the State takes a very practical interest in all co-operative organisations. The country is divided up into districts, and in each of these districts conferences of members are held at regular intervals. These conferences are invariably attended by some State official, and all questions of public policy affecting agriculture are framed in accordance with the opinions gathered at the deliberations. Government experts are in constant touch with the different societies, and are always available to give technical advice regarding any particular industry. In the butter industry exhibitions take place fortnightly at the Government laboratories in Copenhagen. Creamery managers, on receipt of a telegram, forward samples to be adjudicated by experts. Usually 107 creameries are invited to send samples for each competition, and thus three times in each year the products of the different creameries are placed side by side for comparison. The samples are numbered and catalogued, and great care is taken that the judges, usually nine in number, should have no means of identifying the creameries from which the samples have been drawn. The judges in their notes point out where one butter excels another, and where in some cases there may be a distinct defect. The laboratory officials communicate the result to the creamery managers, and give advice where such may be called for, and suggest experiments which enable the managers to determine for themselves how weak points may be remedied, and obstacles overcome.

Quickness of Communication

Electricity plays an important part in Denmark, a telephone installation in Jutland costing only £2, 15s. per annum, and in the islands £3, 5s. Nearly every creamery has its telephone system, and indeed it may be said that every large farmer and tradesman of any consequence has a telephone service, and the telegraph service is thus little used. Creamery managers are thus kept in constant touch, not only with each other, but with the official experts in Copenhagen. In this way the latest advices as to market fluctuations and other matters affecting them is at once known. There is no such thing in Denmark as that of one creamery underselling another, but rather there is a general understanding to assist each other in raising the standard of quality and of price. In consequence of receiving regular monthly payments for their agricultural products, the Danish farmers seldom owe any debts to merchants, for they in turn settle their accounts monthly, thus securing to themselves a position of independence, which has

added materially to their efficiency as agriculturists, and their social status as citizens.

The Creamery of Trifolium

As an example of the working of a Danish co-operative creamery, the great creamery of Trifolium, situated near Haslev in the south of the province of Zeeland, may serve, all the creameries being conducted on very similar lines. Trifolium differs from most others in Denmark inasmuch as its membership is entirely made up of considerable estate owners having very large herds of cows. The milk of something between 7000 and 8000 cows is daily

EXTERIOR: TRIFOLIUM DAIRY, NEAR HASLEV

handled and manufactured. The operations are two-fold, butter-making and cheese-making. This necessitates very extensive and expensively equipped premises, costing, we were informed, something like £40,000 sterling. About three-fourths of the total milk brought to the creamery is separated and the cream manufactured into butter, the remaining fourth being used to mix with separated milk for the manufacture of cheese. There are forty different kinds of cheese made, some of skim milk, others with varying quantities of whole milk added of from 20 per cent. to 90 per cent. The skim milk cheeses sell at 3d. to 4d. per Danish pound, and the other grades at from 6d. to 9d. per pound.[1] Cream cheeses are also now being made, and are named "Alexandras," in compliment to our Queen, who visited the creamery a short time ago. A large proportion of the cheese made at Trifolium is exported to Germany

[1] The Danish pound = 1·1023 lbs. avoirdupois : 100 Danish pounds = 110·23 lbs. avoirdupois.

where it meets a ready sale, and the different qualities are manufactured according to the demand. The milk here as at most Danish creameries is carted by the factory, and special waggons have been built for the purpose, capable of carrying 4000 lbs. of milk. The milk is received at the creamery between the hours of 7 and 10 A.M., and is drawn from a radius of twelve miles. Six separators are daily at work, capable of treating between 2000 to 3000 gallons of milk per hour. Each separator is provided with a heater and pasteuriser and two sets of refrigerators, in the first of which ordinary cold water is used, while the second is supplied with specially cold water from the refrigerator tanks of the cooling machines. Skim milk required for cheese-making is conveyed right from the separators to the cheese vats, but all the rest of the skim milk is pasteurised by being heated to 194 degrees Fahrenheit and then cooled over the two refrigerators prior to being taken back to the farms for calf and pig-feeding. The price charged for returned skim milk is ½d. per litre or about 2d. per gallon. The price of whole milk supplied to the creamery is regulated as at other creameries by the Butter Quotation Committee in Copenhagen, and the proportion of its butter fat. A plentiful supply of ice is manufactured on the premises by means of a machine capable of turning out 100 lbs. of ice per hour. The cream on leaving the separator is heated to 90 degrees centigrade and then rapidly cooled and conveyed to ripening vats prior to being churned. As at most Danish creameries the Holstein churn is the one used here, six being in daily operation in the churning room, and four circular butter workers.

The premises were well lighted and in spotlessly clean condition. There is a large butter-packing room and three cooling rooms where the butter is placed after being packed and kept at a very low temperature. The roofs of these cooling rooms are arched and double, and insulated by means of non-heat conducting material such as husks of grain, etc. Something like 15 tons of butter are turned out per week, most of which goes to England, but a good proportion is sold in Copenhagen at, we were astonished to learn, 10s. more per cwt. than the British price. In addition to the butter manufactured from milk sent to the creamery, the company purchases considerable quantities of butter from other creameries in order to supply their demands. A large staff of fully 100 young women are employed, and all the employees were neatly attired in spotlessly clean white material. These young women are boarded in the establishment and are paid 5s. to 20s. per month in addition to food and lodgings. Here as at other creameries everything in the shape of bye products is made the most of. At Trifolium the whey from whole milk cheese is passed through the separators and all butter fat taken out. This fat is churned and whey butter made which is sold at 6d. per lb. The power for the working of the factory is supplied from two boilers and two high-pressure steam engines of 90 horse power. In the engine room there is also an ammoniac refrigerator and electric light plant. By an ingenious arrangement the man in

charge of the engines can regulate the temperature of all the various rooms in the building.

In the actual manipulation of the butter here, as at other creameries visited, there was nothing in advance of what can be seen at well-managed Scotch dairies. Indeed, in some respects, the best Scotch makers are ahead of the Danes; as, for example, in the matter of securing a nice grain, and the more perfect

BUTTER-MAKING: TRIFOLIUM DAIRY, NEAR HASLEV

elimination of the moisture from the butter whilst on the butter-worker; but, as was explained to us, 16 per cent. of moisture is our standard in Britain, and they like to keep as near that as possible. There seemed also room for improvement in the matter of handling the butter, and surprise was expressed at finding it being worked to such an extent by the human hand, instead of the more modern and up-to-date plan of using wooden hands. It must be conceded, however, that everywhere the butter was well flavoured, though often much over-worked, and containing probably 4 per cent. more moisture than our best Scotch butters. Whence, then, the secret of Danish supremacy in the butter market and of its never-failing uniformity? In the first place, this is to be attributed

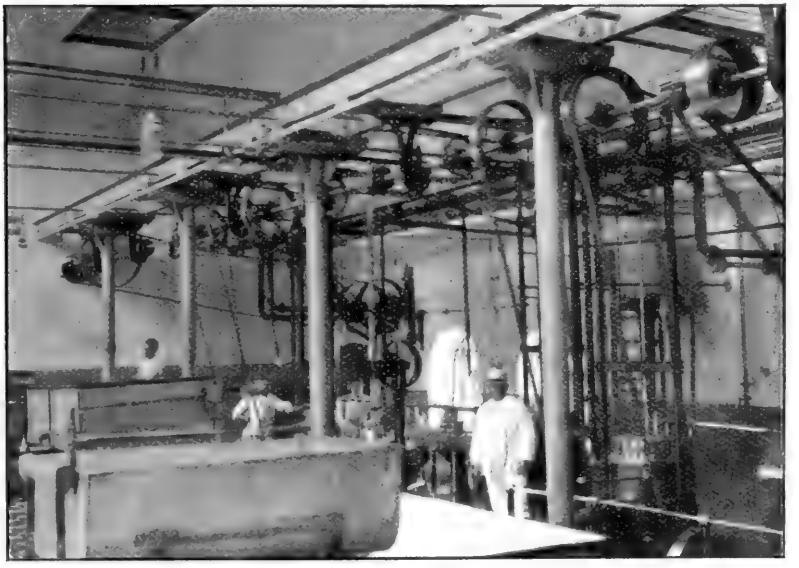
to the skill and care taken with the milk from the moment it s milked till it is delivered at the creameries; and the three essentials to success in this respect are careful attention to the feeding of the cows, cleanly milking and immediate cooling of the milk, and the thorough cleansing of all dairy utensils. In the second place, their supremacy and success may be attributed to their treatment of the milk and cream at the creamery. Pasteurisation and immediate cooling to a low temperature get rid of all objectionable flavours, and the keeping properties of the butter are thereby ensured. However much we may admire the skill and care bestowed by the Danes on the treatment of milk and its products, there is even more to admire and imitate with advantage in the matter of the production of the raw material milk itself. Here the Dane is vastly ahead of us in Scotland. It has already been shown how enormously their output of dairy products is year by year increasing, and this is not due so much to an increase in the number of dairy cattle, as to the systematic and rational way in which they have been grading up their dairy stock by careful selection and breeding to a higher and higher standard of production, both as regards yield of milk and butter-fat contents. That this can be done without impairing the animal in any way is proved to demonstration.

The Danish Milk Supply Company of Copenhagen

This is quite a wonderful place, and our visit proved immensely interesting. The courteous and obliging managing director, Mr Salicath, showed us through the premises, and explained every process from the moment the milk was received till it was bottled and sealed ready for distribution. Something like 120,000 Danish lbs. of milk are handled here daily, of which 75,000 lbs. are sold as whole milk, 2000 lbs. as children's milk, and the balance is passed through cream separators, and disposed of as cream, butter and skim milk. The whole of this milk is sent in to the Company's premises by rail, and is supplied by three hundred farmers. It is sent in distances of from ten to one hundred and seventy kilometres, and the stocks of dairy cattle from which it is produced are under the strict supervision of the Company's veterinary surgeons, who not only see to the health of the animals, but also as to the proper feeding of them, and that thorough cleanliness is observed in the process of milking. Immediately on being milked, the milk is passed over ring coolers supplied with iced water, and in this way it is thoroughly aerated and reduced to a temperature that ensures its quality not being impaired in the course of transit. The entire produce of this establishment is sold for consumption in the city of Copenhagen. The Company, recognising the sensitive nature of such a product as milk, and its liability to become contaminated after passing into the consumers' hands, resolved not only to so treat the milk at their premises by pasteurisation and cooling as to ensure its immunity from infectious germs, and preserve its keeping properties, but also by delivering it to their customers in sealed

bottles, corked and sealed at the dairy, to obviate all risk of contamination in the homes of the consumers.

A brief description of this process may be of interest. As soon as the milk arrives at the dairy it is carefully examined, then weighed, and emptied into large tanks. From these tanks it is filtered, aired and pasteurised, and then cooled all in one continuous stream. The arrangements for this process are on such a scale that 16,000 Danish pounds can be treated per hour. This Company, whilst taking precautions to ensure that their supply of milk shall be the produce of healthy cows only, nevertheless



INTERIOR: TRIFOLIUM DAIRY, NEAR HASLEV

pasteurise their milk by heating it up to a temperature of 85 to 90 degrees centigrade, or 185 to 194 degrees Fahrenheit. In order to ensure that no milk shall leave the pasteurisation machines at a lower temperature than 85 degrees centigrade, a man is specially told off to watch two thermometers at the outlet through which the milk passes, with strict orders to turn the cock should there be the slightest lowering of temperature. Further, the Company employ a medical officer, who daily takes samples from the pasteurising tanks, and tests them in order to see that they have been efficiently heated. By means of the paraphenylenediamine test, milk, if sufficiently pasteurised, retains its original colour, but if not heated sufficiently the milk turns to the colour of ink when the two chemicals of which the test consists are added and shaken together for a few seconds. After being thoroughly pasteurised, the milk is passed over refrigerators and cooled down to 5 degrees centigrade, then filled into bottles containing half litres and whole litres (a litre is equal to 2 lbs.), which are packed into cases and placed in the cooling chamber, a huge cellar with an area of 2000

feet. The Company have a splendid water supply of their own, and with an ice-making plant they are enabled to cool their products to a very low temperature.

The milk is delivered to the customers from the Company's vans between the hours of 3 and 5 A.M. and 3 and 4 P.M. For this work 95 horses are employed. These horses cost on an average 500 kroner each, or about £28 sterling. The milk, it may be mentioned, is sold in varying qualities, at varying prices, according to the desires of the customers; thus some of it may consist of half whole milk and half skim milk, and some of it mixed with one part of whole milk to two of skim, but each kind of milk has its own distinctive label on the bottle, so that no tampering is possible on the part of the distributors, and each customer has the guarantee that he is getting exactly what he wants, and at the price stated on the label. A special feature is that of supplying children's milk, that is, milk treated in such a way as to be as near as possible in composition to that of human milk. The milk for this special department is supplied from two farms only, from cows which are regularly tested once a year with the tuberculin test by one of Professor Bang's assistants from the Veterinary College. Animals which may react are at once eliminated from the stock. The cows are examined by the veterinary surgeons once a month, who report as to the state of health of the animals, also as to the cleanliness of the cow-houses, composition of feed of animals, and precautions for cooling milk immediately on being milked.

As already explained, all milk not required for sale as such is separated at a temperature of 38 to 40 degrees centigrade by means of a Laval Separator capable of treating 4000 lbs. per hour. The skim milk is largely sold to bakers and margarine manufacturers, and the butter is all sold for consumption in Copenhagen. The cream, after being separated, is heated to 85 degrees centigrade, then cooled, and then allowed to ripen for twelve hours prior to being churned. About 10,000 lbs. of butter are sold weekly. Besides the butter made from their own surplus cream, the Company buys butter from two other creameries in order to meet the demand of their customers. About 8000 lbs. of cream are sold in two qualities, the one at 100 öre per litre and the other at 45 öre per litre. Whole milk is sold in sealed bottles at 15 öre per litre, and in half litre bottles at 7 öre, and skim milk at 4 öre per litre. The bottles in which the milk is distributed cost 19 öre for litre size and 6 öre for half litre size. On inquiry it was ascertained that about 400 bottles are broken per day!

The carters distributing the milk are held responsible for the bottles, and in turn they look to customers to pay for any bottles broken whilst in their possession. The wages paid to the milk carters is 24½ kroner per week (equal to 27s. 6d. sterling), and a commission in addition according to the amount of sales; thus for every 10 kroner above 30 kroner of sales a commission of 2 per cent. was allowed; for the next 10 kroner a commission of 3 per cent. The wages of the women workers inside the establishment, of whom there were a considerable number working

in shifts of 9 hours each per day, were stated to be 60 to 80 kroner per month. The systematic way in which all the work about the place is conducted was much admired, and reflects the highest credit on the management.

We were afforded an opportunity of witnessing the cleansing of the milk cans and bottles, and were much impressed by the thoroughness with which the work was carried out. These vessels are first immersed in a strong solution of lime and soda, then rinsed in cold water, after which they are sterilised by steam. Altogether, the success of this Company, which was only started five-and-a-half years ago, seemed to us extraordinary, and in many respects its system might with advantage be adopted in all centres where there is a large consumpt of milk.

The Copenhagen Milk Supply Company

This business was founded in 1878. Under the management of Mr Busck, whose wife, by the way, is a Scotch lady, the first attempt was made in Denmark to supply the city of Copenhagen with an absolutely reliable supply of wholesome milk, the produce of cows warranted free from tubercular disease. Mr Busck, in the initial stages of the undertaking, had many difficulties to overcome, and much prejudice to contend with. He early enlisted the sympathy of the leading medical authorities, three of whom, without remuneration or monetary interest, formed themselves into a Committee of Control. A private Company was formed, and in its prospectus it was announced that the undertaking was not to be of a purely mercantile character, but that all profits exceeding 5 per cent. should go towards reducing the price of milk and of extending and improving the business. Gradually the public confidence was gained, and from a small beginning, with a capital of £600, the undertaking has so prospered that time and again the Company have had to move into larger premises, till, finally, they had to build their present establishment at a cost of nearly £10,000. About 5000 gallons of milk are handled daily by this Company, drawn from fifty-seven farms, all situated in Zeeland. Pasteurising of milk is not practised here, except in the case of milk specially asked for for infants, Mr Busck preferring to rely on the precautions he adopts to secure that the milk is the product of cows guaranteed free from disease. Fortnightly examinations are made of all the cows by a veterinary surgeon employed by the Company, and an inspector is regularly sent round the farms, who must report as to the general management, the condition of the cows, the quality of the fodder, and see that the drastic rules laid down by the Company are rigidly carried out in regard to the feeding of the animals, and the cleanliness exercised in the process of milking. He must also examine the cooling apparatus and report as to its order, and see to the sufficiency of the stock of ice and how it is stored. It is laid down in the Company's rules that at least 30 lbs. of ice must be stored for every 11 gallons of milk produced. Further, a skilled dairy-maid is regularly sent round

the farms, whose special duty it is to give instructions as to the cleanliness to be observed in milking, and the cleansing of milk utensils, and also the proper cooling of the milk. The following are the regulations made by this Company with regard to its milk supplies, which must be conformed to without deviation :—

"Newest Regulations for Contractors.

"A.—*Feeding and Management.*

"I. The food of the cows must be of such a nature and quality that no bad taste or taint may thereby be imparted to the milk.

"(*a*) Brewers' grain, and all other similar refuse from distilleries, are strictly forbidden, as also is every kind of fodder which is not fresh and in good condition.

"(*b*) Turnips, kohlrabies, and rutabaga are absolutely forbidden ; no kind of turnip leaves may be used.

"(*c*) Carrots and sugar beets (mangolds) are permitted up to half a bushel per cow, but only when at least 7 lbs. corn, bran, and cake are given along with them. Cows supplying infant milk may get carrots, but never more than a quarter bushel per head.

"(*d*) Oilcake. Rape seed cake is the only oilcake which may be used. 1½ lbs. is the furthest limit, along with at least 5 lbs. corn and bran. Infant milk cows must not receive any cake.

"(*e*) The proportions in which the different kinds of food are to be given must be arranged with the Company before the contractor commences to supply milk.

"II. Stall feeding in summer will not be permitted under any circumstances. The cows must be fed in the open air upon clover and grass. Vetches are forbidden.

"In a case of necessity dry food or cut corn may be given, but on the field.

"III. In autumn the cows must be clipped on the udder, tail, and hind quarters before being taken in.

"IV. Calving must be so regulated that the milk sent in during the months of September and October is not less than two-thirds of the largest quantity sent in any other month.

"V. The milk of cows newly calved must be withheld for twelve days after calving, and must not be less in quantity than three imperial quarts per day.

"B.—*Milking.*

"VI. The greatest cleanliness must be observed during milking, and the milk must be strained through a wire sieve covered with a clean woollen cloth.

"VII. Immediately after milking, and during all seasons of the year, the milk must be cooled down with ice water to 40 degrees Fahrenheit.

"VIII. Every contractor must be provided with a Lawrence cooler, which he can obtain on hire from the Company.

"IX. Thirty pounds of ice, making due allowance for waste, must be kept in stock for every 100 lbs. milk produced, which can be calculated from the fortnightly trial milkings.

"C.—*Delivery of Milk.*

"X. (*a*) The milk must be delivered at the nearest station once or twice daily, according to the requirements of the Company, either as whole milk or as 'half-skimmed' milk and cream.

"(*b*) The milk must not be sent from the farm earlier than is absolutely necessary for its arrival in proper time at the railway station.

"(*c*) In summer the van for conveying the milk to the station must be provided with a cover to protect the milk from the heat of the sun.

"XI. The Company will supply the cans necessary for transport.

"XII. The Company cleans the cans before returning them, but they must be carefully rinsed out with cold water as soon as they reach the farm again, to get rid of any dust or dirt which may have adhered to them during the return journey.

"The cans must be placed in a cool, airy spot until again required, protected from all impurities, with lids off, and bottom upwards, but in such a position that the air can freely get into them.

"XIII. The cans may not be used for any purpose but the conveyance of milk.

"D.—*Further Regulations.*

"XIV. The contractor is bound—upon word of honour—to answer any inquiries made by the Company concerning the milk supply.

"XV. The contractor must allow any of the veterinary surgeons of the Company to inspect his cattle as often as the Company requires, and must drive the surgeon to and from the station. The contractor is bound to follow out closely the instructions of the veterinary surgeon.

"XVI. Any cow declared by the veterinary officer to be suffering from tuberculosis must be instantly and entirely separated from the rest of the herd, and should be got rid of as soon as possible.

"XVII. The contractor must immediately inform the Company of any case of illness which may arise between two visits of the veterinary officer. If necessary, he must withhold his milk until the veterinary officer arrives and inquires into the circumstances.

"In such a case the full price will be paid for the milk.

"XVIII. The contractor, to the best of his ability, must watch

over the health of all who reside on his farm, or work upon it, also the families of the latter.

"Should a case of infectious disease arise among any of them, he must immediately report the fact to the Company, and withhold his milk, which will nevertheless be paid for as usual, if these conditions are fully complied with.

"XIX. Either of the contracting parties, after having given six months' notice, can terminate the contract on the following 1st of January.

"XX. Should the Company find the milk of inferior quality, and therefore unfit for sale, they shall be entitled to refuse to take it, without giving any compensation to the contractor.

"XXI. If, owing to an epidemic, or other unavoidable cause, the sale of milk in Copenhagen should be suspended, the contractor must withhold his milk for a shorter or longer period without compensation."

It is claimed that milk produced under such ideal conditions, from animals warranted free of disease, commands a much higher price than that ordinarily obtained, and in order to induce the farmers who contract for the supply to give the utmost heed to the Company's regulations, a slightly higher price is paid than ordinary current rate. The milk is brought to the dairy once a day. The morning's milk is brought skimmed, after having been set 12 hours in ice, and the evening's brought whole, carefully cooled down to 40 degrees Fahrenheit by being passed over a refrigerator supplied by the Company. At the time of our visit, 9 P.M., the milk was being brought in, and an opportunity was afforded of witnessing the precautions adopted to secure that nothing but absolutely sweet well-flavoured milk should be put out to the public. On arrival the milk is weighed, its temperature taken, and any lot which is higher than 8 degrees centigrade or 50 degrees Fahrenheit is put aside and disposed of at the expense of the contractor. All milk of the proper temperature is passed on, after being tasted by two skilled dairy-maids, who take turn about at this work for a quarter of an hour each, and samples of each lot are taken for the purpose of analysis. Any milk with a disagreeable taste is rejected. The samples are all carefully tested for butter fat next morning in the Company's premises, and before the milk is sent out, samples of each quality, both of milk and cream, are sent to the University, where they are analysed and reported on by the lecturer in Chemistry.

All the whole milk, half skimmed milk, and cream brought to the dairy are carefully filtered. This process seemed very effective, and may be described in detail. The milk is poured into a large enamelled receiving tank placed at a somewhat higher level, then another vessel similar in character placed beside it, and connected at the bottom by a syphon-like pipe. The milk by its own pressure rises up through the bottom of the lower vessel, passing through two layers of gravel of different degrees of fineness, and several layers of fine cloth. The layers of gravel are separated by

perforated tin trays, and the whole is kept in position by means of a pyramidical framework pressing down the trays. As the milk rises to the top of the lower tank, it passes off into a large storing tank, and thence into the bottling room. There are four of these filters in use for the different qualities of milk. It is quite inconceivable the amount of sediment which is arrested by this process out of carefully handled and, to all appearance, quite clean milk. Not only is there palpable dirt, such as hairs, scales, chaff, etc., but also enormous numbers of bacteria. In the coarser layer of gravel, as much as 6½ millions of bacteria have been found, and in the finer layer 17½ millions per cubic centimetre. The gravel is taken out after each day's work and cleaned by being boiled in a solution of water and soda, and then thoroughly sterilised by steam at a temperature of 302 degrees Fahrenheit. When thoroughly dry, it is passed through fanners in order to have all particles of dust blown out of it. From the storage tank referred to above, the milk is drawn off, and weighed up into larger or smaller tins as customers require. These cans on being filled are labelled and sealed, and then placed in tanks amongst ice until being sent out in vans for distribution. The milk sold as children's milk is passed through a separate filter, and led by a pipe into a bottling room, where it is bottled by a machine, similar to that used for bottling beer. A skilled bottler fills the bottles, which are of clear glass, from six taps, each bottle holding about a quart, and then passes them on to a woman who corks them by machinery. Finally the corks are tied down by thread, and sealed with lead seals, which are compressed and stamped with the Company's stamp. The bottles are first placed in boxes fitted with racks and covered over with ice, and then sent out in vans for distribution to the Company's shops, or direct to customers as may be required.

On the initiative, and at the request of a number of ladies and gentlemen, chiefly doctors, the Company agreed to supply pasteurised and specially prepared milk for infants. As the process involved some extra expense, a Society was formed called "The Society for the Nourishment of Infants," the object of which was to raise a fund to enable the poorer classes to obtain this specially prepared milk at a price that would be within their reach, and thus check the infant mortality which was believed to be due to inferior and unwholesome nourishment. This prepared milk consists of milk mixed with sugar and water in varying proportions according to the age of the child. With a view to kill any possible germs of disease, the milk is filled into specially constructed bottles, then corked and heated up to 85 degrees centigrade, at which temperature it is kept for half-an-hour, and then rapidly cooled down by being placed in ice. It is claimed that milk prepared in this way will remain in perfect condition for at least twenty-four hours. It is sold in zinc stands or cruets, each containing the number of bottles necessary to nourish a child according to its age for twenty-four hours, and each bottle containing sufficient for one meal. Prior to being used, these bottles are placed in warm water to take off the chill, and then uncorked, and an ordinary mouthpiece

inserted. This system must prove an enormous boon, especially to the poorer classes who are living amidst squalid surroundings where milk under ordinary circumstances, exposed to an atmosphere teeming with disease germs, speedily becomes unfit for food, and a certain medium for the transmission of disease. It is claimed that the Company by selling milk at a reduced rate to infant schools and other charitable institutions, besides distributing considerable quantities gratis amongst the very poor, as well as by the sale of specially prepared milk for infants, has become a powerful agency in promoting the health of the city of Copenhagen. The Town Councils of Glasgow and Dundee have recently opened depots for the sale of children's milk prepared in this way.

Not only has there been this direct advantage, but indirectly by bringing home to the inhabitants the value of a wholesome supply of milk, the standard of the trade has been raised, and rival concerns have been formed, working on similar, or even more progressive lines. Like all other similar places in Denmark, the premises were faultlessly clean, and the utensils kept in splendid condition. The employees, of whom there are 180 at work daily, were clean in person, and neatly and appropriately apparelled. As already explained, the milk begins to arrive about 9 P.M., and work is carried on till 1 A.M., and again resumed by another shift of workers at 3 A.M. An important part of the work is the cleansing of the milk cans and bottles. The system of cleansing is as follows:—

The cans are rinsed by means of a cold water spray three at a time, then scrubbed with hot water and soda, after which they are placed on a revolving wheel and immersed in a tank of lime water, and finally sterilised by jets of steam and boiling water driven into them at high pressure, and then placed on racks to drip. The bottles are washed with warm water and soda, then scrubbed inside with a revolving brush, and then rinsed out with cold water. As at the Danish Milk Supply Company's place, previously described, the breakage of bottles here would seem to be a heavy item. On inquiry it was found that as many as 30,000 bottles were broken per annum. To Mr Busck, the manager, every credit is due for initiating and planning and carrying out this great undertaking.

Mention should be made of the enormous ice store on the premises in which 3000 tons of ice, obtained from the lakes in the district, are annually stored.

The prices obtained for the different products are as follows:—

For half-skimmed milk, or milk containing 1 per cent. of fat, 5d. per gallon; butter milk, the same price; whole milk, 10d. per gallon; and infants' milk, 1s. per gallon. Cream is sold in two qualities, No. 1 at 5s. per gallon, and No. 2 at 3s. per gallon. Milk and cream not sold as such are churned and sold as butter and butter milk.

The Danish Milk Supply Company's Freezing Station at Marslev

The milk collected at this centre is brought in from a radius of four miles, and is the produce of about 1400 cows. The milk is brought to this establishment twice a day in summer and only once a day in winter. The most of the milk is brought in by collectors or contractors, who are usually farmers. These collectors get ½ ore per 4 Danish pounds when the milk is collected once a day, and 1 ore per 4 pounds when collected twice a day. Farmers who choose to deliver their own milk get the full price of 16½ öre per 4 Danish pounds. When the milk is brought only once a day the earlier milking must be refrigerated and cooled down to from 14 degrees to 15 degrees centigrade or 59 degrees Fahrenheit, and must not be mixed with that of another milking. The bulk of the milk collected is forwarded daily to the Company's establishment at Copenhagen, and, as it takes about seven hours on journey, the Company take the most rigid precautions with a view to secure that it shall arrive even in the hottest weather in the most perfect condition. The process adopted is as follows:—

The milk, on arrival, is first pasteurised by being heated to 85 degrees to 90 degrees centigrade or 185 degrees to 194 degrees Fahrenheit, then passed over first one refrigerator and then another, the water circulating through the second refrigerator being highly brined; by this means the milk is reduced to a temperature of 10 degrees centigrade or 50 degrees Fahrenheit. To ensure that the milk will not rise in temperature in course of transit, a portion of it is frozen and the frozen blocks put amongst the milk. The freezing process is carried out by what is called the Casse Ammonia System. The milk is placed in thin oblong tubes having wooden lids, and immersed in a tank containing a strong solution of brine. This brine is cooled by liquefied ammonia, which is forced through pipes circulating in the brine tanks. The freezing of the milk is accomplished in about twelve hours. The tubes containing the frozen milk are then, by an ingenious arrangement, hooked out of the tank and immersed for a moment in another tank containing hot water. This facilitates the getting of the blocks of ice readily out of the tubes. Several of these blocks are then placed inside the larger churns or tanks in which the cooled milk is conveyed to Copenhagen. These churns or tanks contain half a ton of milk each, and are fitted on trolley wheels and run out on rails to the loading stage, where the arrangements are so perfect that they are hoisted with the utmost ease into the specially constructed railway vans in which the milk is conveyed to Copenhagen. It is claimed that milk treated in this way will keep perfectly sweet for five days. In summer the railway vans are painted white, and sometimes are covered by tarpaulins, in order to keep down the temperature in very hot weather. A quantity of the milk received at this station is separated, varying according to the demand in Copenhagen. In this case the farmers are only bound to take back 25 per cent. of the separated milk to the farms which is

charged at the rate of 1 ore per 2 Danish pounds, but if anyone desires more than 25 per cent. of the skim milk back he is charged 2 öre per 2 Danish pounds for all the milk in excess of 25 per cent. Prior to separating, the milk is heated to 90 degrees and the cream to 85 degrees centigrade.

As at all creameries in Denmark, arrangements are here made for making the most of surplus bye-products, and when there is an over supply of milk in Copenhagen, cheese is made at this establishment with skim milk, to which is added 20 to 25 per cent. of whole milk. The system of paying for milk here is as at all creameries in Denmark, the price of milk being regulated by the price of butter as fixed by the Copenhagen Quotation Committee. At this distance from Copenhagen, the price of milk is lower than in more favoured districts. Thus, when butter is selling at from 76 öre to 1 krone per Danish pound, milk is paid for at the rate of 15 öre per four Danish pounds; and for every ore that butter makes over 1 krone, the farmer gets an increase of $\frac{1}{7}$ of an ore for his milk; and for every ore that butter makes below 76 öre, the price of milk is fixed at $\frac{1}{7}$ of an ore less. Eight hundred thousand Danish pounds of milk are collected and treated at this station annually, and the cost incurred may be roughly put at 6000 kroner for wages, 2800 kroner for coal, and 70 kroner for ammonia. This latter item seems small, but it is explained in this way, that little of the ammonia is lost, being recondensed for further use after having effected the purpose wanted. The rate for conveying milk to Copenhagen over a distance of ninety-six miles is 69 öre per 100 kilos (a kilo is equal to two Danish pounds). Empty milk vessels are not returned free, as in Scotland, but charged at the rate of 35 öre per can of 120 lbs. weight. A rebate of 10 per cent. is allowed off the rail rate on large quantities of 10,000 kilos and over. For short distances of, say, 10 kilometres,[1] the rate is about 22 öre per 100 kilos, equal to about one-tenth of a penny per gallon; and for a distance of 170 kilometres, the rate works out about $\frac{1}{2}$d. per gallon.

[1] A kilometre is equal to five-eighths of an English mile.

THE ART OF MILKING

Ladelund Agricultural and Dairy School

THIS institution was founded in 1879 as a private Agricultural School, and for a time received a grant from Government = £150 per annum, which is now increased to 6000 kroner = nearly £400. There are on an average 180 students in attendance at a time, and they usually stay about five months. The fees are 37 kroner a month, or nearly two guineas, which covers board and lodging on the premises. The students in attendance are from 20 to 25 years of age, and for the most part have been engaged at factories and dairy farms, and come here to get better equipped. There is a Co-operative Creamery in connexion with the school handling the milk of 500 cows, where the students have an opportunity of seeing milk treated and tested with all the most modern appliances, and manufactured by the most recent methods. There is also attached to the school a farm of about 70 acres on which are kept 30 milk cows, 12 young cattle, 6 horses, 80 pigs, and 100 head of poultry.

The milk brought to the creamery is all paid for according to the percentage of butter fat it contains, and it is claimed that this system, now almost universal in creamery practice, was first introduced at this institution by Professor Fjord.

There is attached to the institution a chemical laboratory, where not only milk but feeding stuffs and manures are analysed.

The class-rooms are large and well equipped, and to them is attached a museum containing a most interesting collection.

An interesting and useful innovation was introduced here in the shape of weekly courses of instruction in the art of milking.

Mr Hagelund, a Danish V.S., has been engaged by the Government to teach an improved and special method of milking, and it is claimed for this system that not only is an increased flow of milk obtained, but a slight increase of butter fat as well. The process consists of manipulating or massaging the milk vessel in a special way; first rubbing the vessel thoroughly with a dry cloth in order not only to clean the udder, but also to bring the milk down into the teats; next beginning to milk slowly at first the two front teats, and then the two rear ones; and when the four teats are completely milked in this way, the udder is manipulated in the following manner:—

First. The right quarters of the udder are pressed against each other with the left hand on the hind-quarter, and the right hand in front of the fore-quarter, the thumbs being placed on the outside of the udder, and the four fingers between the two

divisions of the udder. The hands are now pressed towards each other, and at the same time lifted towards the body of the cow. This pressing and lifting is repeated three times, the milk collected in the milk ducts is then drawn out, and the manipulation repeated until no more milk is obtained in this way, when the left quarters are treated in similar manner.

Second. The glands are pressed together from the side. The fore-quarters are milked each by itself by placing one hand with fingers spread on the outside of the quarter, and the other hand in the division, between the right and left fore-quarters; the hands are pressed against each other, and the teat then milked. When no more milk is obtained by this manipulation, the hind-quarters are milked by placing a hand on the outside of each quarter, likewise with fingers spread and turned upward, but with the thumb just in front of the hind-quarter. The hands are lifted, and grasp into the gland from behind and from the side, after which they are lowered to draw the milk. The manipulation is repeated till no more milk is obtained.

Third. The fore-teats are grasped with partly closed hands and lifted with a push towards the body of the cow both at the same time, by which method the glands are pressed between the hands and the cow's body; the milk is drawn after each three pushes. When the fore-teats are emptied the hind ones are treated in a similar manner.

At the time of our visit there were seventeen Swedish students attending specially for this milking instruction.

Mr Hagelund, we are informed, has been engaged to give instruction at other centres throughout the country. When we think of the perfunctory manner in which too much of the milking is performed in Scotland, and of the enormous loss that is thereby incurred, the advantage of this or some similar system cannot be too strongly commended. The process, as described, may to some seem very elaborate and intricate, but in actual practice it seems quite simple, and the cows in full milk were being milked by Mr Hagelund in from six to eight minutes. It had long been known by observant dairymen that the flow of milk from a cow may be increased by slight gentle manipulation of the udder, but no systematised method had been adopted or published till within the past few years, when it was adopted in Denmark. Now we find that it is being largely practised in Scandinavian dairies.

Our American cousins, ever alive to the advantages of improved methods, have had careful investigations conducted with a view to test the efficiency of Hagelund's system of milking. In bulletin No. 96 of the University of Wisconsin Agricultural Experiment Station, Mr F. W. Woll gives detailed particulars of the investigation, and furnishes data regarding 142 different cows operated on, and the amount of milk and butter fat obtained by combined clean milking and use of the so-called manipulation method.

The following is a summary of the investigation reported in the bulletin referred to:—

"I. The milking experiments conducted by the writer were

made partly with cows in our University herd, partly with cows in twelve different Wisconsin dairy herds. The aim in all cases was to ascertain the gain in the production of milk and butter fat obtained by a system of manipulation of the udder after the regular milking was finished (Hagelund's method); where the regular milker did not milk clean, the gain obtained by clean milking, together with manipulation of the udder, was ascertained.

"II. In our University herd the average daily production of milk from twenty-four cows was increased by 4·5 per cent. by means of the manipulation method, and the production of fat was increased by 9·2 per cent. As the result of a milking experiment conducted for four weeks, the average gain in milk being one pound, and in fat ·09 pound per head per day.

"III. A similar average increase in production was obtained for the twelve dairy herds tested, viz., a gain of 1·08 pounds in the daily production of milk per cow and ·1 pound of fat. The results obtained in this investigation, extending over a period of four months, with cows in all stages of lactation, indicate that this gain is maintained through the whole period of lactation. An increase in the daily production of butter fat per cow, of one-tenth of a pound, for the million cows in the State, would mean an annual gain of 30,000,000 pounds of butter fat if the cows give milk 300 days in the year; the value of this increase to the dairy industry of the State would be about $6,000,000 = (£1,250,000 sterling), on the basis of a valuation of 20 cents. a pound for butter fat, a figure considerably below average prices.

"IV. The largest amount of milk obtained from a cow by the manipulation method, after the regular milking was done, was 5·5 pounds per day, and the lowest ·20 pounds. The corresponding figures for fat production was ·64 and ·02 pounds.

"V. The greater portions of the gains obtained came through lack of care on the part of the regular milker, as the cows were not milked perfectly clean. But even in herds, where the milkers did their work well, there were always one or more cows which gave an increase of nearly a pound of milk and one-tenth of a pound of butter fat by the manipulation method.

"VI. The milk obtained by means of the manipulation method is similar in composition to that of 'strippings'; on the average for all herds it contained 10·32 per cent. fat, and was found to be about two and a half times richer than ordinary milk. The highest per cent. of fat found in the after-milking from any one cow was 23·0 per cent., and from any herd 14·41 per cent.

"VII. The difference in the work done by different milkers is brought out strongly by the results of the work done. In several cases one milker did his work so much better than the others in the same herd as to be worth nearly $10.00 = (41s. 8d. sterling) a month more to the owner on account of the larger yields of milk and fat which he obtained from the cows milked by him.

"VIII. The results obtained in this investigation suggest that a thorough system of milking is an essential and foundation requirement in successful dairying. For, apart from directly

increasing the production of milk and fat from the cows, exhaustive milking will be likely to maintain a maximum flow of milk throughout the lactation period, and to permanently develop the qualities of both the dam and her offspring."

The conclusions stated in paragraph 8 will be readily assented to by all practical men who have studied the subject. It is well known that there is no more certain and rapid method of drying off a cow than by leaving a considerable quantity of milk in her udder for a number of milkings. The milk glands, like all other organs of the body, are developed by being worked. If the entire secretion of milk be not removed, and the glands not thoroughly emptied, they are not stimulated into renewed activity. Nature never provides in vain, and gradually they will cease to manufacture milk-producing materials. The complete emptying of the contents of the milk glands is the best possible stimulus to increased production. This holds good with special force in the case of heifers in their first milking season. The milk glands in the case of young cows are still in the process of development, and by careful, painstaking milking several times a day after calving the milk glands are stimulated to greater activity, and will thus reach the highest development of which they are capable. It goes without saying that careless, ineffective milking will have quite the opposite effect. It is a well-known law in Nature that "like begets like," and it stands to reason that cows whose milk-producing capacities have been developed to their utmost capacity will be more likely to transmit these qualities to their offspring than cows whose faculties for transforming plant food into milk and butter fat have never been developed. A secondary, but very important, advantage resulting from systematic clean milking would be an almost total absence of diseased udders in dairy farmers' herds. This mischief is invariably the result of careless milking. When the milk is not removed thoroughly, an inflammatory condition supervenes, often resulting, if not properly attended to, in the drying up of the affected quarter. The loss sustained by dairy farmers from this cause is incalculable, resulting not only from loss of produce, but in depreciation of value of cows. Hagelund's method seems to be easily learned; an intelligent and observing milker can become expert at it in six days. Persons learning the manipulations are apt to make too hard work of it at first, but the secret is to do it in such a way as to cause no irritation to the cow, or waste of energy on the part of the milker. In the Wisconsin experiments the average time taken for the manipulating part of the milking was 2·6 minutes per cow, and for the whole operation of milking, from start to finish, an average of 7·6 minutes per cow.

In this connexion we may render a service by printing the words of "good advice" or milking rules issued by the Danish creameries to the farmers:—

"MILKER, MARK THIS WELL.

1. The cow is a living machine.
   a. Kindly treatment entails less labour, and gives more milk.

2. Good work improves the living machine.
   - *a.* Milk clean. Clean milking develops the udder, and with this increases the quantity of milk, and
   - *b.* You receive richer milk.
   - *c.* Remember that the milk last drawn is by far the most valuable.

3. Cleanly milking.
   - *a.* You should wear tidy and clean clothes.
   - *b.* Have the milk pail clean as well as the creamery can.
   - *c.* Thoroughly clean the udder by rubbing with a piece of linen.
   - *d.* Wash the hands thoroughly before milking.
   - *e.* Let the udder be quite dry before you begin to milk.

4. Carry out the work properly.
   - *a.* Milk with dry hands.
   - *b.* Seize the teats with the whole hand.
   - *c.* Keep a gentle pressure on the udder.
   - *d.* Milk as fast as you can, and never cease working until the milk is wholly drawn.
   - *e.* Don't strain the teat beyond its natural length.
   - *f.* Remember the value of the last drops.

5. Healthy state of the udder.
   - *a.* If there be soreness or bumps in the udder or teats, stoppage in the milk canal, or unnatural coloured milk, don't mix the milk with any other, and don't send to the creamery.

6. Milking times.
   - *a.* Begin milking always at fixed times.
   - *b.* Milk the same cows in the same order.

7. Regard this excellent work as one of honour.

FARMER, MARK THIS WELL.

1. Clean the cows.
2. Have good air in the stalls.
3. Light should be freely admitted."

BACON CURING

THE exclusion of Danish live pigs from Germany has truly proved a blessing in disguise to the Danish farmer, and to the prosperity of the country generally. Shut out of their accustomed market, pig-feeders were compelled to find another method of disposing of their product, and this necessity was the mother of a great system of organisation and industry, viz., the Co-operative Pig-killing and Bacon-curing Factories of Denmark.

Starting in 1888, the Co-operative Bacon Factories have been an unqualified success, securing for pig owners a convenient market and full value for their animals without a host of middlemen to reduce the profits.

A glance at the following table will show what has been accomplished :—

Year.	Number of Bacon Factories.	Number of Pigs Killed.	Average Price Paid for Pigs.
1888	1	23,400	£2 9 0
1889	8	131,500	2 18 0
1893	14	317,780	3 5 0
1894	15	385,700	2 18 0
1895	17	528,800	2 8 0
1896	20	626,850	2 5 0
1897	25	583,400	2 15 0
1900	26	660,000	2 16 0
1901	26	651,000	3 0 0
1902	27	777,200	3 4 6
1903	29	*About* 800,000	

In addition to these co-operative factories, there are twenty-five private factories, and in many cases cattle, sheep and horses are slaughtered as well as pigs.

Each factory serves a tract of country about sixteen miles in radius, within which the pigs are fattened, and the average number supplied by one farmer per year runs from ten to twelve.

Whether a farmer sends his pigs by rail, or brings them in by road, he runs no risk of loss by accident to his animals, as, when once consigned, they are covered by an insurance fund administered by the factory.

Whenever the pigs arrive, small metallic number plates are securely fixed into their ears. This remains until they are slaughtered, disembowelled, weighed, inspected for tuberculosis or other disease, and classified for quality. The inspector for tuberculosis, etc., is a Government official. Pigs condemned by him are also covered by co-operative insurance. The farmer is paid for the

dead weight taken, with only the bowels removed, and according to the quality, which is decided by an expert official, when the carcase is cut up. No dissatisfaction has ever arisen about this classification, or the weight given. Indeed, though weighbridges are provided for live pigs at the factories, farmers seldom or never trouble to use them.

Nearly all pigs of 120 to 150 Danish lbs. weight get into the first class. At Horsens, the first co-operative factory started sixteen years ago with a membership of 1200 farmers, killing 24,000 pigs

BACON-CURING FACTORY: HORSENS

a year, now with a membership four times greater, and killing 58,000, the quality classification runs :—

About	5	per cent.	extra prime.
,,	50	,,	first class.
,,	20	,,	second class.
,,	20	,,	third class.
,,	5	,,	inferior.

and ½d. a lb. represents approximately the variation in value.

The prices for pigs are fixed once a week for all deliveries during the ensuing week by the managing committee of a factory, who are advised of the state and prospects of the British markets by cable from their London sales agents. Immediately the prices are fixed they are telegraphed or telephoned throughout the supply area, so that people know exactly what they are doing before consigning their swine.

Part of the price is paid on delivery of pigs, part when weighed, and once a year the profits earned are divided amongst the farmers in proportion to the quantity supplied.

The 777,200 pigs killed by the co-operative factories in 1902 averaged 129 lbs. in weight. Their price averaged about 64s. 6d., or 6d. a lb. free to the owner.

It seems quite unnecessary to go into details about the slaughtering of the pigs or curing of the bacon. These operations in the factories differ only in magnitude and in the use of labour-saving devices from what take place at any cottager's pig-sty in Britain. No part of the pig is lost, the very bristles being of value ; while the blood is dried, and prepared for feeding cows, horses, and poultry.

For the disposal of some of the cheaper cuts of bacon, liver, sausages, etc., the factories run shops in their local towns. Tails, feet, and heads nearly all go to Ireland in barrels, while the cured bacon almost wholly goes to Great Britain, there to be smoked and consumed.

The cost per pig of killing and curing averages about 2s. 6d., while freight, etc., and selling in the British markets comes to about 2s. 9d.

Strong evidence of the soundness and prosperity of the pig industry is borne by the increasing numbers of swine in Denmark.

Year.	Total of Pigs.
1881, . . .	527,000
1888, . . .	771,000
1893, . . .	829,000
1898, . . .	1,168,000
1903, . . .	1,456,699

To complete their wonderful organisation, the district factories are each represented on a central "Association of Co-operative Bacon Curers" in Copenhagen. Funds of £400 or £500 a year are subscribed by the local factories for running this association, which costs considerably under a farthing a pig.

The duties devolving on this central organisation are :—

(1) To deal with strikes of workmen.

(2) To deal with insurance of workmen against accidents.

(3) To deal with insurance of bacon to Britain.

This system of mutual insurance has resulted in a vast saving over the former practice of each factory doing its own insurance.

(4) To hold exhibitions of bacon ; and it is worth noting the simple method of conducting these exhibitions, coupled with the practical steps taken to benefit by the results.

The exhibition Committee in Copenhagen telegraph at any time, and without any notice, to the managers of local factories to send on some sides of bacon, just as they are ready for shipment to the British markets. The judges' decisions are thereafter intimated to the managers of co-operative factories, along with remarks stating whether any defects are due to faults in the manufacture, or to the breeding and quality of pigs.

With this information managers are enabled to correct and improve their methods, while an expert in pig-breeding is sent by the Central Association to visit the farmers in districts where the

quality of pigs is defective, and instruct them in the breeding and feeding of a better class of animals. Of paramount importance is the fact that no skim milk is allowed by law to leave the creameries without being pasteurised, and it is believed that this practice has almost eliminated tuberculosis from swine.

Before a factory is started it is necessary to make sure of a supply of pigs to be regularly delivered, and to obtain security for a sufficient loan to provide buildings, plant, and working capital.

Farmers who fail to supply the number of pigs they guarantee are liable, according to the signed conditions of co-operation, to a fine of 11s. 3d. per head on the deficiency; but this fine has seldom or never been incurred or imposed.

In providing the whole capital no money is actually raised from the farmers, but is obtained by loan on their personal security from banks and various other sources; the forms of guarantee bear that the signatories sign as securities, "Each for all and all for each." At the beginning some difficulty was experienced in getting farmers to sign such a deed; but since the benefits of co-operative action have become known farmers are not only willing but anxious to share in all the responsibilities.

Only one factory, we believe, has been unsuccessful, and that was due entirely to the want of a sufficient supply of pigs.

A model factory erected in a district in Denmark, to deal with 300 swine a week, costs for buildings about £1230 sterling, for machinery about £1500, and site £170, or about £3000 sterling in all.

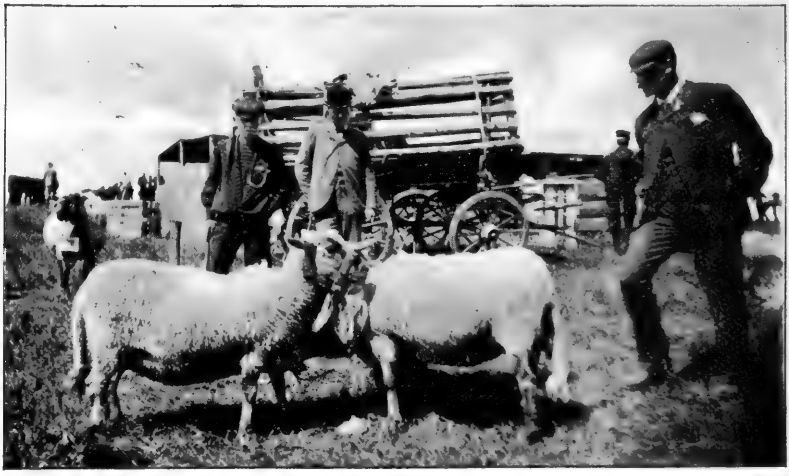
In Scotland there are in various likely districts idle mill buildings which could easily be converted into bacon factories, thereby enabling a saving on initial cost.

Comparing the conditions of marketing:—

In Denmark.	In Scotland.
Pigs go direct from farm to bacon factory.	Pigs go to an auction sale, either in farmer's possession, or in some dealer's, who has bought from him.
Carriage to factory only.	Auctioneer's commission at 6d. per £; on a 70s. pig = 1s. 9d.
	Dealer's profit.
	Expense of carriage to auction.
	Expense of farmer attending auction, and wasting some hours till his turn for sale.
	Expense of carriage—possibly to a second auction—before a slaughtery.
No loss in Denmark.	Loss of 25 to 50 per cent. if a pig shows sore in the feet at an auction.

In Denmark.	In Scotland.
Pigs can be sent almost any day to a factory.	Pigs have to go to market on the sale day—whether convenient or not.
Price is known before consignment.	The price depends on a chance supply of pigs, a chance attendance of buyers, and sometimes, it is believed, a chance that buyers have an understanding not to bid against each other.

It is pretty clear that much more expense is incurred in Scotland in converting a pig into bacon ready for the consumer than is incurred in Denmark.



SHEEP AT SKANDERBORG

EGG AND POULTRY INDUSTRY

LAST year (1903) the value of eggs exported from Denmark was £1,500,000 sterling, and the trade is an increasing one. This from a country with an area less than the half of Scotland must be noted as a remarkable fact, even though the smallness of the town population in comparison with the country population is taken into account. In driving through the country districts we had ample opportunity of seeing the number of hens kept on the farms, and of ascertaining the general methods of housing and feeding. The number of hens varied from about 15 to 300, according to the size of the farm, and the individual taste of the farmer or his wife. On every farm, however, there were some, and also in the gardens of a great many cottagers. It is the great number of flocks spread all over the country that provides the enormous surplus for export, and not the large poultry farms, of which there are very few, and these mostly for breeding pure birds for exhibition or stock purposes.

The housing of the birds was much on the same general plan all over. The hen-house was part of the farm buildings, often with cement floor, the perches only about two feet high and all on the same level, the nest boxes clean, and the whole interior generally well kept. Round the outside a wired run of from 5 to 20 or 30 yards square kept the birds from straying, and allowed every egg to be gathered. The birds seemed to be confined all the year round, and no doubt the small size of the holdings accounted for this, and prevented the use of movable houses on the stubbles in the autumn. The birds had a uniformly healthy appearance, which showed that the extra attention entailed by this system of confinement was freely given. The feeding was principally on oats, rye and barley, with sometimes a little maize, and very often a condensed food made from dried blood and flesh. This was got at the slaughter-houses and bacon factories at a very moderate price—15s. a cwt. Incubators seemed very little used unless on the larger farms, turkeys and hens doing the hatching and rearing. Neither turkeys nor ducks were very much in evidence, but a good many geese were seen. Of these the Toulouse was considered the better layer, and the Embden the more valuable on account of its white feathers. The general run was a cross between these two breeds.

The trade in feeding and selling fat poultry is not large. On one farm where 1000 breeding hens were kept a fair amount of trade was done in cramming birds for export to Germany, and the prices for these averaged 10d. to 1s. per lb. dressed, but this

practice was not common. The production of eggs appeared the chief aim of every farmer, and very close inquiry seemed to prove that the general annual profit was 2s. 6d. to 3s. on each hen. A very careful record of the number of eggs sold, and of the food bought, seemed to be kept, and an example of a balance sheet produced at a farm where our visit was quite unexpected may here be given :—

BALANCE.

Income.				Expenditure.			
7630 eggs sold . .	£21	1	1	Grain bought . .	£9	4	6
40 eggs for hatching .	0	4	6	Ground food bought	3	1	0
96 „ „ .	0	10	8½	Other feeding stuffs	0	16	10
614 eggs used in house	1	7	7	Profit . .	13	2	1
Hens and chickens used in house . . .	2	3	8				
12 chickens reared . .	0	16	10½				
	£26	4	5		£26	4	5

The system of collecting and marketing eggs has now been brought through co-operation to a fine science. Copenhagen is the head-quarters of the Danish Co-operative Egg Export Association, with which are associated other eight similar though smaller branches. The membership is now 33,000, and these are divided into 500 local societies. Each society has its own bye-laws, but these are in general conformity with the rules of the Central Association. The principal object of the Association is to build up the most profitable trade for Danish eggs in foreign countries. Each local society employs a collector to collect the eggs from the farmers within its circle at least once a week. The eggs must be perfectly clean, and no washing is allowed, as washed eggs do not keep so well. The collector weighs the eggs, which must have the farmer's number stamped on them, payment being made by weight irrespective of size or number. The eggs are also stamped with the number of the collecting society, and from it are forwarded in wooden boxes with cardboard subdivisions for each egg to one of the central shipping stations. Here the process of grading, testing, and packing for export is done. The grading and testing are effected by women, who become expert at judging the different sizes, and placing them according to their sizes into perforated trays holding 120 each. These trays are then taken to a dark chamber and passed over a very strong electric light. Each egg is examined, and any the least stale or old are instantly detected and put aside. Any farmer sending in bad eggs is first fined, then struck off the list of members if the practice is continued. After testing, the eggs are stamped with the private mark of the Association, and then packed in long flat boxes with a layer of wood wool or straight rye straw between each layer of eggs, and without any wrapping round the egg. In each box is put a printed guarantee that the eggs are new-laid when packed, and that they have been forwarded by first boat afterwards. Any complaint can easily be traced direct to the seller by means of the

stamps. The cost of collecting, forwarding, grading, testing and packing for export is about 1d. per dozen, and prices are quoted free on board.

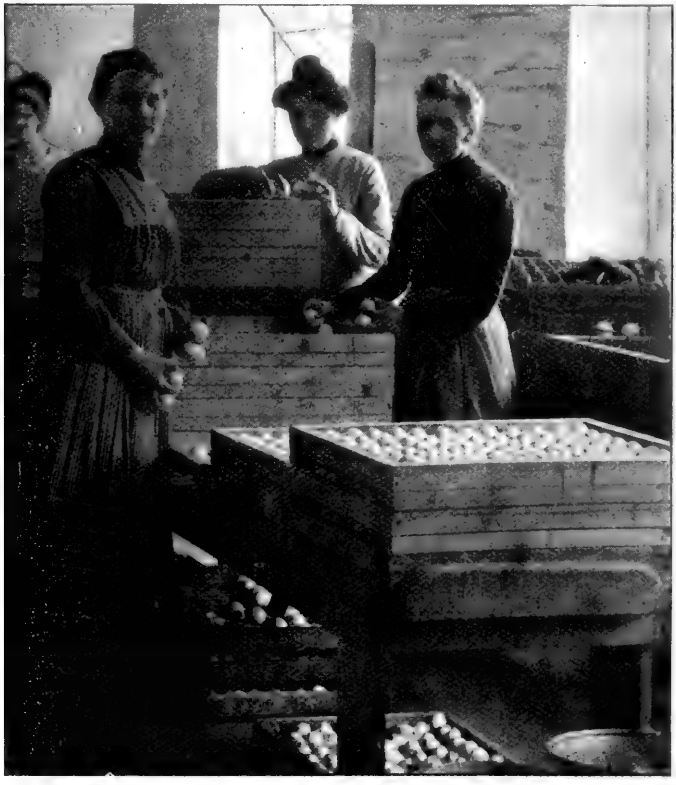
As in our country the winter price differs very much from the summer price. In winter the price is as high as 1s. 6d. per dozen, and in summer as low as 8d. per dozen. Very few eggs, however, are collected in winter, as the Danes do not seem to make a special point of this, so a fair average price for the year is 9d. to 10d. per dozen. There is a very considerable trade done

AT THE EGG EXPORT SOCIETY: COPENHAGEN

in preserved eggs. At the time of our visit the Danish Co-operative Egg Export Association had nearly 2,000,000 eggs stored in large cement tanks and preserved with lime and one or two other secret ingredients.

Entirely apart from this Association, but working harmoniously with it, are three societies whose chief aims are the improvement and advancement of poultry culture in every way. These societies, by means of official papers, keep the farmers alive to what is going on in other countries, and are in many ways of great educational value. One society, called the Danish Poultry Breeders' Association, has been established twenty-five years and has a membership of 6000. The membership fee is 2s. 3d. annually, and this entitles members to a fortnightly paper devoted entirely to poultry matters, also to the advice and assistance of an expert on all matters relating to poultry. In connexion with this Association are eight centres, with a paid assistant in charge, where experiments with various pure breeds are conducted to ascertain the best layers, and from which members can have eggs for hatching at 2s. per dozen, and

pure birds at 3s. to 5s. each. All eggs sold for hatching are from hens with a good laying record, and, to accomplish this, trap nests are used by means of which a record of each hen's eggs can be kept. This Association holds poultry exhibitions in connexion with the leading agricultural shows throughout the country, and gives valuable prizes for a small entrance fee. The Government



AT THE EGG EXPORT SOCIETY: COPENHAGEN

gives an annual grant of £350 to further the general aims of this Association, and further adds a half to the sum offered in prizes at the shows. Another similar society, called the "Society for Agricultural Poultry Breeding," has been established seven years, and has a membership of 4000 with thirty centres for the distribution of pure eggs for hatching at 3s. a dozen, and pure fowls at 3s. to 5s. each. This Society issues a paper fortnightly called *The Poultry Yard*, and holds poultry exhibitions in connection with the leading agricultural shows. The Government gives this Society £250 a year, and also adds a half to the sum offered in prizes at the shows.

Very little attention is paid to the breeding of show or fancy points. The chief aim of all is rather to produce a breed of hens

to lay the greatest number of eggs weighing as near as may be 7½ to the lb. In this desire they are following the same lines as the producers of milk. Utility, not fancy points, is the goal always kept in view. The most popular breed of poultry seemed to be the Brown Italian, or Brown Leghorn as we call it, but Plymouth Rocks, Wyandottes, Minorcas, and Orpingtons were frequently seen. At almost every farm the males were of some pure breed, and an evident attempt was being made to improve the breed generally. No doubt in time the number of eggs produced in winter will greatly increase. There can be no doubt that the development of this egg industry has been almost entirely due to co-operation.

Poultry Farm near Horsens

At this farm we were cordially welcomed by the proprietors, two brothers, whose energies were fully employed in managing the 800 acres of land, with its stock of 200 cows, 470 pigs, and 1000 head of poultry—an admirable combination of industries. The poultry runs were situated in the middle of a beautiful wood of beech and pine trees. A clearing of about five acres had been made, and thus there was ample natural shelter on all sides. The felled wood was cut up and used for the construction of the houses and runs. The houses, which were built to hold 12 to 20 birds each, had a frontage about 8 feet high, with roof sloping backwards; they were thoroughly wind and waterproof, with plenty of ventilation, but with no superfluous ornamentation. Separated from the sleeping compartment was a large scratching shed, which also protected the birds in bad weather. Each house had an extensive grass run planted with fruit trees. These trees provided shelter for the birds, as well as increased the income from the farm; whilst the manure from the birds added to the productiveness of the trees. This combination of fruit and poultry farming is an ideal one, the busy time with the poultry being in the spring before the fruit season commences. The chief varieties kept were Leghorns, Buff Orpingtons, Faverolles, and Coucou Malines, the last breed being little known in Great Britain. The general idea of this farm, as of similar farms in Great Britain, being to keep the best specimens of the most useful breeds only, no purely fancy varieties were encouraged. The large number of eggs available for export do not come from these large farms; nevertheless, they exercise a very beneficial influence in keeping up the type and general stamina of the various breeds. They are also educative, and provide a centre from which reliable, well-bred stock birds and hatching eggs can be obtained. At the time of our visit some of the best birds were carrying off leading honours at Copenhagen and Skanderborg shows. There were ten incubators in use with the necessary rearing appliances, almost all the chickens being hatched and reared by artificial means. As the chickens grew up they were removed to the wood, where they matured rapidly and at little cost, owing to the abundance of

natural food. At about four months they were brought in and fatted on the Sussex principle by cramming, thereafter being killed, dressed, shaped, and sent to Hamburg and Berlin, where they realised from 10d. to 1s. per lb. We were assured a very fair profit was made.

A SMALL HOLDING

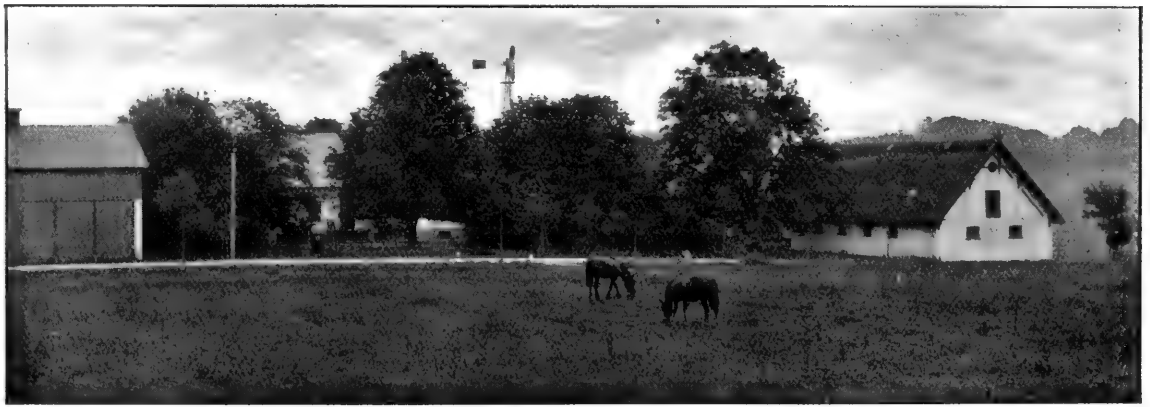
SOME TYPICAL DANISH FARMS

Kolle-Kolle

THE skilfully managed farm of Mr Grut Hansen at Kolle-Kolle, north from Copenhagen and near the famous castle of Fredricksborg, is well known to visitors from the British Islands. Nothing could exceed the heartiness with which Mr Hansen received the party, or the patience and courtesy which he exhibited in grappling with the many questions that were addressed to him regarding the management of his stock, the cultivation of his farm, and the multitude of other matters that occurred to the inquiring Scotchmen. Mr Hansen has an excellent herd of the red Danish variety of cattle. He has for many years kept an accurate milk record of his cows, together with the butter-fat test of each; and during these years he has used bulls bred out of his best milking cows, and kept only the heifer calves out of those cows showing a high record, with the result that he has in a few years immensely increased the milk production of his herd. The average for the whole herd of sixty-five cows a few years ago was something like 650 gallons per head per annum; whereas for the past year the average totals to nearly 900 gallons, with an average butter-fat percentage of 3·93. In the case of some individual cows, the record totalled 1100 gallons, and in one case 1200 gallons.

Bulls bred in this herd are in strong demand, and command very big prices. The heifers are usually brought to calve when about two and a half years old. At this age such as are not required to keep up the stock are sold, and fetch from £15 to £16 a-piece. The sire of most of the cows in stock at the time of our visit was a veteran, thirteen years old. Mr Hansen holds somewhat utilitarian views on the tuberculosis question. He does not test his cows, and looks upon the tuberculin test as uncalled for and unnecessary in a herd where cows are giving up to 50 lbs. of milk per day, and living and doing well up to fifteen years of age.

The arrangements of the byres left little to be desired, being roomy, well ventilated, and scrupulously clean. The milk from this farm was all sold for consumption in Copenhagen at 18 öre per litre, or from 7d. to 8d. per gallon on an average all the year round. Mr Hansen feeds his cows according to their milk production; thus they may be getting from 40 to 60 lbs. of roots, 5 to 8 lbs. of hay, plus straw, and 7 to 12 lbs. of oilcake, bran and oats. The ration is adjusted in this way: A given quantity, say four standards, of food is considered sufficient to maintain the animal in good condition, with what is termed a standard of food additional for each 3 Danish, or $3\frac{1}{3}$ English, pounds of milk pro-



A VIEW OF KOLLE KOLLE FARM

duced. The term standard denotes, say, 10 lbs. of roots, 2½ lbs. of hay, and 1 lb. of oilcake, bran and oats.

Bregentved

The home farm of Bregentved estate, owned by Count Moltke, is a farm extending to 900 acres, on which there is a stock of 300 cows, all of the red Danish breed. The steading here was of enormous size and splendidly appointed. Live stock in Denmark are for the most part tethered to stakes when out in the fields at grass, one reason being that there are, with few exceptions, no fences in the country; and, on the other hand, it is claimed on behalf of the tethering system that more stock can be kept on the land. On this score many of the party were sceptical, believing that, where pasture is uniformly cropped down in the early stages of its growth, considerably more herbage will be produced in the course of the season than where, as was seen in Denmark, the grasses had attained the stage of maturity before the stock had been over it. Be that as it may, we found at Bregentved another system, viz., the soiling system in vogue, which in many respects had more to commend it to the practical Scotchmen. Here the cows were wholly fed inside, being allowed out only for exercise. The food was cut in the fields and carted in, and fed to the cows in their stalls. The land was very liberally manured, both with farmyard manure, of which enormous quantities were made, and liquid manure, which was carefully preserved in tanks, as well as with liberal dressings of artificial manures. Under such an intensive system of farming it is quite conceivable that a much larger number of head of cattle can be kept on a given area of land. Here, too, great care was taken in the feeding and breeding of the dairy stock, and the milk yield was highly satisfactory. Some of the cows in the herd were giving up to 60 lbs. of milk per day shortly after calving, and from 30 to 40 lbs. per day seemed to be a common average. The cows here were milked three times daily, and the wage paid to the milkers was equal to 8d. per day. The women were paid 2 kroner, equal to 2s. 3d. per day, with house and perquisites. The milk of this dairy was sent once a day to the large creamery of Trifolium. Immediately on being milked, the milk was passed over a refrigerator, and then the vessels in which it was to be conveyed to the creamery were placed in large tanks containing ice water, and in this way it was kept at a very low temperature.

Skipygaard, near Aarhuus

What may be termed a typical peasant farm of 130 acres is that owned by Mr Rasmussen, near Aarhuus. For most of the way out from Aarhuus the soil seemed to be of a very light sandy description. Mr Rasmussen's farm of Skipygaard was purchased at a cost of £3300, including the price of the cattle then on the land, and with the improvements since effected,

both as regards the land and the stock, the owner computed it would be worth fully £4000 stg. The cattle here were of the black and white variety, which is the prevailing breed in Jutland. To most of us the black and white breed seemed larger than the red Danish, and were, as a class, more milky like, having well-sprung ribs, deep at the flank, and with capacious milk vessels. In common with the red Danish, they have conspicuously fine loose skins, and nice soft-touching milk vessels. They are invariably deficient in fore-vessels, but were this defect remedied they would be ideal dairy cattle. It is claimed on behalf of this breed that they are hardier and more vigorous than the red Danish; certainly they are stronger about the shoulders, and to all appearance are of stronger constitution. Mr Rasmussen has bestowed great pains in breeding his cattle on utility lines, with the result that he has, since acquiring the farm, immensely increased both the milk and butter-fat productiveness of his herd. The average milk record per cow for the past year was fully 800 gallons, and the butter-fat test 3·65 per cent. The average yield of butter per cow for the past year worked out to 337 lbs. The milk was all sent to a private creamery, and paid for according to percentage of fat, the average price for the year being 6d. per gallon, giving a return of £20 per cow. The cows were being grazed out during the summer, and were receiving in addition a little cake, bran and oats. The farm is cropped with a view to produce a suitable winter food for the cows, mangolds being largely grown, as well as swedes, oats, rye, barley and hay.

The hours of work of the servants, who are all boarded on the farm, are longer than in Scotland as a rule, and the wages about half. For instance the female servants were getting the one about £10 per annum, and the other £8; whereas the same class would in the dairying districts of Scotland be getting £10 to £12 per half year. Mr Rasmussen, an active, intelligent-looking man in middle life, had four of a family, two sons and two daughters, one son being at the university, and the other in Scotland studying the Scotch system of farming.

The whole place had a frugal well-managed air, the buildings were commodious and comfortable, as is usual in Jutland, arranged in the form of a square, the walls built of brick in a wooden framework, and the roofs thatched, with the inevitable stork's nest on one of the chimneys. By shrewd and judicious management Mr Rasmussen has acquired a position of pre-eminence with his dairy cattle, and as a consequence any young bulls he has to dispose of are eagerly inquired after. Bull calves out of his best milking cows are sold when six to eighteen months old and realise from £10 to £25, and quite recently he got as much as £60 for a very promising yearling bull out of an extra deep milking cow with a good butter fat record. Here as everywhere in Denmark the cows were tethered when at pasture, a system to which the Scotch party could hardly be reconciled owing to the trouble involved, but their minds were somewhat disabused in this respect on seeing the whole twenty-four cows being marched in for milking

in charge of one man, and marshalled up in the court yard four deep like a company of soldiers, and despatched in fours for water prior to being tied in the byre. The apparent docility of the cows in Denmark is a striking testimony to the gentle and kindly treatment bestowed on them from calf-hood.

Borupgaard

This splendid holding, probably one of the best in Denmark, owned by Mr Petersen, extends to about 700 acres. The live stock

FARMHOUSE : BORUPGAARD

on the farm consists of 150 cows in milk, all tethered in one field of 180 acres at the time of our visit, 150 head of young cattle, 200 pigs, 12 horses, and 23 brood mares and young horses. We found the cows grazing on the best pasture we had yet seen in the country, and Mr Petersen assured us that he computed that by the tethering system he could keep 25 cows for every 20 he could keep on the same area going at liberty, but it is somewhat doubtful if he succeeded in convincing his audience as to the soundness of his views on this point. This farm lies fully 500 feet above the sea level, which is nearly the highest point in the country, and it may be noted in passing as a peculiar trait of the country, that the finest and most productive land is invariably found at the higher elevation, and the least valuable at the lower elevation. Borupgaard is the farm referred to in another part of this Report where Professor Bang resolutely set himself the task of eliminating tuberculosis from the herd, and so successful have his efforts been that it is now declared to be absolutely immune,

there being not a single reacting animal in the stock. The milk record of this herd for the past year was 6000 to 8000 Danish lbs. per cow, the former being the yield of some of the younger cows, and the latter that of a few of the best. In consequence of having his stock certified immune from tubercular disease, Mr Petersen is enabled to dispose of about one-fourth of his entire production of milk in the town of Aarhuus at a very high price, where it is sold as children's milk, the remainder being sold to a creamery located on his farm and owned by a private company. As is the case at all the creameries in the country, a large proportion of the separated milk is taken back after being pasteurised, and utilised for calf and pig feeding.

Stenballe

This farm, in the occupation of Mr Soltoft, is situated about five miles from Horsens. Mr Soltoft is a tenant farmer and a splendid specimen of the good old yeoman type. Stenballe extends to 500 acres. The present occupancy was entered on thirty-seven years ago, and the rent is £680 per annum. This includes the use of the cattle as well as the land, the cattle being bound to the land. He pays no taxes to the State, but pays local taxes to the commune, such as school, church, and road rates amounting to £70 a year. Where land is rented in Denmark the system of tenure somewhat resembles that of sheep farms in Scotland, the cattle being bound to the land. The tenant, however, does not pay for the stock; they are valued at the commencement of the occupancy, and again at its termination; and where depreciation has taken place through mismanagement or otherwise, the outgoing tenant must make good the difference in value, but where on the other hand the value of the stock has been enhanced, the landlord pays the difference in value to the outgoing tenant. At the beginning of the occupancy the tenant deposited a sum of fully £1000 as security, on which sum the landlord pays interest annually. The rent is paid six months in advance, and one year's notice is necessary on either side to terminate occupancy. No compensation is paid for improvements or for the unexhausted value of manures applied to the land or for feeding consumed thereon. The landlord keeps up the farm buildings externally, and the tenant is held responsible for the internal upkeep. At the beginning of Mr Soltoft's occupancy the cattle consisted wholly of bullocks valued at 150 kroner each, or roughly eight guineas sterling, but now it is converted into a dairy stock worth on an average fully twice that amount.

The stock at the time of our visit consisted of 120 milk cows, 100 young cattle, various ages, 150 pigs, 18 work horses, 22 young horses, and 2 light horses. Mr Soltoft's herd are all of the Dutch breed, and in order to keep up the purity he introduces fresh bulls bought in Holland every few years. All new stock are tested with tuberculin before admission into the herd, and the whole of the cattle are kept immune by careful testing and isolation of re-

acting animals. These Dutch cows were larger framed than the Danish white and black, and gave every indication of being right good milkers. We found the same methodical system of book-keeping and the keeping of correct records of milk and butter fat percentage as at the other well-managed places visited, and these Mr Soltoft placed in our hands. His books were a marvel of neatness and method. A glance at the milk record for the past year showed some splendid totals: in one case 10,950 Danish

FARMHOUSE: STENBALLEGAARD

pounds during a milking period of eleven months; another period 10,646; and others ranging from 7446 to 8909 Danish pounds, the average for the whole lot being roughly 8000 Danish lbs., which is equal to 880 gallons, while the average butter fat test was 3·25 per cent. The unanimous opinion formed of this stock was that while the Dutch cows give more milk than the Danish, the milk was slightly poorer in fat. Mr Soltoft rears all his heifer calves, and for those not required to keep up his own stock he finds a capital demand from Sweden, getting from £19 to £20 a piece for in-calf heifers when 2½ years old. The cows are milked twice daily, at 4 A.M. and 4 P.M., the average period of lactation being ten months.

Mr Soltoft impressed the strangers as being a masterful type of man, holding strongly conservative notions in regard to the conduct of his business. He is unconnected with any of the organisations which have proved such a boon to the smaller farmers, preferring to do his business in his own way, making his purchases in the cheapest market, and selling his products on his own account in the dearest market. He has, however, three brothers,

all extensive occupying owners of land, and it is just possible that they can form a fairly strong "combine" on their own account. When asked if he was connected with any co-operative organisation, he naïvely replied, "I was born a free man, and wish to remain one." He manufactures all his own dairy produce in his own splendidly equipped dairy, where everything is done on the most up-to-date methods.

Butter is made from separated cream and sold to a merchant in Horsens, who ships it direct to England, at a price usually 2 öre over the Copenhagen quotation. All skim milk not required for calf and pig feeding is made into cheese and sold to local merchants at 15 to 16 öre per Danish pound = to 2d. to 2½ per English pound. The system of winter feeding adopted is to give besides roots and fodder, 1 lb. of concentrated food for every 4 lbs. of milk produced by each individual cow. The steading was large and commodious, with the usual thatched roofs, and the whole buildings arranged in a square with large open court-yard in the centre. The farm-house was of palatial proportions, and the dairymaids' cottage a model of neatness and comfort. The byres were roomy and in good order, and the cows were fed from a passage running up the centre. In the course of inquiries as to the wages of servants, conditions of labour, etc., the party were at first staggered to learn that as many as sixty holidays are allowed per annum, but on further inquiry it was elicited that fifty-two of these holidays were Sundays.

The Farm of Count Weddell in Fyen

A short drive from Ejby station brought us to the beautiful farm of Count Weddell. This was undoubtedly the largest and best appointed farm we had visited. The steading itself would cover at least 5 acres, and the land in connexion with the farm would extend to fully 1000 acres. The splendid arrangements for housing the stock (the roof of the buildings being fire-proof), and the arrangements for preparing food for the animals, were much admired. Here again we found the same scrupulous care bestowed on the keeping of pedigree registries, milk records, etc. The stock of cows, 200 in number, are all regularly tested by Professor Bang and his assistants, and reacting animals are at once isolated. The cows are all of the Red Danish breed. The average milk record for the past year was 7000 Danish lbs. per cow = 777 gallons Imperial measure. In the case of one cow kept in the reacting byre, it was explained that in one year she produced the enormous total of 576 lbs. of butter. The butter fat test for the entire herd for the past year was 3·8 per cent.

A stock of 200 pigs are kept for the utilisation of skim milk, whey, etc. Some splendid boars and sows of the White Yorkshire breed were to be seen in the breeding pens. The arrangements in these breeding pens were superb, radiators being fixed between each two pens in order to keep up a uniform temperature during winter, and iron bars fixed round the sides of the walls

to prevent the young pigs being overlain. A large number of the employees are boarded on the premises, and we had the pleasure of being shown through the comfortable sleeping apartments, kitchen, dining-hall, recreation room, and bathroom. The Count himself received the party in the most courteous manner, and personally conducted us through his steading, stock, etc., in which he evidently takes great pride. He also showed us through his mansion house, which dates from the fourteenth century, the private chapel, and flower garden. Then mounting our brakes, we proceeded, on the invitation of the Count, who accompanied us with a party of friends in his own carriage, to inspect some of the small holdings on his estate.

The Count's estate, it may be mentioned, extends to 30,000 acres, let for the most part to 260 tenants, with holdings varying from 50 to 100 acres, and 9 very large farms of from 300 to 600 acres each. There are also on the estate 300 cottars with houses and pieces of land attached of from 1 to 2 acres in extent. Our next place of call was at Count Weddell's private creamery, where he sends the milk from his own herd, and also takes in and manufactures the milk of eleven of his larger tenants on the co-operative principle. The smaller tenantry have a co-operative creamery of their own. This is characteristic of many of the districts we visited, the smaller class of tenants invariably preferring to have a creamery of their own, and managed by themselves on co-operative principles.

The Count's dairy factory was a model in every way, situated in beautiful surroundings, and fitted up with all manner of modern appliances, which were evidently kept in beautiful order; the various products were being manufactured under ideal conditions. Butter is the principal product, but a considerable quantity of cheese is made from skim milk not required by the farmers for calf and pig feeding. Various kinds of cheese are made, some from skim milk only, and others from half skim and half whole milk, and others from full milk. These cheeses are all sold locally at prices varying from 15 öre for the skim cheeses to 42 öre for the full milk cheese. All the cream, immediately on being separated, is heated up to 85° centigrade = 185° Fahrenheit, and then cooled down, and the skim milk going back to the farmer is treated in a similar manner. Count Weddell is evidently a firm believer in providing ample bathroom accommodation for his employees. Here, as at the farm, we found a splendid bathroom, where hot and cold baths and shower baths could be obtained. On leaving the factory, the Count and party accompanied us for miles through his beautiful estate, and had time permitted we would have had the opportunity of seeing some of his larger farms as well as the smaller, but our programme would not allow of longer delay. The Count was most cordially thanked for all his kindness, and for the pleasure he had afforded the party in showing them through his beautiful estate, farms and factory.

A LABOURER'S HOLDING

By an Act of Parliament passed in 1899 for five years and renewed in 1904, the Government of Denmark provided money for the purpose of granting loans to agricultural labourers for the purchase of their holdings. When this Bill was passing through Parliament a discussion arose as to whether it should provide sufficient land to enable the labourer to maintain himself and bring up his family, or whether it should provide only allotments with the view of inducing the labourer to remain in the country as a ploughman on the larger farms. The majority decided that sufficient land should be provided to make the labourer independent of outside work. It may be questioned, however, whether the discussion did not end somewhat in a compromise, with the result that less land had been put at the disposal of the labouring class than is absolutely necessary. The Act stipulated that the holdings should extend from $4\frac{2}{3}$ to $6\frac{2}{3}$ acres of average land, and not below $2\frac{2}{3}$ of good land or above $10\frac{2}{3}$ of poor land. In any case the Renewal Act of 1904 extended the size of the holdings to 16 acres, where the land was of poor quality. Even now, it must be kept in view that this class of holding is still in its experimental stage, and that it may be necessary to extend the acreage still further before these holdings become as successful as other holdings in Denmark.

Let us take a concrete example of this class of holding. The owner of the holding we refer to obtained a Government Prize for his holding and may, therefore, be reckoned one of the best of his class. He was a small holder before the 1899 Act was passed, and his holding, which extends to 8·7 acres of clay mould, near Vejen in Jutland, is somewhat larger than the Legislature thought necessary for a self-supporting holding. But it will show the position which labourers' holdings occupy in Danish agriculture. This small farmer was trained at a High School and Agricultural School in Denmark. When he bought his farm in 1886 he was a labouring man and unmarried. He paid £332 for the farm and the stock. He had not money to pay the price, and he obtained two loans, amounting together to £304 at 4 per cent. interest. Since then he has paid back £156. His stock now consists of 1 horse, 3 cows, 2 young cattle, 5 pigs, and about 30 hens. The rotation on his farm is: Potatoes, turnips and beet; mixed crop of grain and green peas; rye; beet and carrots; oats; clover and grass; clover and grass. One acre is used for stall feeding and garden plants. The garden, which extends to two-thirds of an acre, contains about 100 orchard trees and some fruit bushes.

SMALL HOLDING: MR SORENSEN'S, THREE MILES FROM ODENSEE, THIRTEEN ACRES

He gives the potatoes, turnips, and beet a dressing of artificial manure and urine. The other crops are dressed with dung and urine. He buys his stock himself, but he is a member of a co-operative society which keeps well-bred bulls. His seeds and manures are bought through a Co-operative Supply Association. He is a member of a creamery, bacon-curing establishment, and egg export centre, and he disposes of his produce by means of these Societies. He is now married, and has one child, a boy of fourteen years of age. He and his wife, with the assistance of a young girl from May to November, do most of the work on the farm. For a number of years he went out and worked to other farmers, and in this way added to his income. He now confines himself entirely to his farm.

The farmers of Denmark keep their accounts and balance their books, not always perfectly, but much more accurately than farmers do in this country. It is, therefore, comparatively easy to see the result of their farming. The following balance sheet from 1st January 1903 to 1st January 1904 will show the result of this small holder's operations.

BALANCE-SHEET OF 8¾ ACRES FARM.

INCOME.	£	S.	D.	EXPENSE.	£	S.	D.
Delivered 20,696 lbs. milk to the Creamery	41	2	10	Bought meal for the cows	13	3	6
Sold pigs and little pigs	23	3	8	„ „ „ pigs	12	3	10
„ 3 calves	1	12	3	„ seed of corn, beet, grass	2	7	9
„ eggs for about	5	11	1	„ artificial manure	0	15	0
„ 1058 lbs. green peas	4	8	2	Repair of buildings and tools	1	18	11
„ berries	3	6	8	Rates and Taxes—Tithe —Fire Insurance	2	16	3
Used in the household—				Girl's Wages	2	4	5
Milk, about	3	6	8	Day Labourer	0	5	7
Pork	2	15	7	Veterinary Account	0	5	7
Eggs and Poultry	2	10	0	Balance — payment for own work, and interest of farm's value	59	6	1
The stock increased with 1 heifer and 1 calf	7	10	0				
	£95	6	11		£95	6	11

£59, 6s. 1d. is not a large amount with which to pay the farmer for his own work and interest on his loan. Suppose the farm is worth what he paid for it—viz.: £332—interest on this amount at 4 per cent. would be £13, which would leave as wages to the farmer £46. It cannot be said that there is a fortune in small holdings of this kind. Still, they compare favourably with the same class of holdings in the United Kingdom. Outside the crofting areas—which are not suitable for a comparison—there are no districts in Scotland where holdings of this kind predominate. There is, however, one district at least in England where there are many of them—the Isle of Axeholme in Lincolnshire. We have seen a balance-sheet of a ten-acre holding there, worked by the farmer, his wife, and children. The return to them for their year's

labour and interest on their money was £64—a labourer's wage. The English and the Dane apparently reach pretty much the same result at the year's end. In comparing these two holdings it must not, however, be forgotten that the scale of living in all ranks of life in Denmark is simpler and less expensive than it is here, though it must not be assumed that the small farmer is either overworked or underfed. He may work longer, but he does less work in the day than the Scotch crofter. He is thriftier and more careful than the Scotch crofter, and he is as well nourished. These small holdings, while giving the owner as good a living as he would get as a labouring man, give him more freedom, more independence, and they form a stepping-stone to larger and better paying farms. That is probably the most useful part they play in the agricultural industry of Denmark.

OBTAINING A FARMER'S HISTORY

TWO PEASANT FARMS

THE peasant farms of Denmark average 93 acres. Of the total cultivated area of Denmark, 66 per cent. is composed of these farms. They are pre-eminently the backbone of Danish agriculture. We take two farms of this class, one extending to 84 acres, and the other extending to about 107 acres arable and 27 acres of meadow. The owner of the 84 acre farm was educated at a High School and Agricultural School. He is a married man with two children, a son and a daughter, both at the present time at a Popular High School in Denmark. His farm is situated near Malling in Jutland. He bought it in 1886 for £2775, the price including the stock, as it invariably does in Denmark. He had no loan at that time, but the following year he got a loan of £555, the interest payable being 4 per cent. None of the loan has been repaid. His stock consists of 30 cows, 14 young cattle, 40 pigs, and 6 horses. The rotation of his farm is: oats; roots; barley; clover grass; rye; roots; barley; oats; clover grass; and clover grass. Last year he dressed his rye with superphosphate and nitrate of soda, the other crops with dung and urine. He buys his seed, manures, stock, etc., privately, but he is a member of a co-operative creamery by which he disposes of his produce. He employs six workers—a cowman, who gets 800 kroner a year; three men, who are paid respectively 300, 200, and 100 kroner; and two maid servants, who each receive 150 kroner. The men are sometimes mere boys. That accounts for the small wages in some cases. His last balance-sheet is as follows:—

BALANCE-SHEET OF 84 ACRES FARM.

INCOME.	£	S.	D.	EXPENDITURE.	£	S.	D.
Sold milk	400	0	0	Taxes (State)	13	17	9
„ cattle	15	4	5	Taxes (Commune)	25	0	0
„ pigs	218	3	4	Insurance (buildings and live stock)	8	6	9
„ horses	22	4	5	Wages to servants	111	2	2
„ corn	33	6	8	Seeds of grass, clover, etc.	16	13	4
„ eggs	22	4	5	Feeding stuffs	166	13	4
				Keep in repair	22	4	5
				Rent for a loan (worth £555)	22	4	5
				The family's subsistence	111	2	2
				Surplus for the owner's and his family's work at the farm, and for rent for the owner's fortune resting at the farm	213	18	11
	£711	3	3		£711	3	3

The owner of the larger peasant farm is a man well up in years. He received no education after he left the elementary school, probably because the Popular High Schools and Agricultural Schools were not much in evidence then. His farm is situated near Aarhuus, in Jutland. He bought it, including the stock, in 1870, for £3284. He did not get a loan at that time, but in 1888 he obtained a loan of £2207 at 4¼ per cent. Of this amount, £1104 has been repaid. His stock consists of 25 cows, 11 heifers, 2 bulls, 12 calves, 30 pigs, 70 hens, and 10 horses. The rotation of the farm is: oats; roots; barley; rye; roots; oats; clover and grass; clover and grass. He breeds his own cattle, and purchases his seeds and manures through a Co-operative Society. He disposes of his milk to a private creamery, because it is in his immediate neighbourhood, and more convenient than the nearest Co-operative Creamery. He is a member, however, of a bacon-curing establishment. He employs eight workers. None of the members of his family is employed on the farm. The eldest son—when we were making investigations—was proceeding to take over the farm; the second son is a mechanical engineer; one of the daughters has married a farmer, and the other one a carpenter. They have all attended the Popular High Schools and the Agricultural Schools of Denmark. His balance-sheet does him credit:—

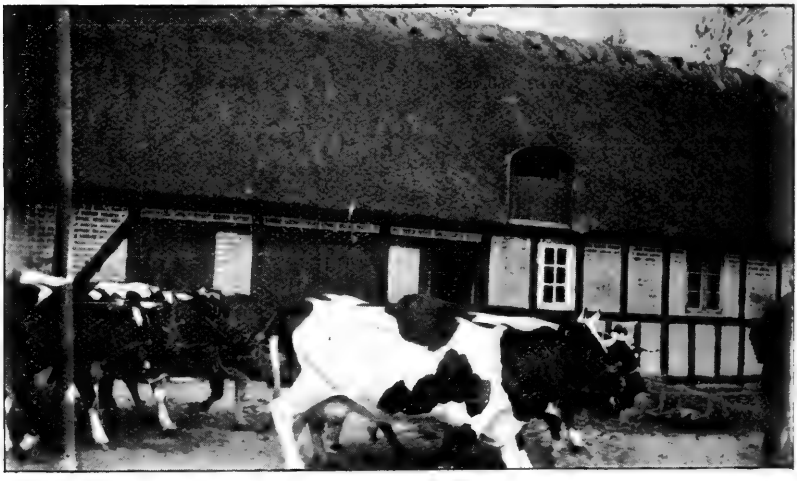
BALANCE-SHEET OF 134 ACRES FARM.

INCOME.	£	S.	D.	EXPENDITURE.	£	S.	D.
Sold milk	405	11	1	Taxes (State)	29	15	6
Sold young cattle (well-bred)	122	4	6	Taxes (Commune)	24	6	8
Sold pigs (72)	119	8	9	Insurance for buildings	3	2	2
Eggs	18	18	4	Insurance for live stock	6	2	2
Corn	40	5	7	Bought skim milk for the house	5	0	0
For the house—				Bought for calves and pigs	57	15	6
Sweet milk	9	8	11	Wages to servants	107	4	5
800 lbs. of bacon	15	11	1	Seed of roots and grass	10	14	5
2080 eggs	4	12	5	Oil cakes (feeding stuffs)	100	0	0
Poultry	5	15	7	Keep in repair (buildings inventarium)	8	6	8
Sold one horse	47	4	6	Rent, interest for loan on the farm	75	11	1
				For butter used in the house	23	2	3
				Colonial wares	24	0	0
				The family's subsistence	157	15	6
				Surplus (for the owner's work and profit)	156	4	5
	£789	0	9		£789	0	9

It will be noticed that in the balance-sheet of the 84 acres farm, the farmer, after paying all expenses, has a balance in his favour of £325, 1s. 1d., made up of: family subsistence, £111, 2s. 2d., and surplus for work and interest, £213, 18s. 11d., while in the balance-sheet of the larger farm the farmer has after

paying all expenses a balance of £361, 2s. 2d., representing butter used in the house, colonial wares—which means such articles as tea, sugar, coffee, etc.—family's subsistence, and surplus for his work and his profit.

The Danish farmer, large and small, owes nothing of his prosperity to freedom from rates and taxes. From an examination of the balance-sheets of four farms, ranging in extent from $8\frac{3}{4}$ acres to 290 acres, it appears that the State and Communal taxes of Denmark work out to an average of from 8 shillings to 9 shillings per acre.



MARCHING TO THE BYRE

AGRICULTURAL CREDIT

Loans and their Repayment

THE development of the movement for the formation of small holdings in Denmark has from time to time received considerable assistance from Government. As early as 1786 the Government started a fund from which loans were given to peasants to enable them to buy small farms. The rate of interest charged was very low, only 2 per cent., and the period of repayment of capital was a very extended one.

In the depression which accompanied and succeeded the Napoleonic wars in the beginning of the nineteenth century, the movement for the formation of small holdings was checked. About the middle of the century, however, it received a fresh impetus, and there then sprang up a strong desire among the agricultural population towards acquiring ownership of land. It became a question whether the money necessary should be provided through the State or by private enterprise. The solution was found in the establishment of a number of lending companies calling themselves "Agricultural Credit Societies," and carrying on business on principles similar to companies known in France as the "Credit Foncier." These companies have rules which are approved by Government, and their administration is to some extent controlled by Government. It is through them that at the present time most of the money is lent upon land. They advance to the extent of 50 per cent. to 60 per cent. of the value of the land and the stock upon it, and they receive in security not the land alone, but also the stock upon the holding. The rate of interest varies, but it is usually 4 per cent., with ½ per cent. added for repayment of capital, which repayment is usually extended over a period of about sixty years. Prior to the loan the holding and the stock are reported upon, and the Company has it in its power, from time to time, to inspect the farm, with the object of seeing that it is properly farmed, and that the stocking on it is maintained. In the event of the borrower failing in his obligations, the Company have power to take possession of the holding or to sell. The companies charge a commission of 2 per cent. for carrying through the transaction. It is a peculiarity of the system that the borrower does not receive cash for the amount of his loan, but he obtains cash securities of the Company of the face value of the amount of the loan, and these cash securities the borrower sells in the open market. The securities may at the time be either over or under par, and the borrower loses or profits accordingly.

The borrower is bound, as already stated, to repay the capital

by instalments, but he has also the option of repaying sooner, if the market is favourable, by the purchasing of securities of the Company.

The ordinary banks, as well as the Savings Banks also, lend money on the security of the land and stocking at varying rates of interest, and at varying terms in regard to repayment of the principal.

In 1899 the State came forward to assist in the formation of smaller holdings, and by an Act passed in that year, extending for five years, and since renewed, they undertook to provide an annual sum for loans on small holdings. The loans are administered by a committee for each district, consisting of three members, one appointed by the Minister of Agriculture, and another being a "husmand," *i.e.* a cottager or small holder. The purpose is to provide land for rural labourers between twenty-five and fifty years of age, who must have had five years' experience of agriculture, and possess testimonials from two reliable persons that they are diligent, sober, and suitable. The holding varies in size according to the quality of the land, but must be not less than $2\frac{2}{3}$ acres nor more than $10\frac{2}{3}$ acres of average land or 16 acres of poor land. The Government lend upon the security of this to the extent of nine-tenths at 3 per cent. During the first five years no capital need be repaid. After that two-fifths of the loan must be repaid in yearly instalments of 4 per cent., and thereafter the remainder in yearly instalments of 4 per cent. The holding must be cultivated, and the buildings and stocking maintained, to the satisfaction of the local Committee.

The Government also assist small farmers by providing for the formation in villages or districts of a Society, who may borrow from the Government to an extent not exceeding £333. This money is lent out again to the members of the Society in sums of not more than £2, 15s. each at a moderate rate of interest, and is repayable at the end of nine months. At the expiry of that time the borrower may reborrow. The money thus got is used for reproductive purposes.

In these several ways ample provision is made for the lending of money on land and stocking combined. It would seem, however, that excepting when the Government itself provides the money, it is not got on any easier terms than it would be in our own country, but there is this very important difference in the landowner's favour, that he is able to borrow on the security of the stock upon the holding as well as on the security of the land itself.

In any of the cases which came under the Commission's notice, the conditions regarding repayment of loans did not seem to press heavily on the debtors.

HOW THE FOREIGN MARKET IS KEPT

A NATION devoted in the main to the outputting of three commodities has a peculiarly strong incentive to study the best means of recommending them to the purchaser and to be alert and adaptable in all matters tending to favourable competition. The profitable disposal of her goods means for Denmark the keeping and extending of the foreign market. What are the causes of her success as an exporting nation? Just as we feel the force of definitely-aimed organisation at every stage in the extraction and collection of Denmark's agricultural products, so do we become conscious of the same practice of "moving together" at the selling and distributing end.

Although the effect is not directly traceable, it cannot be of small importance that Denmark is free from international distractions, and therefore can bring to her economic development a concentration of State effort not enjoyed by larger powers. Whatever hits agriculture in Denmark hits the State in a vital part. Accordingly, ministers whose departments bear upon the dominant industry are not obliged to compete for a hearing with other departments claiming greater urgency. The pressure of the internal trading interest is always greater than the pressure of any external interest that can normally arise. Danish representatives abroad are similarly without excuse for putting a single concern in front of that of helping the Danish export trade. In short, the central authority of the State is able to organise itself largely for the very purpose of pushing Danish commerce. It is significant that while the annual vote for the Ministry for Foreign Affairs is £39,000, that for the Ministry of Agriculture is £182,000.

Denmark also enjoys the security of a policy which has been adopted to suit the export trade. The tariff revenue of the State amounts to £1,600,000, but only a fraction of this sum is derived from taxes that could be said to affect appreciably the cost of agricultural production.

The following among other commodities are on the free list:—

Bacon and hams.
Living animals for food.
Meat, salted or preserved.
Meat, fresh.
Oilcake.
Wheat.
Wheat, flour.

To understand the importance of these exemptions from the tariff, we need only note the amount of the annual imports for 1903 of five principal articles, part of which may be re-exported :—

Meat, provisions, etc. . . .	£1,974,444
Grain, unground	3,082,222
„ ground	450,556
„ manufactures of . .	176,111
Feeding stuff	3,115,000

Thus, as the farmer's whole energies are bent upon the turning out of butter, eggs, and bacon for the foreign buyer, the soil being cropped to that end, it is part of the State policy that he shall have cheap imported commodities for his own consumption, and cheap imported feeding stuffs for his animals. Denmark recognises that for profitable selling in Britain and elsewhere there must be unrestricted admission of the primary requisites not produced in quantity by herself.

A fact of equal importance in its relation to the export trade is the State ownership of the railways. Denmark has a monopoly of 1112 miles of track, constructed by the State at a cost of £10,000,000, and a control over 800 miles more. What appears the moment we look at the finances of Denmark is that the State railways are not rigidly treated as profit-earning institutions. There is a natural desire that the Budget should show a profit rather than a loss ; but as soon as the profit becomes a substantial looking one, though it may not be the equivalent of 2 per cent., the farmer party begins to agitate for a reduction of rates. This actually happened in 1897, when the demand of the agriculturists that the profit should be returned to the people had a success. Since then the railway revenue account has been as follows :—

RETURNS FROM STATE RAILWAYS.

YEAR.	PROFIT.	LOSS.
	£	£
1897-8	241,473	
1898-9	163,235	
1899-1900	140,492	
1900-01	14,276	
1901-02	...	12,504
1902-03	164,686	
1903-04	262,055	

The falling of profit to a trifling sum in 1900-01 and the actual

extinction of profit in 1901-02 are attributed not to a decrease of traffic, but on the contrary to an increase so great that much fresh capital expenditure was required to cope with it. We are informed that the outlay upon new material, plant, machinery, and staff has nearly doubled between the years 1897-8 and 1901-02. The return to profitable working in 1902-03 shows that the costs of expansion were wisely undertaken; and it will be seen that the year 1903-4 presents a still more favourable account, as a law increasing considerably the passenger rates came into force on August 1, 1903. The point here concerning us, however, is that the goods rates are as low as they can be made; lower than any company working for dividend would be content to make them. Denmark's State railways are a national asset, large enough without reckoning State harbours, forests, and domains to offset the public debt of £13,600,000. She is therefore justified in so constructing her Budget as to dispense with any substantial amount of revenue from the railway service. She is bound in all questions as to the relative burden of goods rates and passenger rates to keep in view the agriculturists' dependence upon the export business. She cannot afford to make profit out of the railways to the detriment of the export business. In any case, the farmers see to it that the railways shall not earn too much profit when there is the agreeable alternative of reducing the goods traffic rates. For the farmers have the fixed idea that the State railways are part of their co-operative system whereby commodities are to be transported with the minimum of addition to the costs of production.

The State ownership of Danish railways takes them out of a useful comparison with railways which are answerable to private shareholders. It enables extensions of the track to be made and facilities given that are not completely justified by the traffic prospects. It enables the State to use the railways as part of a science of marketing; the State being content to obtain its reward in the form of a richer and more numerous people, a people of higher spending power and greater tax-bearing capacity. The outstanding features of the collection and transportation of goods in Denmark serve indeed to emphasise the familiar complaint made by British Railway Companies when they are charged with favouring the foreigner in the matter of rates. It is our interest, say the British Railway Companies, to foster the home market, because the establishment of prosperous industries in the products of the field, farm and dairy, means an ultimate advantage to carrying companies much greater than is obtainable from the encouragement of the foreign import business, the one raising the hope of increased passenger traffic, the other beginning and ending with the transport of goods. But so long as the home producer is a unit he cannot expect the terms of producers acting in combination. It is here we realise the value as a marketing agency of the co-operative network extending over Denmark. The farmer making up his own goods into lots according to his individual capacity, despatching for himself, selling for himself,

is the exception. The little rural association collects from the farmer; the federation collects from the local association; the produce for export is thus aggregated in centres where it is offered to the railway in ton loads or truck loads at stated intervals and despatched with the smallest cost of time and labour. Co-operation, as widely and skilfully practised in Denmark from the first stage to the last, favours this preliminary accumulation of goods before the chief transporting agency takes up the work. Handling of perishable goods in small quantities made up in packages of all sorts and sizes is incompatible with the low railway rates and quick transit that are essential to Denmark's export trade. It follows, of course, from the system that a far larger proportion of the total traffic is being carried at the 5 tons waggon-load rate than could be the case in a country of non-associated senders doing a greater total business.

As the Danish export business grows, the proportion of traffic enjoying the lower scale of charge will also grow. The advantage accruing from the large load is considerable. While the railway will carry small lots 10 miles for 2s. $5\frac{1}{3}$d. per ton, it will carry a waggon load of 5 tons the same distance for 1s. $6\frac{2}{5}$d. per ton. Or, on the principle of the sliding scale in use, the figures for 100 miles would be 9s. 4d. for the small lots per ton, and 6s. $6\frac{2}{5}$d. for the waggon load per ton. Moreover, if the sender is also the owner of the refrigerator or insulated waggons—and 90 per cent. of the waggons used for the carriage of butter and eggs are private property—the railway refunds him 1s. $1\frac{1}{4}$d. for every 31 miles the waggon travels.

The fixing of rates in a sliding distance scale, the charge rising with the addition of every three statute miles, seems to be regarded as fair, and at any rate it has the merit of rendering impossible secret contracts and preferences. A foreigner cannot get his goods into a Danish market at an advantage over the native trader; nor can one native trader obtain better terms than another. The effect of geographical inequality is minimised by the co-operative working which spreads the cost of carriage over numbers, as well as by the absence of any undercutting in the selling market. Then perishable goods are not subject to the tax of a higher rate. No matter how distant the place of origin from Copenhagen and Esbjerg, the two chief points of departure for Great Britain, the perishable goods are carried at the same rate for quick transit as by goods train. All the rates are at owners' risk.

As examples of rates for inland conveyance of butter, eggs, cheese and bacon, the following may be quoted :—

Kilometres.	Miles.	Price per 100 Kilogrammes, = 2 cwt.		Price per 100 Kilos in a Waggon load of 500 Kilos = 5 tons.	
		Danish.	English.	Danish.	English.
		Öre.	Pence.	Öre.	Pence.
1-5,	1 to 3·1	13	1·73	8	1·06
6-10,	3·7 ,, 6·2	16	2·13	10	1·33
11-15,	6·8 ,, 9·3	19	2·53	12	1·6
16-20,	9·9 ,, 12·4	22	2·93	14	1·86
21-25,	13 ,, 15·5	25	3·33	17	2·26
31-35,	19·2 ,, 21·7	31	4·13	21	2·8
41-45,	25·4 ,, 27·9	37	4·93	26	3·43
51-55,	31·6 ,, 34	43	5·73	30	4
61-65,	37·8 ,, 40·3	48	6·4	34	4·53
71-75,	44 ,, 46·5	52	6·86	37	4·86
81-85,	50·2 ,, 52·7	56	7·46	40	5·33
91-95,	56·4 ,, 58·9	60	8	43	5·73
101-105,	62·6 ,, 65·1	64	8·53	46	6·13
121-125,	75 ,, 77·5	72	9·6	51	6·8
141-145,	87·4 ,, 89·9	78	10·4	55	7·33
161-165,	99·8 ,, 102·3	84	11·2	59	7·86
181-185,	112·2 ,, 114·7	89	11·86	63	8·4

In contrast with the moderation of these rates it may be remarked that the charge for conveyance of milk from Kilmarnock to Glasgow is three-farthings per gallon, the distance being twenty-four miles. This is three times the cost of a pound of butter from Copenhagen to Leith, and one pound of butter is the product of two-and-a-half gallons of milk.

The following table of rates for the carriage of butter and eggs in small lots at owner's risk in Denmark and in England may also be interesting :—

CARRIAGE OF BUTTER AND EGGS.

DENMARK.		ENGLAND. *Great Western Railway Co.*	
	per ton.		per ton.
30 miles . .	4/5⅓	30 miles . .	10/-
40 ,, . .	5/4	40 ,, . .	11/8
50 ,, . .	6/3	50 ,, . .	13/4
60 ,, . .	6/10⅔	60 ,, . .	15/-
70 ,, . .	7/6⅔	70 ,, . .	16/8
80 ,, . .	8/1⅓	80 ,, . .	17/11
90 ,, . .	8/8	90 ,, . .	19/7
100 ,, . .	9/4	100 ,, . .	21/3

The vexed question of through or preferential rates does not directly arise in connexion with the Danish railways. The peculiar organisation of the export trade has led to the produce

which is destined for the British market being first warehoused by local merchants or by representatives of British firms. Accordingly these warehousemen arrange with the steamship lines, of which there are six, for rates combining freight by sea and railway carriage to points in Great Britain.

The statement that the Danish railways do not offer other than inland rates, however, requires two qualifications. There are, in point of fact, through rates for bacon from Odense and possibly from other places; and the Danish Government subsidises the Union Steamship Company to the extent of £20,000 per annum. This State aid is held to be warranted by the running of three boats a week instead of two on the Esbjerg Harwich route, the third boat, and, indeed, all of the boats going without full cargo. What is secured by the subsidy is a market advantage in the shape of a quicker delivery of goods. As Denmark is competing in butter with Canada, the effect of the subsidy is very real, though it cannot strictly be called the equivalent of a bounty or preferential rate.

Danish produce for Scotland is mostly shipped from Copenhagen. The following rates are in force:—

BUTTER FROM COPENHAGEN *via* LEITH.

	s.	d.	
To Edinburgh	30	0	per ton.
„ Dumfries	40	0	„
„ Dundee	36	0	„
„ Belfast	43	4	„
„ Ardrossan	44	0	„
„ Glasgow	30	0	„

EGGS FROM COPENHAGEN *via* LEITH.

	s.	d.	
To Edinburgh	35	0	per ton.
„ Dumfries	45	0	„
„ Dundee	40	0	„
„ Belfast	45	0	„
„ Ardrossan	45	0	„
„ Glasgow	35	0	„

It has to be observed that the ton weight includes in the case of butter, 300 lbs. of packing material, and in the case of eggs, 440 lbs. The value of a net ton of eggs may be taken at £43 and of butter at £100. As nearly as can be computed the cost of carriage of these commodities from Copenhagen to any one of the chief cities of Scotland is one farthing per lb.

The pitch of efficiency to which the Danes have raised the science of marketing is well illustrated by the Wholesale Butter Quotation Committee of Copenhagen. Consisting of eight members representative of the various butter interests, with the Chairman,

Mr Adolf, who is unconnected with the trade, making nine members in all, this Committee meets every Thursday to fix the quotation for the current week. The duty is a critical one, designed to obviate competitive price-cutting among the creameries, and to give the farmers the assurance of a fair and uniform price for their produce. The practice of the Committee, as explained by Mr Adolf, is to take the actual prices in the two principal countries of sale, Britain and Germany, and to correct these by what is termed "the feeling of the market." Consideration is also given to official and private reports as to the relation of supply and demand in the various markets. When the Committee has arrived at its decision, the Quotation is immediately published in the newspapers along with a statement of the Quotations issued in the corresponding weeks and months for a series of past years. Such a system is not easily carried to perfection. At the time of the visit of the Scottish Commission the complaint was rife that goods were sold at a price above the quotation, some buyers being willing to give better terms for butter in the enjoyment of a reputation for peculiar delicacy of flavour or other quality, just as higher prices are paid for wines of a special bouquet. This appearance of preference, it will be readily understood, spread dissatisfaction among the farmers whose butter was produced in conditions practically alike. They held that the Quotation was about 3½ kroner too low for the 100 Danish pounds of butter. The Committee was then grappling with the difficulty, and looked forward to a time when it would be justified in adding the existing over-price to the Quotation. The time came on January 1st 1905, an arrangement taking effect on that date whereby five kroner were added to the Quotation and the over price cancelled. It appears that the Quotation directly serves two business purposes: it is used by buyers in Britain, Germany, Sweden and Norway for their general guidance in placing orders; and it is the basis on which the price paid to the farmers for their milk is computed. But its effect also descends to the consumer. By the publicity given to the Quotation the butter trade is conducted, as it were, with the cards on the table. The retail dealer in Britain knows approximately what price the importer has paid to the warehousemen in Denmark. Hence both exporter and wholesale importer are obliged to trade on a very small margin of profit, the maximum advantage going to the associated farmer and the consumer.

The following table shows the variations of the Quotation over a period of nine months. The price in Danish currency is for 100 Danish pounds weight; the price in British money is per cwt. of 112 lbs. avoirdupois. The quotations are free on board at Copenhagen :—

COPENHAGEN BUTTER QUOTATIONS FROM 2ND JUNE 1904 TO 30TH MARCH 1905.

Date.	Kroner.	British Money.	Date.	Kroner.	British Money.
1904			1904		
June 2	77	86/9	November 3	93	104/9
„ 9	77	86/9	„ 10	93	104/9
„ 16	81	91/3	„ 17	93	104/9
„ 23	81	91/3	„ 24	93	104/9
„ 30	81	91/3	December 1	95	107/-
July 7	81	91/3	„ 8	95	107/-
„ 14	81	91/3	„ 15	95	107/-
„ 21	81	91/3	„ 22	91	102/6
„ 28	83	93/6	„ 29	91	102/6
August 4	86	96/10½	1905		
„ 11	89	100/3	[1] January 5	96	108/2
„ 18	92	103/7½	„ 12	...	...
„ 25	92	103/7½	„ 19	...	...
September 1	92	103/7½	„ 26	...	...
„ 8	95	107/-	February 2	...	...
„ 15	100	112/7½	„ 9	93	104/9
„ 22	100	112/7½	„ 16	...	...
„ 29	100	112/7½	„ 23	...	...
October 6	98	110/4½	March 2	...	...
„ 13	96	108/1½	„ 9	...	...
„ 20	96	108/1½	„ 16	95	107/-
„ 27	96	108/1½	„ 23	95	107/-
			„ 30	93	104/9

Denmark, it need scarcely be said, has many organisations directed to the extension of the export trade. One of these is the Export Association, the working of which was explained by its President, Mr Schou, the Adviser in Agriculture to the Ministry. This body discharges the function of a Chamber of Commerce, but with a special eye to the finding of new markets. Formed of persons interested in various branches of industry and trade, it aims at assisting every one in foreign countries to buy Danish articles. The Association has been the means of starting many Danish businesses in British possessions, as well as in such countries as Mexico and Argentina. A showroom has recently been opened in Berlin. A similar establishment is to be started in Stockholm. To assist the operations of the Export Association, and to make the practical applications of its policy, an Export Trading Company has been formed with a capital of £6000. The Trading Company, having first been satisfied that a particular market is a promising one, endeavours to find a Dane with sufficient capital. It then accepts a half of the risks, guarantees his credit, collects the goods, and controls and expedites the shipments. The scheme, thus briefly outlined, is part of the deliberate endeavour of Danish business men to create new outlets for the national products.

[1] NOTE.—The Copenhagen market is reported 5 Kroner up. This is the new arrangement which has the effect of cancelling the over-price of 5 Kroner; the market remaining unaltered.

RURAL LIFE

In the competition engaged in by Continental nations for British trade it is not unusual to attribute to them the advantages of cheap labour and long hours, associated with a low condition of the people. This, however, is an illusion as far as Denmark is concerned. The people show no signs of want. Indeed, everywhere we were struck with the air of prosperity and contentment. The people, frugal and thrifty in habit, live simple but happy lives. All are neatly although inexpensively dressed, and behave with great decorum. The Danes, although constant, careful and systematic at their work, do not seem to work hard. There was, as far as we could judge, an entire absence of the push and strenuous labour so apparent about a well-regulated Scotch farm. The farm hands, where hired labour is required, are either married and live on the farm in comfortable cottages which are well kept, or unmarried and lodged and fed in the farm house. The food provided is pretty much the same at each place, consisting of a breakfast at 5.30 of porridge made of oat and barley meal, served with milk, followed by a cup of coffee and rye bread. About mid-forenoon, sandwiches and coffee or sometimes home-brewed beer are provided. At twelve, dinner, generally consisting of soup, meat and potatoes is served. Work is resumed at two o'clock. Sandwiches are again served in the afternoon, and supper, consisting of porridge, followed by coffee or sometimes tea, is served about seven o'clock. The working day in the fields varies from nine to ten and a-half hours. Engagements are for six months, and young men get, with bed and board, £14 to £18 per annum. Women similarly receive from £8 to £10, while married men get from £23 to £34 per year with a cottage and various small allowances. Cattlemen, who milk three times a day, and have a full day's work on Sunday, earn £3 to £5 more ; and when married men's wives milk three times a day, they earn 8d. or 9d. a day. But although some idea of the rate of wages and the conditions of labour can be gathered from this information, it must be remembered, owing to the system of land tenure and the very large proportion of small farms, that there is far less hired labour than in this country. It is the aim of the Danish peasant to become a small holder, and he is wonderfully successful in realising his ambition, with the result that the large farmers are now beginning to have labour difficulties, as the peasant proprietor, once he has got his holding, although it may consist of not more than half-a-dozen acres, contrives by intensive cultivation, cow-keeping and thriftily doing all his own labour, including repairs of buildings, harness and the like, to

make it keep himself and his family. Indeed, he seldom seeks labour on the larger farms.

The holidays of the farm servants amount to about sixty-one days per annum. This includes the Sundays, which are openly spent as holidays, and are marked by gatherings of the people for amusement and social intercourse. At recognised centres all classes, men, women, and children, meet and thoroughly enjoy themselves; and although drinking-saloons and places of amusement are open, the conduct of the people is orderly and praiseworthy. Lecture-rooms and libraries also exist at convenient places; and the Government has arranged a cheap rate of postage by which daily newspapers are delivered for about 6½d. a month.

In a country where small holdings predominate, it is a matter of no surprise to find that there is not the same class distinction and gulf between the social condition of master and servant that we find nowadays in this country.

The system of farming, and the co-operative methods of disposing of the produce, render markets, and attendance at them, unnecessary, with the result that the farmers stay more at home than they do in this country, and closely supervise their business there. In this they usually find able seconders in their wives. On one of the largest farms visited, although it was the property of the holder, the mistress made it pretty apparent that she was really chief poultry and dairy maid. This good lady lost nothing in the estimation of the party when, after showing off her scrupulously clean poultry houses with patent nests which only allow the hens to enjoy the freedom of the farmyard after paying the toll of an egg, her chickens, ducklings, incubators, and young calves, she invited them to inspect her splendidly equipped house, and refresh themselves with her choice home-brewed wine. Thus we have evidence that the large as well as the small holders are simple and thrifty in their habits, and closely attentive to their business.

In all the complicated arrangements of the co-operative system it is remarkable how faithfully the members carry out the terms of their bargains. The price obtained is, as a rule, accepted without question. All disputes seem to be settled with the minimum of friction. There is no difficulty in obtaining able and honest managers. The central boards at Copenhagen and elsewhere appear to maintain excellent relations with the local factories. It is a striking testimony to the business capacity of these boards, and to the truthful; honourable understanding among the people, that the operations of the trading confederations have worked so harmoniously that there has been no revolt, and outside trades and rings have quite failed to break up the co-operative union.

In visiting numerous small holdings we had many side-lights revealing the secret of the conspicuous success of this distinctive feature of Danish agriculture. The system everywhere was the same; cows, pigs, and a few poultry, the milk all going to the local creamery, and about 90 per cent. of the skim milk coming back to rear the calves and fatten the pigs. The position of the wells, and the spaces in which the cows were housed might, in some instances,

COTTAGE OF ONE OF THE PROFESSORS AT DALUM

WIND-DRIVEN ELECTRICAL STATION AT ASKOV

not conform to the ideas obtaining amongst our authorities at home, but in every case the animals were comfortable, and the premises well kept. Of the people themselves it is impossible to speak too highly. We saw amongst these humble small holders some fine specimens of manhood and womanhood, bearing eloquent testimony to that splendid system of education and training which has for some time been placed within the reach of the peasant population. Everywhere we saw evidence of careful management, backed up by prudence and thrift. Indeed some Danes, in anxiety to save, are said to sell the best of everything, and to use secondary or foreign stuff for their own households. The arrangements for saving labour, in some cases by using electrical power, the care taken of implements and utensils of husbandry, the trig, clean cottages, each with its neat, well-kept front garden, carefully painted gates and doors, all unmistakably point to the influence of the People's High Schools.

The Commission were at Askov compelled to admire the initiative of the Dane in the application of electricity to farm work. There we found a generating station with the windmill for the motive power, supplemented by a petrol engine in periods of quiet weather. As the station had a storage capacity of four or five days, the petrol engine was not in use for more than thirty days in the year. By an ingenious arrangement, the invention of Professor La Cour, the variations of speed arising from variations of wind force were regulated and controlled at the dynamo. From this station the village was lighted; the circular saw and lathes in the carpenter's shop were actuated by the current; and at least one small farm was on the system. At another farm of about 80 acres close by, the owner had a private electric installation, the current also being generated from a windmill. The farm machinery was driven by this power. The farmer's dwelling, a beautiful suite of rooms, was fitted with 25 lamps. Moreover, the electric light was carried throughout the farm buildings, even to the pig-sty. It was worth visiting Denmark to find the wind harnessed and made to generate electricity for the illumination of a pig-sty.

The interior of a farmer's house on a holding of 10 to 20 acres is certain to contain two little reception rooms, with brightly polished wood floors, a few articles of furniture, among them often a bureau, excellent prints upon the wall, the whole effect being rather formal and precise, but expressing a love of cleanliness and modest comfort, as well as a certain measure of refinement. In every case, whether our visit was, as often happened, a surprise one, or whether prearranged, we met the same kindly courtesy and hospitality. What struck us forcibly was the evident contentment of the people with their lot. We never heard a grumble, or saw any evidence of jealousy or striving between individuals, but rather a harmonious working together towards a common cause.

Many rural pictures fixed themselves in the memory. The fields showing up fresh in the sunshine after rain; well-kept hedges and rows of trees; here a neat holding with white walls and low-thatched roof; there a bigger farm surrounded by its

SMALL FARM AT ASKOV FITTED WITH ELECTRICAL POWER AND LIGHT

ROADSIDE COTTAGE ON THE ESTATE OF COUNT MOLTKE

orchards of fruit; and on a knoll the village church, with rude square white tower and steep red roof, completing a scene of great beauty. A little off the road was to be seen a woman milking a tethered cow, her baby in a perambulator near by, her dog yoked to a small cart containing the milk can. On the right was a field of camomile, and about 50 women busy pulling the white flowers. But nowhere man, woman, or child soliciting alms! No vagrants! No roadside mendicancy!

It will have been seen that the hired agricultural workman has not the same opportunity to save money as in Scotland; though it must be added that he does not yield to the same temptations to waste. The prices of the staple articles of diet approximate to those current in Great Britain. If margarine, rye-bread, and Russian produce are used to any extent the household budget is probably lower. Clothing is from 15 to 20 per cent. cheaper. Boots are about the same. The working classes and peasant farmers, however, wear at their daily work wooden-soled shoes, which cost 2s. 3d. a pair, and last a long time. It is the rule for workmen to contribute to a Sick Benefit Society by way of insuring against illness. The State provision for poverty and old age has been very carefully thought out. A strict discrimination is made between pauper relief and old age relief, no discredit whatever attaching to the acceptance of the latter. The old age pensioner must be 60, and have no conviction for crime or record of a disorderly and extravagant mode of life against him. The amount of the pension varies according to locality. In Copenhagen the average pension for a married couple is £9, 3s. 5d.; for a single person, £7, 9s. 3d. In the smaller towns it is £9 for a married couple and £7, 15s. for a single person. In rural districts it is £5, 4s. 4d. for a married couple, and £3, 11s. 10d. for a single person. Of course, these are really augmentations of income, the old age pensioner as a rule being not "destitute." The fixing of the amount of the annuity is in the hands of local authorities, who, by a recent enactment, make no deduction on account of other income held by the pensioner up to the value of £5, 11s. 1d. It is believed that this enactment has the effect of inducing workmen to save a capital yielding at least £5, 11s. 1d. per annum. But the position of the Danish agricultural workman has really to be viewed in connexion with his opportunity of rising into the class of small farmer. His life need not always be confined to the daily round of paid labour. He has the chance of a career. A very small amount in hand of the purchase price of a farm, with a loan obtainable at easy interest, enables him to exchange the lot of the wage earner for that of the cultivating owner, and to come within the range of influences that we call "the magic of property."

Needless to add, the Danish rural folk are of sober habit, deeply religious, and law-abiding. Fine old Lutheran churches, of which they are naturally proud, are numerous. The public-house is unobtrusive; the drunkard scarcely known. The police force in Denmark is said to be a little over 300 strong, half of the total

count being in Copenhagen, which, like all great seaports, has its share of the degraded and the criminal.

Perhaps the best proof that rural life in Denmark rests upon sound economic conditions, that the farmer is prosperous, that the labourer's existence is provided with a hope and a horizon, will be found in the comparative statistic of urban and rural population.

Year.	Urban Population.	Rural Population.	Total.
1901	936,585	1,512,975	2,449,540
1890	722,244	1,450,136	2,172,380
1880	551,968	1,417,071	1,969,039

From these figures we see that the land in 1901 is sustaining nearly 100,000 more people than it did in 1880. The cities are growing, but not at the expense of the country. Moreover, the drainage by emigration to foreign parts is being reduced, only 8214 Danes having left Europe in 1903.

As a last word it may be said that the dominant feature of Danish agriculture is the thoroughness of its organisation. From the local associations supplying the farmer with his requirements and purchasing the produce of the land, to the great trading corporations having their headquarters in Copenhagen, a network of Co-operative Societies, all federated together, covers the whole field of agricultural work and provides a solid union for advancing the general welfare of the farming community.

As the middleman is largely dispensed with, and most of the local buying and selling is done practically for ready money, a great deal of additional profit is secured to the producer, which in other countries is lost.

By the separation of the commercial from the productive side of agriculture a most useful division of labour is secured. The trading is carried out wholesale by specially skilled men, who are fully occupied, so that the individual farmer is free to devote his whole time and energy to getting as much produce as possible from the land.

The success of this complicated organisation is greatly facilitated by the reasonableness and trustfulness of character of the people. They have proved themselves eminently teachable, and ready to consider and adopt any new method which offers a good prospect of economy or profit.

COMPARATIVE OBSERVATIONS AND SUGGESTIONS

Education

THE Popular High Schools, which are the distinctive feature of Denmark's educational system, are the growth of Danish conditions. No country could easily imitate them; at the same time the concensus of testimony to the leading share they have borne in the industrial evolution of the country is so strong that the Commission desire to emphasise their general aim. It is the formation of character by bringing young persons under the play of literary, moral, religious, and personal influences, rather than the acquisition of knowledge in subjects usually regarded as of more direct practical value. The experience of the Commission, and particularly their observation of what co-operation has done to vivify all forms of Danish life, leads them to think that the rural schools of Scotland might be used to prepare the minds of the young for the better reception of the idea of associated effort. The principle of co-operation in agriculture is already at work, and its extension is generally viewed as a good. Without weakening the value of the individualism which, in the Scottish character, is strong enough to take care of itself, the curricula of the rural schools might with advantage be made to include lessons inculcating the importance of sympathetic, voluntary combination. The effect upon character of numbers working together for a common end warrants this use of school opportunity. At present, efforts to introduce co-operation among farmers, and other persons of the rural class, suffer from the settled predisposition, perhaps not so much to distrust and suspect, as to believe that personal acuteness, operating in a competitive atmosphere, will always count for more than joint exertion. The Co-operative Distribution Societies of the towns have asked that the principle they are constituted upon should have a recognition in the schools not less marked than that accorded to thrift and temperance, and the promotion of a similar object in the country districts is thought worthy of the consideration of the Scotch Education Department.

In regard to agricultural education the Commission cannot too strongly impress upon the sons of farmers, and all others contemplating a farmer's life, the necessity of taking a regular course of tuition at one of the Scottish Agricultural Colleges. To make the fullest use of the resources of the soil, and to contend successfully with rivals in all parts of the world, it is increasingly necessary that practice should go hand in hand with the scientific knowledge these Colleges are fitted to impart.

Small Holdings

Combining the example of Denmark with their experience of Scottish agriculture, the Commission are clearly of opinion that without raising questions of land tenure too wide for this Report, and without imputing failure to the large tenant farming system, a sound case is made out for creating a class of small holdings in the hands of cultivating owners. By means of these a larger number of country-bred people would be fixed upon the land; careers would be offered to the active, intelligent, and thrifty order of farm overseers and labourers; the material wealth of the State would be added to. It is believed that these advantages are sufficiently great and well established to warrant the subject being handled as an affair of national policy. The demand for labourers' holdings of a few acres according to ability, and for small farms corresponding to the peasant proprietorships of Denmark, and ranging in size from 30 to 150 acres, already exists and would rapidly increase. To bring such holdings into existence the credit of the State could safely be used on principles with which the Legislature is familiar, suitably adjusted to Scottish conditions. Success appears to depend upon the devotion to this object of areas of land of good average quality, lying conveniently to the railway or other means of transport; also upon the aggregation of the small farmers within districts, so that co-operative working may be resorted to in the event of the nature of their produce and the requirements of profitable marketing being such as to suggest the superiority of associated to individual effort. The machinery by which Land Commissioners acting for the State might effect a transference of land from a willing seller, and its division among a number of qualified applicants, need not be discussed here. But it may be remarked that the local government institutions of Denmark broadly resemble those of Scotland, and that these local bodies share with the functionaries of the State the responsibility of investigating the character and capacities of would-be purchasers. As to the difficulty of providing farm buildings, it is believed that this would be greatly minimised in practice. Utility, good order, and security are obtained in the Danish steadings at much less cost than is thought necessary according to the prevailing Scottish ideas. A good deal might be trusted to the resourcefulness and prudence of the Scottish small farmer when swayed by the talisman of property, for it is a marked feature of the strongly similar type in Denmark that he manages all departments of his work with a total absence of half-heartedness. It may be added that the opinion of the Commission as to the practicability of forming peasant proprietorships with State assistance on favourable land is to some extent justified by the operations of the Congested District Board in the Highlands and Islands, this body having purchased whole estates for the purpose of vesting them in crofters on a plan of deferred payments.

Egg Collecting

The great and profitable egg export trade of Denmark rests, not upon large poultry farms, but upon numerous groups of peasant proprietors and cottagers who keep fowls, from the number of 10 to 100, and are joined in co-operative societies for collecting, testing, and marketing the eggs to the best advantage. In Scotland the keeping of poultry for profit is less general, but the practice would rapidly grow were organisations formed to gather in and sell the eggs. Co-operative societies with this object, beginning in a small way in suitable rural centres, are well worth attempting and encouraging. One society of the kind has recently been formed at Kirriemuir, upon the initiative of Sir Leonard Lyell. The crofting districts seem well adapted for success in this form of associated work.

Bacon-Curing Factories

Bacon-curing is an adjunct of dairying. Co-operative bacon-curing factories in Denmark have grown concurrently with the growth of co-operative dairying. But the Commission are of opinion that it is not necessary to wait a marked development of dairying in Scotland before attempting to capture for the Scottish farmer the advantage from pig-keeping that is so successfully obtained by the Danish farmer. It is known that there are sold, publicly and privately, in certain groups of counties with a convenient centre, for example, Perthshire, Forfarshire, and Fifeshire, a number of pigs per week sufficient to maintain a co-operative bacon-curing establishment in profitable working. This is clearly a phase of co-operation in which farmers may take the initiative to their common advantage; and the Commission recommend the formation of District Committees to consider the subject.

The Art of Milking

The Commission direct the attention of dairy-farmers to the Hagelund system of milking, which is fully described in this Report. They are of opinion that the experience of Denmark, corroborated by the experience of the Wisconsin Agricultural Experiment Station, justifies the conclusions drawn, namely, that by the more thorough system of milking the production of milk and fat from the cow is increased, the maximum flow of milk throughout the lactation period is more likely to be maintained, and the milking qualities both of the dam and her offspring are permanently developed. The Commission strongly recommend this matter as one requiring to be dealt with in the form of special instruction classes under County Councils and Colleges of Agriculture.

Milk Supply in Cities

The Commission are deeply sensible of the advantages that must accrue to our large communities by the establishment of such milk collecting and distributing agencies as the Copenhagen Milk Supply Company and the Danish Milk Supply Company. It is not too much to say that the subjection of milk to scientific tests,

the elimination of impurities, and the treatment and preparation of the fluid for sale in a form calculated to ward off disease germs, are prime necessities of public health; while an organised system of collection, preparation, and distribution enables the management to impose salutary conditions on the dairy farmers for the keeping, feeding, and milking of the cows. In this respect our Scottish cities not only fall short of the example of Denmark, but of the requirements of a scientific hygiene. There is here an important field for private or municipal enterprise.

Improvement of Dairy Cattle and Keeping of Milk Records

What are we doing in Scotland in this respect? If we except a few well-managed herds situated in two or three counties, there is no such thing as keeping regular and authentic milk records, or having the milk tested to ascertain the percentage of butter-fat in the milk of individual cows. It is true we have a herd-book in which the pedigrees of Ayrshire cattle are registered, but what is its value in the direction of grading up a stock on the lines the Danes are moving in? There is nothing within its pages to guide anyone in the direction indicated. By adopting one line of breeding, and keeping to a certain class of pedigree, we are likely to breed animals with nice outlines, broad torrs, fine shoulders and necks, and often weak constitutions. This class of cattle win prizes at our principal shows up till they are two years old, but are seldom heard of after. If, on the other hand, another and quite distinct line of pedigree be chosen to breed from, a class of animal may be obtained unfit to win a prize until shown in milk. With this class we may get the desired formation of milk vessel and set of teat, but not necessarily a good dairy cow; often indeed quite the reverse. Our national and other societies offer valuable prizes for males and females of this distinctive dairy breed, but the improvement resulting therefrom may be gauged by the fact that the owner of a first prize cow in milk would never for a moment think of mating his cow to the winner in the male section of the same class. He knows too well that the result would be most unsatisfactory. This state of matters is not creditable to breeders of dairy cattle. Several of our Agricultural Societies have at various times attempted to get on to more rational lines by promoting milking competitions at their shows, but generally have met with so little support that the scheme had to be abandoned. The Ayrshire Agricultural Society made a most praiseworthy effort in this direction, but through lack of interest and support the competition had to be dropped. Latterly the Highland and Agricultural Society have started a scheme in the dairying counties in the West of Scotland on somewhat similar lines to that adopted by the Control Society in Denmark, and it is to be hoped that the tabulated results of these inspections and tests which are being published will tend to draw more attention to this important subject, and lead to its more extensive adoption. Mention should also be made of the competition inaugurated some years ago by the

Fenwick Farmers' Society. In this competition the milk yield and percentage of butter-fat is a factor in awarding the prizes, and it is pleasing to note that these competitions are creating considerable interest in the district. Of the many object-lessons brought under the notice of the Scotch party in Denmark, there was none more worthy of imitation than the most admirable and enlightened system pursued in the breeding of dairy cattle, and much good it is hoped may result from the diffusion of information on this subject.

Railway Service and Rates

While recognising the disparity of condition springing from the State ownership of Danish railways, the Commission are not content to think the British railway companies are performing their full duty to the agricultural interests. The broad effect is that the produce of the Danish farmer is being carried at something like one-half the cost the produce of the British farmer must bear. This, however explained, is a handicap not to be accepted with resignation. It is an important public concern, reaching beyond both the railway interest and the farming interest, to bring the terms of competition nearer a level. On this head three things may be said: (1) The British railway companies are too much disposed to think their part fulfilled in quoting lower rates after the traffic has been created, too little disposed to assist in creating the traffic at its critical stages; (2) their services are not always adapted to actual needs, otherwise farmers would not now be employing traction engines to convey manures and other materials from towns to their farms, though the farms are in the vicinity of railway stations; (3) they do not intimate that considerable consignments will be accepted at rates approximating to those of continental countries, and consequently fail to stimulate a practice of making up the goods in large lots.

State Aid

The Commission have been much impressed by the extent to which not only the various educational institutions, but all other organisations in Denmark, formed for the promotion of agriculture in its varying branches, are assisted and encouraged by Grants in Aid contributed from the National Exchequer; and they are of opinion that lasting benefits would accrue to British agriculture were the present small grants to colleges, dairy schools and experiment stations largely increased, and were the formation of Associations for the promotion of rural industries in any practical and efficient manner also stimulated by assistance from the State.

Co-operation

Although one great principle runs through all co-operative societies, the operations of that principle vary with the particular objects. There is much information to be gathered from Denmark, as well as from other European countries, which will be found

profitable for guidance in the construction of a union, whether for the purchase of farmers' requisites or for collecting and marketing the products of farm, field, and dairy. The tendency to greater co-operation is well set, even large farmers confessing its utility, and the tendency must strengthen with time. Of all origins of a co-operative society the most natural and the best is the local origin—the unpretentious coming together of the few who are persuaded of the suitability of united action to the local conditions. But as an easily accessible source of information, and as an agency for helping the desires of beginners to take shape, an Agricultural Organisation Society would, it appears to the Commission, have a useful place in Scotland.

ITINERARY OF COMMISSION

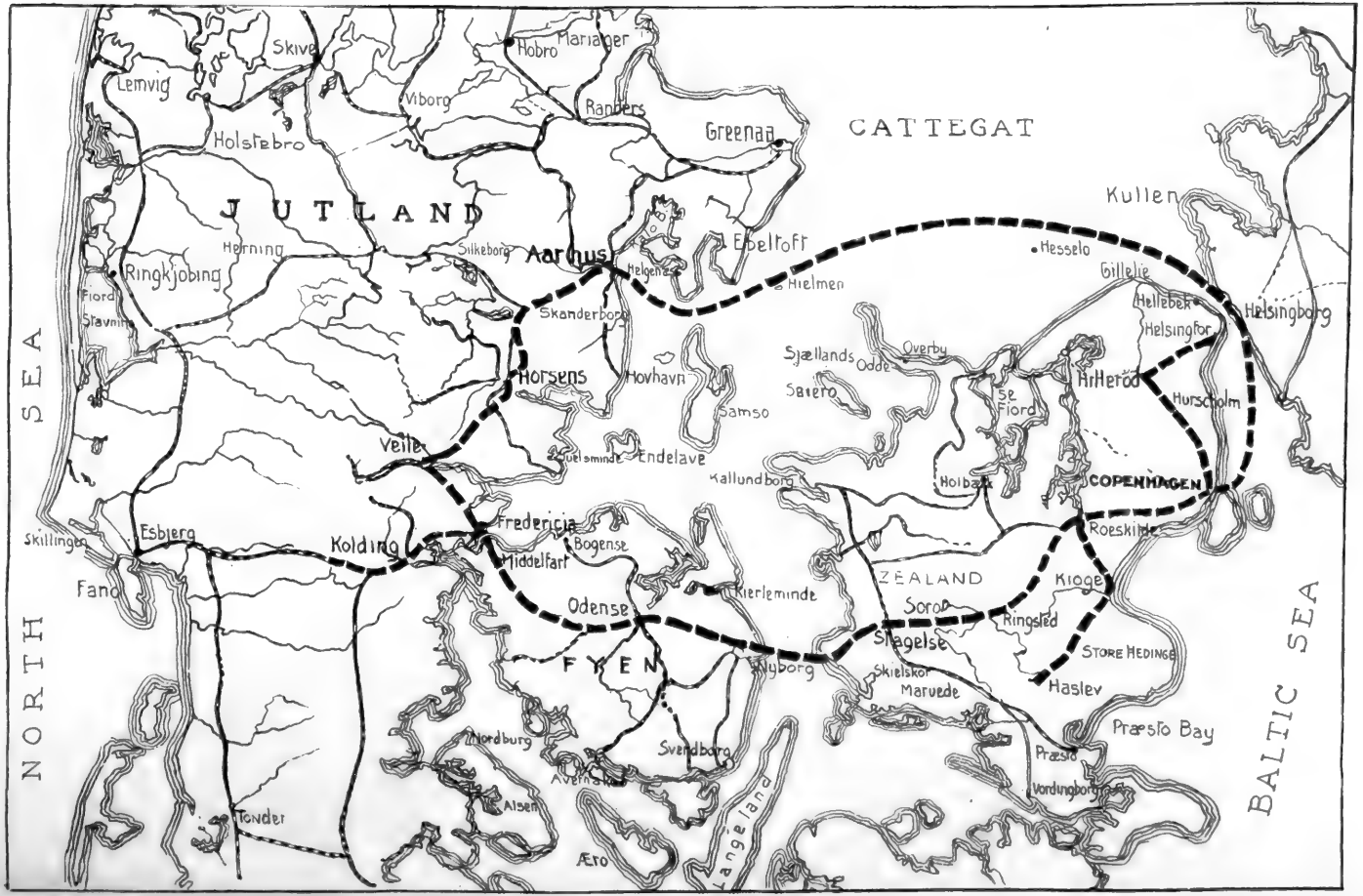
Sunday, June 19th. Arrived in Copenhagen.

Monday, June 20th. Visited the Royal Veterinary and Agricultural College and Experimental Station, Copenhagen, in company with Professor Bang, the great authority on tuberculosis; Professor Maar, Professor of Agriculture; and Professor Böggild, Professor of Dairying. At the close of the visit, Professor Bang delivered a lecture in perfect English on the best method of stamping out tuberculosis. In the afternoon a visit was paid to the People's High School, the Agricultural School, and the Experimental Station at Lyngby, where Mr Lacour, one of the teachers and son of the founder of the school at Lyngby, delivered a lecture explanatory of the People's High Schools of Denmark. The day's work ended with a visit to premises of the Danish Milk Supply Company and the Copenhagen Milk Supply Company.

Tuesday, June 21st. Visited Kolle-Kolle in the northern portion of Zeeland. Kolle-Kolle is a well-managed farm of nearly 300 acres, occupied by Mr Grut Hansen, who received the party and provided lunch for them in the dining-room of his capacious farm-house. The special object of the visit was a fine herd of Red Danish Cattle. In the afternoon the Palace of Frederiksborg and Elsinore were visited, the day's proceedings being closed with a dinner at Marienlyst, where the party had as their guest, Mr Schou, the Agricultural Adviser to the Danish Government.

Wednesday, June 22nd. An early start was made for Haslev, a village in the southern portion of Zeeland, where Trifolium, the largest co-operative dairy in the country, owned by landed proprietors, was visited; also the slaughter-house and bacon-curing establishment at Haslev. In company with the managers of both establishments and Mr Olsen, a peasant farmer, and member of the Danish Parliament, the party drove to Bregentved, the estate of Count Moltke, where they were shown over the farm steading and the grounds by the Count's land steward. Returning to Haslev, lunch was served in the little hotel beside the station, with Mr Olsen, the manager of the Trifolium, and the manager of the bacon-curing establishment, as guests. Copenhagen was reached about four o'clock, and dinner was served in the Cosmopolite Hotel with Professor Bang, Professor Maar, Professor Böggild, and Mr Salicath of the Danish Milk Supply Company, as guests. At 9 P.M. the party left Copenhagen by steamer for Aarhuus, Jutland.

Thursday, June 23rd. Arrived at Aarhuus about eight o'clock. Carriages were waiting, and the party drove to Skipygaard, a farm owned and occupied by Mr Rasmussen. It was typical of that class of farms which are of more acres than peasant farms, and yet cannot be described as large farms. On returning


NORTH SEA
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Randers
Grenaa
Herning
Silkeborg
Aarhus
Ebeltoft
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Helsingfor
Hornscholm
Hillerod
Se Fiord
Holbak
COPENHAGEN
Roeskilde
Kioge
Soroe
Ringsted
Slagelse
Store Hedinge
Haslev
Skielskor
Maruede
Praesto Bay
Praesto
Vordingborg
Kullen
Overby
Odde
Saiero
Sjællands

from Skipygaard the train was taken for Horsens, and in the afternoon a visit was paid to the slaughter-house and bacon-curing establishment there. This was the first co-operative slaughtery erected in the country.

Friday, June 24th. Visited the Agricultural Show at Skanderborg, where Mr Apel, a gentleman well-known in dairy circles, undertook the duties of guide. In the afternoon an excursion was made to Borupgaard, a farm belonging to Mr Petersen. The special object of the visit to this farm was to see a herd of black and white Jutland cattle from which Professor Bang had stamped out tuberculosis. On the way back to Horsens a surprise visit was made to a peasant farm which was found to be in a very high state of cultivation. The farmer, it turned out, was the owner of what was considered the best mare in Denmark.

Saturday, June 25th. Mr Hansen, the manager of the bacon-curing establishment at Horsens, who had been of great service, took charge of Saturday's excursions. He secured the services of Captain Eyde, Consul for Norway and Sweden, a gentleman who could speak good English, and drove the party to Stenballegaard. This farm, extending to 500 acres, was of a different class from any yet visited. Mr Soltoft, the farmer, was not owner, but tenant, and unconnected with the co-operative system. In the afternoon, after Mr Hansen had provided a sumptuous lunch, the party broke up into three sections, one section proceeding to a farm where poultry was a specialty, and the other two sections going in different directions to make surprise visits to peasant farms and small holdings of varying sizes. Horsens was reached in time for dinner, and at 8.13 P.M. a start was made for Vejle, where the Sunday was spent.

Monday, June 27th. Train was taken for Vejen, where carriages were in waiting to drive the Commission to the Experiment Station and the People's High School at Askov. After an interesting inspection of the buildings and an exhibition of gymnastic training by the girls, lunch was provided by the teachers. Before leaving Askov the party visited Prof. La Cour's experimental windmill for generating electricity. Once more the party split, one section going to visit the Agricultural School at Ladelund, which makes a specialty of dairying, and where the Hagelund system of milking was first introduced. The other section visited a number of small holdings in the district. Fredericia, where the party were to stay during the night, was reached about twelve o'clock.

Tuesday, June 28th. Jutland was left, and the island of Fyen, the Garden of Denmark, entered. A stop was made at Ejby, and one section of the party visited the large estate of Wedellsborg, where they were taken round the farm buildings by Count Weddel himself, who also accompanied them to a model dairy on his estate and to a peasant farm. The other members of the party, with a local guide who had been requisitioned, drove out into the country and visited whatever holdings they thought likely to be of interest. In the afternoon a few of the members, who had to make special investigations in connexion with the work of the Commission, proceeded at once to Copenhagen for this purpose ; the others stayed at Odense.

Wednesday, June 29th. The Commission was split up into three divisions. One set out for Dalum Agricultural School, where they had a most hearty reception ; a speech was prepared in English and delivered to the company, each member being afterwards presented with a copy. Another division went to the milk-freezing depot at Marslev, some miles from Odense, where the milk is frozen and sent in blocks to the Danish Milk Supply Company's works at Copenhagen. These two sections also took opportunities afforded them of visiting small holdings on the way. A third section of the party devoted themselves entirely to making surprise visits to peasant farms and small holdings. The party left Odense in the afternoon, and reached Copenhagen in the evening.

Thursday, June 30th. The Danish Farmers' Co-operative Egg Export Association was the centre of attraction for the poultry section. Later in the day the cattle market was visited. Some of the party spent the afternoon and evening at Scodsborg, a beautiful seaside resort some miles from Copenhagen ; the remainder dined with the British Minister at the Legation. This ended the work of the Commission. The steamer sailed for Leith at 10 P.M. that night.

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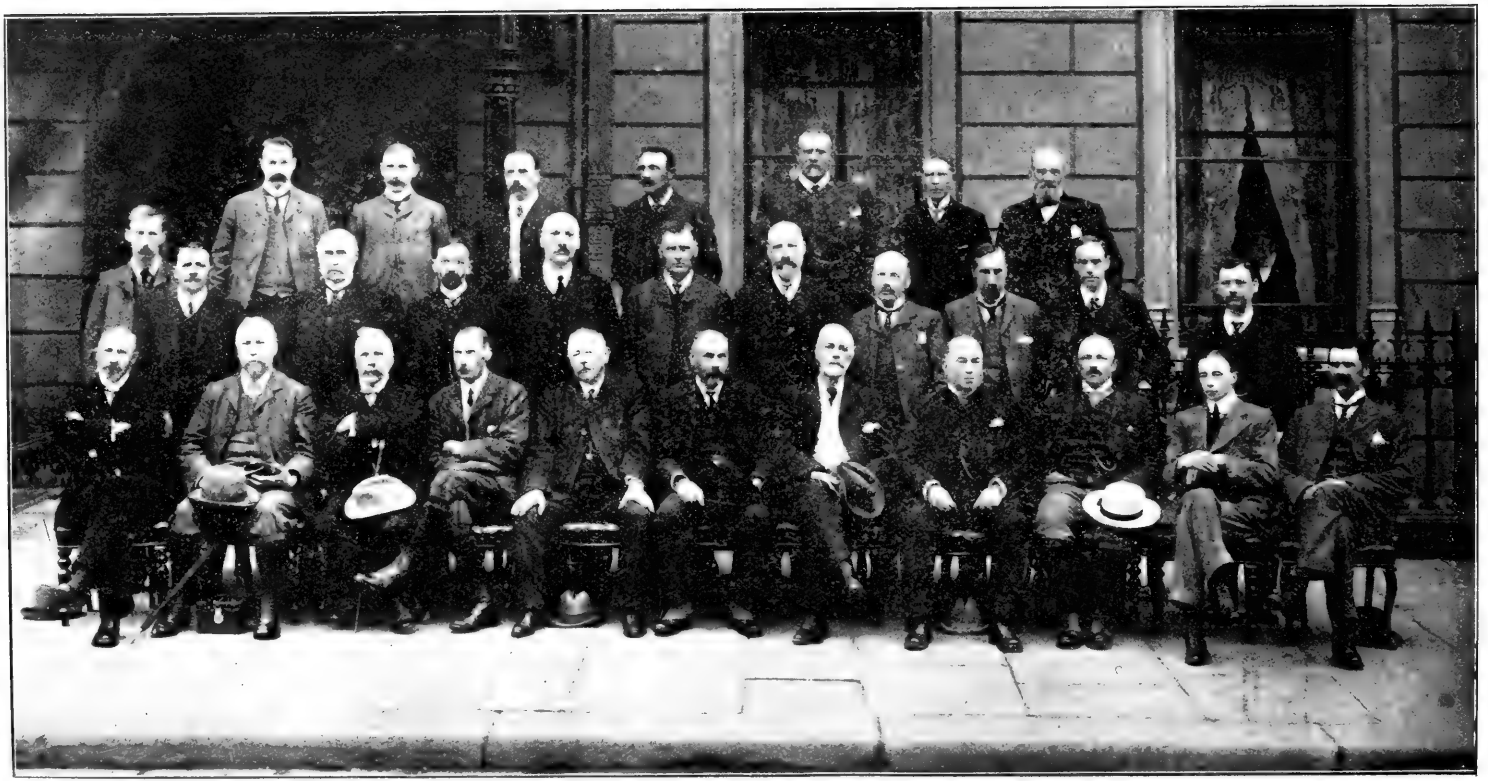

Lafayette MEMBERS OF THE COMMISSION AT DUBLIN

REPORT

OF THE

SCOTTISH COMMISSION ON AGRICULTURE

TO

IRELAND

1906

WITH COMPARATIVE OBSERVATIONS
AND SUGGESTIONS

EDINBURGH AND LONDON
WILLIAM BLACKWOOD & SONS

A GATE ON BOGLANDS, CASTLEREA

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KERRY COW AT FARM SCHOOL, ATHENRY

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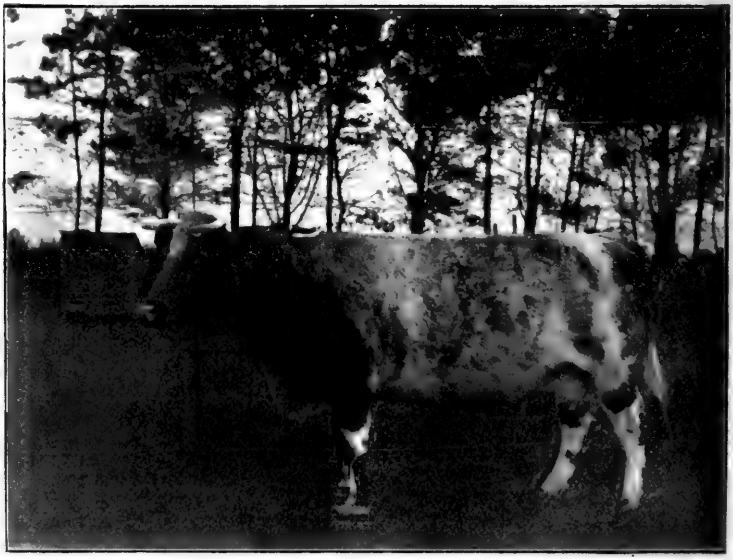


ONE OF THE HERD AT ALBERT AGRICULTURAL COLLEGE, GLASNEVIN

INTRODUCTION

THREE years ago, the Right Honourable John Sinclair, Secretary for Scotland, then a private Member of Parliament, conceived the idea of sending a Commission of Scottish Agriculturists to Denmark to study Danish farming on the spot. The Commission was selected irrespective of politics. No one ever knew the political constitution of the party. It arrived in Denmark in June 1904. The following year the official Report was published.[1] The Report was most favourably received by the Press. We may be pardoned for saying that it educated public opinion; it increased the awakening interest in agriculture; it showed the need and stimulated the desire for co-operation; it helped forward the small-holding movement.

The work accomplished encouraged the Commission last year to undertake, also on the suggestion and with the assistance of Mr Sinclair, a similar investigation in Ireland. All those who went to Denmark could not go to Ireland. This was a loss, inasmuch as the Commission was deprived of the services of some capable farmers. But it was not all loss. Other capable farmers joined the Commission. The result was that more districts were represented on the Commission to Ireland than were represented on the Commission to Denmark, and that was a distinct gain.

We went to Denmark because the Danish farmers had outlived the years of agricultural depression, which had hit us so hard, and stood in the very forefront of those who make their living by agriculture on small farms. But what took us to Ireland? Ireland had failed in agriculture as completely as Denmark had succeeded. We went to Ireland to see in the revival of agriculture just begun there the causes at work which in Denmark had ended in unparalleled success.

The revival of agriculture in Ireland is due in the first place and pre-eminently to the self-help movement represented by the Irish Agricultural Organisation Society, referred to hereafter as the "I.A.O.S."; and in the second place, to the State-aid movement represented by the Department of Agriculture. Much that we have to say must therefore have reference to these movements.

Our investigations were greatly facilitated by help ungrudgingly given by the Irish people. Foremost among our helpers was Sir Horace Plunkett, who recently resigned the Vice-Presidentship of the Department of Agriculture and Technical Instruction for Ireland. He is Ireland's most outstanding figure at the present time. He may be said to have originated the new movement, and he knows everything about it. He put men and information at

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

our disposal, simplifying our work and enabling us to make it more exhaustive than would otherwise have been possible. Our special thanks are also due to Mr R. A. Anderson, Secretary of the I.A.O.S., who acted as the guide of one of the sections of the Commission in Ireland. He has since devoted much time and put himself to great trouble, obtaining facts and figures indispensable to this Report. Nor must we forget specially to thank Mr J. Wood, once a Lecturer in the West of Scotland Agricultural College, and now an Inspector in the Department of Agriculture in Ireland, who was delegated by Sir Horace Plunkett to act as the guide of the other section. We are also indebted to Dr Herbert G. Smith, Sir Horace's private secretary, for much valuable assistance ungrudgingly given. We received kindness and help from all sections of the Irish people, Nationalist and Unionist, Catholic and Protestant. We have endeavoured to acknowledge our indebtedness to them in the Itinerary. If we have omitted any, we can only plead that our helpers were so numerous that it has been difficult to remember all.

We have only to add that the facts and figures in every section of this Report, so far as they relate to Ireland, have been verified by Irish experts whose assistance we gratefully acknowledge.

June 1907.

THE VICEREGAL LODGE, DUBLIN

ITINERARY

THE Scottish Agricultural Commission landed in Dublin on Sunday morning, 24th June 1906. The members wanted, within the limited time at their disposal, to embrace the whole of Ireland in their survey. This was only possible by dividing the party into two, which was accordingly done. Both sections were to study on the spot the revival of agriculture in Ireland. One section was to pay particular attention to the influence of the voluntary movement on agriculture—the movement which preceded the revival, and which ultimately developed into the I.A.O.S. This section, designated "The Northern Section," because its work was for the most part confined to the north, was under the guidance of Mr R. A. Anderson, Secretary of the I.A.O.S., whose arrangements left nothing to be desired. The other section was to pay particular attention to the influence of the official movement on agriculture—the movement which provided funds to help the Irish people after they had first helped themselves. This section, called "The Southern Section," because its work was mostly in the south, was under the control of Mr J. Wood, whose arrangements were also most complete. We propose, in this chapter, to describe the wanderings of both sections.

1. The Northern Section

The Northern Section, whose wanderings are indicated on the accompaning map by a black line, left Broadstone Station, Dublin, on Monday, 25th June 1906, at 9.30 A.M., for Navan, County Meath. The railway to Navan runs through some of the richest grass lands in Ireland, divided into irregular fields by great straggling hedges. On reaching Navan, the members of the Commission had an opportunity of seeing a typical Irish fair. The live stock were occupying the main street of the town, and the dealers were standing in little groups haggling over the prices of the different animals. It was not a pretty picture, and it neither added to the peace nor the sanitary condition of Navan. A drive of half-an-hour, and Randlestown, the property of Colonel Everard, was reached. The Colonel is President of the I.A.O.S., and a member of the Agricultural Board. He is carrying out, under the direction of the Department of Agriculture—though for the most part at his own expense—experiments on the growing of tobacco. It was these experiments the Scottish farmers had gone to see. He has about 18 acres under cultivation. The experiments are being made with a view of finding out whether or not it is possible to

grow tobacco in Ireland profitably. The Colonel has also a splendid herd of Hereford cattle, which proved of more interest to the farmers, being more in their line than tobacco. Before leaving Randlestown they were entertained to lunch by Colonel and Mrs Everard. As they drove out of his beautiful grounds, which contain the most luxuriant grass in Ireland, and trees that could not well be matched anywhere, they felt that if all landlords had been like Colonel Everard the Irish land problem would have been less difficult to solve. Navan was reached in time to catch the 4 P.M.

COL. EVERARD OF RANDLESTOWN

train for Dundalk. The evening was spent discussing the Agricultural Credit Banks of Ireland with Father Lyons, an earnest worker in the great movement that is designed to recreate Ireland.

Mullaghbawn was the destination on Tuesday morning. It lies in the hills, 8 miles from Dundalk. The farmers were much struck with the good quality of the soil in the neighbourhood of Dundalk and the neat trim homesteads. They reminded them of the small farms of Denmark. Farther out, the holdings became smaller and the land of poorer quality. At Mullaghbawn they did not exceed 5 or 6 acres each. The object of the visit was a

shirt factory. What connection had a shirt factory with agriculture? A good deal of connection in Ireland. Mr Macartney Filgate, of the Department of Agriculture, explained that in the old days handloom weaving was a great industry in this district. It supplemented the income of the farm. Since the advent of the steam-loom handloom weaving had gone down, and it was absolutely necessary that some other industry should take its place to enable the farmers to make ends meet. The shirt factory in question was started with that object in view. Hard by the shirt factory there is a poultry-distributing centre, run by the local doctor's wife, a centre from which the farmers and cottagers get settings of pure eggs of the most suitable breeds, the object being, of course, the development of the poultry industry in the district. It was midday when the Commission got back to Dundalk Station. On the way to Portrush, *viâ* Belfast, a halt was to be made at Messrs Barbours' flax-spinning mills at Hilden. What again, it may be asked, has flax-spinning to do with Irish agriculture? It has a great deal to do, for flax is one of the agricultural crops of Ireland, and these mills are as essential to the development of flax-growing as preserve-works are to the development of fruit-growing. It was necessary, however, to reach Portrush that night. There could therefore be no stop by the way. It was a long journey to Portrush, but it was made exceedingly pleasant by the generosity and the kindness of the Great Northern Railway Company, who put at the disposal of the Commission, at greatly reduced figures, a most comfortable saloon carriage. The day was far spent when the popular northern seaside resort was reached. Arrangements, however, had been made to run out to the Giant's Causeway by special car, and so, before turning in for the night, the party had an opportunity of doing a bit of sight-seeing which was not in the day's work.

We should have mentioned that one of the Commissioners had visited Messrs Hogg & Robertson's famous bulb farm at Rush, County Dublin, and had also made a tour through the Armagh fruit district. Still, comparatively little had so far been accomplished. The scene of operations proper began in the far North, and the Commissioners had to get there before they could get a start. They set to work in earnest at Portrush. Divided into two sections, they started on the morning after their arrival at 6 A.M. One section went to the Co-operative Poultry Society at Dervock, about 17 miles from Coleraine, where they were met by some of the members of Committee of the Poultry Society, and afterwards entertained to breakfast by Rev. J. Colhoun. The Society was started about five years ago. Its turnover for eggs collected from a radius of 12 miles is about £600 per month. The other section went to Ballyrashane, which is about 2 miles from Coleraine, to see the Co-operative Creamery. This creamery is looked on as one of the most up-to-date in Ireland. It deals in cream and butter. There are six auxiliary collecting centres in connection with the creamery. Apart from the creamery, the district is interesting from an agricultural point of view. The

TOBACCO PLANTATION AT RANDLESTOWN

farmers are fine specimens, doing as well as any small farmers are doing in these days of agricultural depression. The members of the Commission had an opportunity of discussing agriculture with one of the most intelligent of them. They were also able to examine the steading and the stock of another farmer, younger but not less intelligent than the other. Before leaving the district one-half of the party was entertained to breakfast by the Rev. Canon Cunningham, the English Church minister of the district, and the other half was entertained to breakfast by the Rev. James Hunter, the Presbyterian Church minister of the district, both of whom, along with the Catholic priest, work in perfect harmony.

Subsequently, both sections met at Coleraine Station *en route* for Londonderry, where they had an opportunity of visiting the Agricultural Show. From Londonderry they proceeded to Clady to inspect the Urney Co-operative Creamery, a perfectly equipped concern run on lines similar to the Ballyrashane Creamery. Close by there is a co-operative flax scutching mill, worked in the winter time when farm work is slack. A poultry co-operative society has also been started. After doing justice to ample refreshments provided by representatives of these Societies, the Commissioners took train to Strabane, a halting-place on the way to Omagh. The object of the visit to Omagh was the Co-operative Creamery, which deals with the produce of 560 farms, and turns out six tons of butter every week. During the day the Commission had a conference with Mr Dallinger, the Secretary of the Tyrone County Committee of Agriculture. The conference ended, the party divided into two. One section left with Mr Dallinger to examine a travelling poultry farm established for six weeks in a district eleven miles from Omagh—a travelling poultry farm which teaches everything on the spot, from the artificial hatching of the eggs to the killing of the birds. The other section drove to a farm in the vicinity of Omagh with the object of seeing one of the premium stallions. Unfortunately, it was from home at the time of the Commissioners' visit, but they had an opportunity of meeting the farmer, a frank, intelligent fellow, and examining his farm and his stock. Both sections thereafter met at Omagh and took train for Enniskillen. On their arrival at Enniskillen they drove to the Scottish Co-operative Wholesale Society's premises, and under the guidance of Mr Whyte, the Co-operative Wholesale Society's manager, they were shown over the creamery, bacon-curing factory, and egg-collecting depot. The creamery is one of the largest in Ireland. It has seven auxiliary creameries as feeders, and it gets the milk-supply of 1200 farms. The output of butter is over twelve tons per week. The bacon factory kills 25,000 pigs annually, and the egg-receiving depot collects 2,000,000 dozen eggs in the year. On leaving the Co-operative Wholesale Society's premises, the Commissioners were taken in hand by Mr Humphreys, the manager of the Sligo, Leitrim, and Northern Counties Railway, who is also a director of a steamboat company which runs steamers on Lough Erne. Mr Humphreys had arranged to put the company's steamer, *Lady of the Lake*,

at the Commissioners' disposal. Both he and Mr Jordan, Nationalist Member of Parliament for South Fermanagh, accompanied them up Lough Erne. The little trip was a pleasure and a surprise, a pleasure after a considerable amount of hard work, and a surprise, inasmuch as it revealed beautiful spots in the north of Ireland which have as yet scarcely come within the ken of the tourist. On the return journey tea was served to the company in the cabin of the *Lady of the Lake.* Thereafter, the Commission had the pleasure of entertaining to dinner in the Royal Hotel, Mr Jordan, Mr Humphreys, and Mr Whyte.

The Northern Section was now divided into two, not to meet

"LAMBTON," THE PROPERTY OF COL. EVERARD

again until they met, their labours all but finished, in Dublin. One section proceeded, accompanied by Mr Humphreys, in a special train put at their disposal by the Sligo, Leitrim, and Northern Counties Railway, to Sligo. The run was through a beautiful country, which some of the Commissioners thought rivalled far-famed Killarney. At Sligo the party divided. One section went to see the Dromahair Co-operative Creamery, where they were most hospitably entertained by the Rev. J. Meehan, who showed them over the creamery, and took them to see a number of farms in the district ranging from 15 to 60 acres. The other section drove a distance of 10 miles to Lissadel, the residence of Sir Josslyn Gore-Booth. On the way they had an opportunity of visiting the Drumcliffe Co-operative Creamery. At Lissadel they examined Sir Josslyn's early potatoes, his bulb farm, his Shorthorn and Black Angus cattle, and his poultry department. After lunch,

kindly provided by Sir Josslyn, the party left for Collooney. They were joined there by the Dromahair contingent. From Collooney both contingents proceeded direct to Dublin, where they split into four. One section went to Enniscorthy, in County Wexford, and inspected the prosperous Co-operative Agricultural Society Stores for the sale of agricultural implements, manures, etc. Another left the train at Ballyragget for the North Kilkenny Poultry Fattening and Egg Export Society, the first co-operative society which has attempted to start a trade in properly fatted fowls in Ireland. Afterwards it drove to Kilkenny, where the members were entertained by Mr Houghton. The third section went to Limerick Junction to see the Solohead Co-operative Creamery and some rich dairy farms in the district. The fourth section visited the Agency Society, Limerick. The members lunched with Mr Roche and then left for Roscrea, where they heard a good deal about the Co-operative Bacon-Curing Factory to be started in that district. The different members of the party got together once more in Dublin.

We have said that the Northern section was divided into two at Sligo, and we have described the wanderings of one section. The other section left for the congested districts of the West, to study on the spot the work of the Congested Districts Board. At Claremorris, County Mayo, they were taken in charge by Mr Kelly, of the Congested Districts Board, and had an opportunity of examining holdings in the congested districts with new cottages and steadings erected on them. From Claremorris they took train to Castlerea, in Roscommon. They were met at the station by Mr Fitzgibbon, a well-known Nationalist, who acted as their guide in the district, showing them the Dillon Estate and all that was to be seen in connection with it. From Castlerea they proceeded to the town of Roscommon. Some miles into the country they examined one of the largest grazing farms in this district, and thereafter lunched with Mr W. E. Holmes, one of the best-known land agents in Ireland. From Roscommon they went direct to Dublin, to join the other section of the Northern party.

2. The Southern Section

The Southern Section, whose wanderings are indicated on the accompanying map by a dotted line, began operations on Monday, 25th June 1906, by a visit to the Albert Agricultural College, Glasnevin. This College stands midway between the local agricultural schools and the Royal College of Science. It teaches both agriculture and horticulture. Theory and practice go hand in hand. The students' time is divided between the work in the class-room and the practical work on the farm, where Shorthorn cattle, Yorkshire pigs, and pure-bred poultry are kept. The fee for the year is £25, which includes board, residence, laundry, and medical attendance, as well as instruction. Bursaries are provided, so that the clever student may have his training free. The College will turn out good farmers. Monday afternoon was

devoted to Randlestown, where the party met Colonel Everard and had an opportunity of seeing the tobacco experiments, the Hereford cattle, and the exceedingly rich grass lands in the district. The evening was spent in Dublin.

On Tuesday the Southern Section divided into two. One section, accompanied by Mr Cunningham of the Land Commission, most able and interesting of guides, proceeded to Luggacurran, Queen's County, for the purpose of examining the most interesting work of the Land Commission in that neighbourhood. The Land Commission bought Lord Lansdowne's estates there, and are at work reinstating the evicted tenants. They are

SOUTHERN PARTY IN VALE OF AVOCA: "THE MEETING OF THE WATERS"

at the present time building charming houses suited to the beautiful landscape—white harled houses, with broken gables and long low windows, alike graceful and convenient. The steadings are still to construct, but the Land Commission are apparently determined to make the homestead, with the twenty odd acres of land which will constitute a holding, as comfortable and as complete as the money at their disposal will permit, not only with the view of benefiting these individual small holders, but with the view of making the holdings an object-lesson to the small holders of Ireland generally. On leaving Luggacurran, this section proceeded to Waterford. The other section, which left Dublin in the morning, had gone direct to Rathdrum in County Wicklow. From Rathdrum they drove to Avondale, once owned by the late Mr Charles Stewart Parnell. The mansion-house and demesne were bought in 1904 by the Department of Agriculture,

and turned into a forestry station. The immediate object of the station is to teach the farmers how to utilise their waste land, whether it be odd bits here and there on better-class farms, or larger stretches on hill farms, by growing trees suitable to the soil and climate, for ornament, for shelter, and for poles, timber, and firewood for the farm. But there is an ulterior object of national importance, viz., the general improvement of the climate and the soil of Ireland. The Department has also established on the estate a poultry fattening station, where young men are taught this particular branch of the poultry trade. 1200 chickens are purchased from the surrounding farmers weekly. They are kept a month and sold fat. The Commissioners drove down the beautiful Vale of Avoca, immortalised by Thomas Moore in "The Meeting of the Waters," and proceeded by train to Waterford.

The members of the Southern Section were once more united only to be once more divided. Two of them spent the day after their arrival at Waterford at the Fermoy Agricultural Show, County Cork. The others drove to Piltown, where the Department of Agriculture have established one of their eight fruit experimental plots, with the view of ascertaining what varieties of fruit are suitable for different parts of Ireland, and what profit there is in the fruit trade generally. They also visited the Bessborough home farm, the property of the Earl of Bessborough, where, in the unavoidable absence of the Earl, they were met and entertained by his steward, Mr W. Mitchell, who showed them the pedigree stock—Shorthorn and Aberdeen Angus cattle and Clydesdale horses. On their return to Waterford, the Commissioners inspected one of the bacon-curing factories belonging to Denny & Sons, Limited. This factory is one of the best in Ireland, or, for that matter of it, anywhere. It kills 1200 pigs per week. The pigs are bred by the farmers in the surrounding districts.

Cork was made the centre of inspection in the far south. An early visit was paid to the Munster Institute, where the Commissioners were hospitably entertained by the Superintendent and Matron. The Munster Institute is the chief agricultural school in Ireland devoted entirely to the teaching of women. They receive instruction in all departments of farm work in which women are usually engaged—dairy work, poultry work, domestic work. There is only accommodation at the Institute for 50, and last year there were over 200 applicants waiting for admission. After two sessions, the girls are supposed to be capable of undertaking the management of their own department on any farm in Ireland. After four or five sessions, they are able to undertake the work of itinerant instructors. Adjoining and belonging to the Institute there is an agricultural farm where pedigree stock are bred and early potatoes grown. From the Institute the party proceeded to Clonakilty in the extreme south of Cork, where they had an opportunity of visiting the Agricultural Station, which consists of the farm of Darrara, extending to 340 acres. At this station experiments are carried on in the breeding and feeding of live stock, in

tillage, and in dairying. Apprentices are taken, who get instruction both in the theory and practice of agriculture. In order that any deficiency in their elementary education may be made good, instruction is also given in English, Arithmetic, Book-keeping, etc. The students pay fees according to the aggregate valuation of their parents' farms, ranging from £3 to £15 for the session. Before leaving the Agricultural Station the Commissioners were "refreshed." Thereafter the return journey to Cork was commenced.

Having gone as far south as they could well go—Clonakilty is on the seaboard—the Commissioners proceeded to the West of Ireland, Athenry, in County Galway, being their destination. The

DEXTER BULL AT FARM SCHOOL, ATHENRY

object of their visit was Athenry Agricultural Station, a similar station to that at Clonakilty, existing for the selection and distribution of different kinds of live stock among the farmers, and for the carrying out of experiments in the breeding and feeding of stock, in tillage, dairying, etc. Apprentices are also taken at Athenry. Their elementary education is attended to if that be necessary, and they are taught both the theory and practice of agriculture. The Irish people and institutions vied with each other in extending hospitality to the Scottish farmers, and so, before leaving the Agricultural Station, they had to accept the kind hospitality of those in charge. At Athenry, Mr E. Gallagher, the Department's Agricultural Instructor in Connaught, joined the Commissioners, and put himself at their disposal. From Athenry the journey was continued to Castlerea, where the members of the Commission were to look into the work of the Congested Districts

Board. They devoted a good deal of their time to the examination of the arterial drainage on the Dillon Estate, the carving out of the holdings, and the erection of buildings, and they did what the Northern Section did not do, they made a thorough inspection of the interesting institute which now occupies the Dillon mansion-house, formerly the residence of Lord Dillon. The Congested Districts Board, after they bought the Dillon Estate, sold the mansion-house to the bishop of the diocese. It has been turned into a school, under the control of the Franciscan Missionaries of Mary, where the young women of Ireland are being trained to be house-wives in the most practical fashion possible—to cook without kitchen ranges, there being a dearth of these ranges in rural Ireland; to milk cows and make butter on approved methods, without the expense of modern machinery; to rear poultry and grow vegetables; to make carpets and lace in the long winter nights, when other work is impossible. The school is subsidised by the Department of Agriculture, whose inspectors examine the scholars periodically. It is doing a great educational work in the district.

There was no time for more than a passing sight of the great pasture lands of Roscommon, as the Northern Section had already set out for Dublin, where both North and South had agreed to meet to bring their investigations to a close.

After our arrival in Ireland, and before we had set out to inspect the country, Sir Horace Plunkett was good enough to meet the Commissioners at dinner, and address them on the subject of Irish agriculture. He pointed out that after they had seen things for themselves they might have many questions to ask. In order that these might be answered as far as possible, he suggested that, on their return to Dublin, a conference should take place, at which the Commissioners and the Members of the Department of Agriculture would be present. The Commissioners gladly accepted Sir Horace's kind invitation. The conference was duly held in the office of the Department of Agriculture on the day of our departure, after we had paid a visit to the Irish Agricultural Wholesale Society. Questions were put, and questions were answered, in the frankest way, Sir Horace, as usual, revealing the widest possible knowledge of the work to which he is devoting his life. The conference over, we proceeded to the Vice-Regal Lodge, where Lord and Lady Aberdeen, thoughtful as they ever are, had invited us to tea. We spent a pleasant hour in their company, and then it was time to go. Thus ended our sojourn in the Emerald Isle.

LAND TENURE

MANY volumes have been written on land tenure in Ireland. It is probable that many more volumes will be written, for it has been and, if it is not now, may again be the storm centre of Irish life. It would be impertinence to attempt adequately to deal with a subject so vast and so complex in a single chapter of an agricultural report. It would be unpardonable not to deal with it at all. We shall confine ourselves to a rough sketch of the history of land tenure in Ireland from 1869, when the land of Ireland was mostly held by tenant farmers, to the present day, when it is rapidly passing into the hands of occupying owners.

Tenancies

In the year 1869, the great majority of the tenant farmers of Ireland held their land, not under comparatively long leases, such as we have been accustomed to in Scotland, but under yearly tenancies. The farm buildings were erected and permanent improvements made in Ireland, not by the landlord, as is generally the case in this country, but by the tenant. The landlord, in Ireland, provided the land; the tenant erected the buildings and made the improvements. Each contributed to the capital that made the farm a lettable subject. But so soon as the tenant made his contribution, it became in law the property of the landlord. The landlord thus owned everything, his own share which he contributed, and the tenant's share which he did not contribute. It was a unique partnership. Both partners contributed the capital, and one took all the profit. Justice demanded a fairer division. The Land Act of 1870 was passed with the object of securing a fairer division. In that Act is the seed of all land reform since carried out in Ireland. It provided compensation for improvements, and also for disturbance. It recognised tenant right in a modified form. It was not, however, entirely successful. It did not sufficiently protect the tenant's share in the farm. But the years from 1870 to 1878 were years of agricultural prosperity. Prices were high, and tenants were content to pay increased rents rather than give up their farms and claim compensation. The Act was found wanting when the agricultural boom passed away and crops failed, as they did in Ireland in 1879. The old rents could no longer be paid. Evictions increased. Crimes followed. The Irish Land Act of 1881 was the result. That Act was the just and logical outcome of a system of land tenure which permitted landlord and tenant each to contribute a share of the capital necessary for making the

farm a lettable subject. It was based on the Ulster custom. The Ulster tenants, like other tenants in Ireland, held for the most part under yearly tenancies. The custom in Ulster, varying in different districts and on different estates, was roughly this: The tenant, so long as he paid a fair rent, liable to readjustment at reasonable intervals, and acted properly as a tenant, was not to be disturbed in his possession. The tenant could also, with the approval of the landlord, sell his tenant right. While the other farmers in Ireland were liable to eviction at any time, and had no heart to improve their farms, and while the system of ownership in Ireland generally had completely failed—ownership in which

WEEKLY MARKET, CASTLEREA

each of the partners contributed a share of the capital which forthwith became the property of one of them—the farmers of Ulster had by the custom such security as gave them an interest in the improvement and development of their holdings, and dual ownership in Ulster, notwithstanding that the holdings were smaller, the land poorer, and the climate worse than elsewhere in Ireland, was a success. The Land Act of 1881, extended, in 1887, to include leaseholders, secured for the Irish tenants the three outstanding characteristics of the Ulster custom—fair rent, fixity of tenure, and free sale.

Fair Rent

The rent was fixed by a Land Commission. The main object was to see that the tenant did not pay for his own buildings and improvements, and that he got the share of the profit due to the

capital he had put into the copartnership. To do that with perfect fairness to both landlord and tenant was perhaps impossible. To do it at all was not easy. There were difficulties in defining a fair rent and difficulties in arriving at it, but so long as the tenants of Ireland contributed a share of the capital, it had to be done somehow. It has been done, and notwithstanding the difficulties in the way fairer rents have been fixed and paid in Ireland since 1881 than before. But apart from what equity required for the rent payers, it was necessary that fair rents should be fixed in view of the land purchase movement, because the rents were the basis for ascertaining the selling price of land in Ireland. The fixing of a fair rent was therefore an essential preliminary to occupying ownership.

Fixity of Tenure

The next outstanding feature of the Act was the clause giving fixity of tenure. There is no need here to raise the question of whether in ordinary circumstances in Scotland a tenant is entitled to fixity of tenure. In Ireland he had provided part of the capital, and in equity he had as much right to be secure in his possession as the landlord himself, and this Act obtained for him such security.

Free Sale

The third outstanding feature of the Act was the clause giving power of sale to the tenant. The Act proceeded on the ground that the landlord and tenant were joint proprietors, each having contributed to the capital of the concern. That being so, there was no reason why the landlord should be allowed to sell his interest and the tenant should be denied the like privilege.

How the Land Act of 1881 Failed

Up till this time the whole trend of thought had been in favour of tenancies. Land purchase had occupied a subsidiary position. Afterwards, however, a change took place. Land purchase occupied the forefront and tenancies the background. This was not due to any inherent defect in the Land Act of 1881. It was due to other causes. It was due in part to the opposition of the landlords. They were against it. This was not to be wondered at. The landlords saw the danger ahead. They saw agriculture depressed and prices falling. They saw that every fifteen years, if not oftener, there would be a demand, which could not be resisted, for a reduction of rent. Even with enhanced prices for agricultural produce, they could not feel that there was much hope of rents being increased. The condition of the agricultural world was against the Act. It had fallen upon evil days of depression, brought about by a world-wide competition, which was not to pass away. Still, reasoning from what happened in Ulster, it should have wrought much good in Ireland despite

landlord and competitor, if it had got a fair trial. In 1882, however, a Committee of the House of Lords advocated that the whole of the purchase money should be advanced to the Irish tenant to enable him to purchase his holding. This, so far as regards the effective working of the Act, was an unfortunate suggestion made in the very year after the Act was passed. Both political parties seemed anxious to get such an Act put on the statute book. In 1885 the Conservative Government was successful, and what is now well known as the Ashbourne Act became law. The whole money was advanced to the tenant. He had to pay interest at 3 per cent., with 1 per cent. sinking fund. At the end of 49 years he was absolute owner. The landlord got hard cash, with the exception of one-fifth of the purchase money, which was held back as a guarantee. £5,000,000 was voted for purchasing purposes. A tenant paying a rent of £100 could, if his landlord agreed, redeem it for £1700. On this he paid 4 per cent. for 49 years or £68 per year. He thus got a reduction of 32 per cent. It was cheaper, therefore, by £32 out of every £100 for an Irish farmer to become proprietor than remain tenant. The Irish farmer in the circumstances naturally preferred to purchase. It would have been madness to do otherwise. The 1885 Act thus made the success of the 1881 Act impossible.

Land Purchase

While the whole trend of thought had been in favour of tenancies till 1881, the seeds of land purchase had been sown years before. John Bright delivered a speech in Dublin in 1866, in which he advocated land purchase for Ireland. That was the beginning of the present land purchase movement. In the Irish Church Act of 1869, clauses were inserted enabling the holders of glebe-lands to purchase. The State advanced three-fourths of the purchase money, which was repayable at the rate of 4 per cent. in 32 years. 6057 tenants, after some hesitation, acquired their holdings. Inspired by the success of the land purchase clauses in the Irish Disestablishment Act, Mr Bright secured the introduction of clauses of land purchase in the 1870 Act. The Government in this case advanced two-thirds of the purchase money, and the tenant purchaser paid an annuity of 5 per cent. for 35 years. Again, in the 1881 Act, similar clauses were inserted. The Government advanced three-fourths of the money. The annuity and the period of repayment were the same as in the earlier Act. While the Act of 1869 had been a success, both the Acts of 1870 and 1881, from a land-purchase point of view, had been comparative failures. Under the earlier Act only 877 tenants purchased, and £514,000 was advanced. Under the 1881 Act, only 731 tenants purchased, and £240,000 was advanced. The reasons for the failure are not far to seek. In 1870 agriculture was booming, and the landlords of Ireland, who could have sold independently of the Act, to outside purchasers, were not then inclined to sell. Besides, the legal

expenses in connection with land sales were prohibitive. In 1881, agricultural depression had commenced. The Irish landlord thought that it would pass away, and he was disinclined to sell, particularly in view of the fact that he could not then sell to advantage. Moreover, most of the land in Ireland was entailed. If the landlord had sold, the money would have had to be invested in trustees' securities, and these would have brought a much less return than the rents of the property. The tenant, on the other hand, was disinclined to buy, because he believed that his rent would be reduced under the 1881 Act, and he preferred to wait until the reduction took place and then buy, on the basis of the reduced rental. Besides, the Irish tenant was often

TAKING NOTES AT GLASNEVIN

unable to raise the necessary fourth with which to purchase. In order to get out of this difficulty, the Land Act of 1885 was passed, by which, as already mentioned, the whole of the money was advanced to the tenant for the purpose of purchasing his holding. Inasmuch as the tenant could become proprietor, as we have already pointed out, by paying 32 per cent. less than continuing his tenancy, he was naturally more inclined to purchase; but there were still lacking the necessary inducements to the landlord. Notwithstanding this, under the 1885 Act and under the 1888 Act, which did little more than increase the amount voted for land purchase from £5,000,000 to £10,000,000, 25,367 tenants purchased, and £9,992,536 was advanced. The landlords who sold were presumably either well-to-do landlords, who could afford to lose money to get out of the turmoil of Irish life, or absentee landlords whose estates were heavily mortgaged. The

next great step forward was the Land Act of 1891. The tenant, as under the 1885 Act, was to get the whole purchase money from the State, and he was to pay 4 per cent. for 49 years in redemption of the advance: £33,000,000 was set aside for purchasing purposes. Apart from the large sum available for purchasing land, the terms to the tenant were not better than those contained in the 1885 Act; but the 1885 Act contained so good terms that it had created in the minds of the Irish farmer the desire for purchasing, and that was what was wanted. The need still was to find inducement sufficient to make the landlord sell, and this Act contained the first of these inducements, which before long was turned into an impediment. The landlord was to be paid in land stock. He received £100, while the actual price ran from £107 to £114. In this way, the landlord received a bonus, ranging from 7 to 14 per cent. Consols fell to 85, and then land-purchase came to a standstill, but 42,437 tenants purchased under the Act and the Government advanced £12,336,685. Possibly, the Act, will be best remembered because it created the Congested Districts Board, which is tackling a problem in Ireland of the utmost difficulty. We have considered the work of the Board in another chapter. The next Act of importance was the Land Act of 1896. The tenant paid as in the preceding Act, but the annuity terminated in 42 instead of 49 years. The Act is best known because it introduced "decadal reduction." Every ten years, for three decades if the tenant did not stipulate otherwise, the amount paid was deducted from the purchase price. This reduced the instalments of principal and interest every ten years for 30 years, but it extended the period during which the instalments had to be paid. It was a precaution taken in anticipation of the lean years when deductions might be demanded. It has, however, found no place in more recent legislation.

The Wyndham Act of 1903

In the opening years of this century it became evident to everybody that the Irish tenants as a whole had to be transformed into occupying owners, and that the movement towards this consummation would have to be more rapid in the future than it had been in the past. The Irish tenant was still most favourable because he paid less as owner than he did as tenant. The landlords had had the experience of the original reductions of rent under the 1881 Act, and the second revision had been proceeding since 1896. A diminishing rent-roll—it had gone down over 40 per cent. in 20 years—was not encouraging to the landlord. He was now more willing to sell, but he was still unwilling to sell at a loss. In 1902, a meeting was held in Dublin composed of representatives of landlords and tenants for the purpose of considering what could be done to meet the objections of the landlord and to bring about a more wholesale system of land purchase in Ireland. The landlords were represented by Lord Dunraven, Lord Mayo, Colonel W. Hutcheson Poe, and Colonel Nugent T. Everard.

The tenants were represented by Mr John Redmond, Mr William O'Brien, Mr T. W. Russell, and Mr T. Harrington. A report was issued. Mr Wyndham's Land Purchase Act of 1903, which we are now to consider, was based on the recommendations contained in that Report.

Inducements to Landlords to Sell

The 1903 Act helps the tenant, inasmuch as it places at the disposal of the Land Commission £100,000,000 of money for land-purchase purposes, and in numerous ways facilitates sales; but it offers to him, as an individual, no greater inducement to purchase. In fact, it places him in a worse position than the earlier Acts. The yearly instalments of interest and sinking fund are reduced from 4 to 3¼ per cent., but the period of payment is extended from 49 to 68½ years, so that, while the individual payments are less, the aggregate payments are more. The purchase price is higher. Still, the Irish farmer is paying, as we shall see presently, from 10 to 40 per cent. less as proprietor than he would be were he to remain tenant. There is still, therefore, the necessary inducement to him to become proprietor. In the previous Acts the inducement to the landlord to sell was not sufficient. The clamant need, failing compulsory purchase, which finds no place in Irish land reform, was inducement sufficient to make the landlord willing to sell. The outstanding feature of the 1903 Act is the creation of these inducements. We mention a few of the more important of them.

(1) Method of Fixing the Price

In previous Acts the price was a matter of arrangement between the landlord and tenant. Inspectors on behalf of the Land Commission had to be satisfied with the security before the Land Commission advanced the money. It is still possible and preferable to proceed in this way, but the Land Commission in such circumstances are not bound to sanction the advance. The alternative procedure under the Act is new. Landlord and tenant are restricted in the terms of sale and purchase, and notwithstanding the fact that the State is to advance £100,000,000 of money, inspection on behalf of the Land Commission, in respect of the sales under the alternative procedure, so far as security is concerned, is dispensed with, and the price is fixed as follows:— If the rent payable by the tenant is a first term rent, that is, a rent fixed after 1881 and before 1896, it is reduced by not less than 20 per cent. and not more than 40 per cent. as a preliminary to fixing the purchase price. If the rent is a second term rent, that is, a rent fixed after 1896, the reduction is not less than 10 per cent. and not more than 30 per cent. as a preliminary to fixing the purchase price. Landlord and tenant then endeavour to arrange the price within these "zones." Let us see how a sale is

effected and what the result is. Take the case of a first term rent of £100. From this there has to be deducted anything from 20 to 40 per cent. If we take the lower figure and deduct 20 per cent. from £100 we have a rental of £80 as the basis for calculating the purchase price. The capital value of an annuity of £80, according to the Act, is £2461, 10s. If we take the higher figure and deduct 40 per cent. from £100, we have a rental of £60 as the basis for calculating the purchase price. The capital value of an annuity of £60, according to the Act, is £1846, 3s. 1d. Now, observe the difference between the purchase price of a first term rent under the 1885 Act and the purchase price of a similar rent under the 1903 Act. Under the earlier Act, the landlord might only have received for a farm rented at £100, on which a first term judicial

FARM STEADING AT PILTOWN

rent had been fixed, £1700 or 17 years' purchase. Under the 1903 Act he gets, if this procedure be adopted, for a similar farm, on which a similar judicial rent had been fixed, anything between £1846, 3s. 1d. and £2461, 10s., or from 18 to 24 years' purchase, without taking into account the bonus of 12 per cent. which he gets from the State. Now, a great factor in the arrangement is the fact that it is cheaper for the tenant to buy at the highest figure which the landlord can demand than not to buy at all, for the instalments of principal and interest, even in that case, are less than the rent. The result is, that the Irish landlord, in consequence of this new method of fixing the price under the 1903 Act, is, without taking into account the bonus, getting more for his land to-day than he could have got in the open market or under any of the Land-Purchase Acts since 1885.

(2) Purchase Price

Payment of the purchase price is now made in cash, not in land stock. When land stock was selling at £114, and the landlord was debited with it at £100, this was an inducement for him to sell. When land stock fell to £85, the inducement disappeared and land sales stopped. In order to obviate difficulties of this kind, and to free the landlord of all risks, the 1903 Act stipulates that payment is to be made in cash.

(3) Deposit

The Government decided in 1885 to advance to tenant purchasers the whole of the purchase money. Two conditions were imposed. The Land Commission had to be satisfied with the security, and one-fifth of the price had to lie with the Land Commission as a guarantee deposit. We have already seen that, in cases within the zones, the Land Commission do not now need to be satisfied with the security before advancing the whole purchase money. They advance the money without considering the security. The Land Act of 1896 gave power to the Land Commission to dispense with the guarantee deposit. The 1903 Act goes farther. It leaves the Land Commission no option. The deposit is simply dispensed with. The landlord now gets payment at once of the whole purchase money.

(4) Demesne

One of the difficulties of land purchase in Ireland has been demesne lands, particularly in connection with mortgaged estates. A landlord might sell the holdings on his estate and be left with the residential part of it, without any prospect of getting it disposed of. Under the 1903 Act, the Land Commission may agree to buy from any proprietor who sells his holdings any demesne or other lands in his occupation. This puts the landlord in possession of a considerable sum of money, which is an inducement, as the Act meant it to be, to a poor man to sell his estate. But, further, he is allowed to buy back his demesne lands, as if he were a purchasing tenant, by paying $3\frac{1}{4}$ per cent. for $68\frac{1}{2}$ years, provided the price does not exceed one-third of the purchase money of the estate, or £20,000.

(5) Bonus

Much of the land in Ireland, as we have already said, is entailed. Hitherto, there has been no inducement to the life-owner to sell. To sell might have been beneficial to the estate ultimately. It was not so, generally, to the life-owner. In order to get out of this difficulty, the Government provided £12,000,000 of money, not by way of loan, but as a gift to landlords, in which an owner for life could participate. But this bonus is only given

when what is sold is declared by the Commission to be an "estate." Under the Act, the seller receives 12 per cent. of the purchase price of the estate, and that whether he is an absolute or a limited owner. In fact, if he has been six years in possession of the estate and holds under a lease, 60 years of which is unexpired, or in life-rent, he is entitled to get this 12 per cent. Thus, out of an estate worth £40,000 a limited owner gets an immediate payment for his own use of £4800.

(6) Arrears of Rent

Hitherto, where an agreement for the purchase of a holding had been lodged with the Land Commission, all arrears of rent

STOCK BULL, "BAPTON RANGER," AT FARM SCHOOL, ATHENRY

due by the purchasers were wiped out. This provision is still in force, but the party who would have been entitled to the arrears, that is, the absolute or limited owner may be paid out of the purchase money the equivalent of one year's arrears of rent. Now, an absolute owner would get all the purchase money at any rate. The liferenter, however, would only get the liferent, and the arrears being irrecoverable, he would get none of them. This provision, therefore, takes from the absolute owner and gives to the liferenter an equivalent of the year's arrears of rent. This is done with the view of inducing the liferenter to sell. The arrears might amount to 4 or 5 per cent. of the purchase money. If the estate were sold for £40,000, the liferenter would get a cash payment of from £1600 to £2000.

(7) Trustees' Investments

The Act has given to the limited owner another inducement to sell. If a sale were effected before the Act was passed, the money had to be invested in securities authorised by the Trust Acts. These securities gave in every case a very small return. The result was that the interest on the purchase money was less than the rental, and the landlord suffered. The framers of the Act, in their desire to secure the transference of property from landlord to tenant, endeavoured to obviate this difficulty. The method they adopted was to sanction better paying investments for trust money. The landlord may now be able to sell with the hope of investing the purchase money in securities that will bring him 4 per cent., which compares favourably with the return from his estate.

(8) Legal Expenses

In the early days of land purchase the cost of transferring land was serious. When the 1870 Act was passed, the owner had to pay £200 as the cost of shewing title to a farm of £2000. The lowest fee for passing a property through the Landed Estates Court was £100. This did not include the legal expenses outside the Court. The Land Commission under the 1903 Act may make whatever investigations are necessary in regard to title, including Searches in the different Registers, without charge, and it may also distribute the money among the parties entitled thereto, without charge. In fact, it has relieved the seller of much of the legal expenses in connection with the sale of his property.

Results of Land Purchase

These inducements given to the landlord have not been given in vain. The 1903 Act, considering that it has only been in operation since 1st November of that year, has out-distanced all other Land-Purchase Acts in the rapidity with which it has changed the tenant farmer of Ireland into an occupying owner. It has been the most successful Land-Purchase Act, if success is to be measured by the money advanced for purchase purposes. The following figures speak for themselves. They represent the amount of loans issued under the various Acts, none of which is entirely repealed, from 1885 to 31st January 1906:—

1. Land Acts, 1885 and 1888 .	£9,992,536
2. Land Acts, 1891-1896 . .	£13,122,130
3. Land Act, 1903 . . .	£9,242,650

Lessons for Land Reformers

Irish history has been full of struggle and storm. The unrest has powerfully affected the land question, and made comparison

with countries more happily situated impossible. Yet the land problem in Ireland has some lessons for all land reformers. It has emphasised the fact, scarcely needing emphasis, that a system of land tenure, based on contributions of capital from landlord and tenant, which forthwith become the property of the landlord, is in the long run impossible. It has proved that dual ownership in Ulster, the province in Ireland where it got a trial, was successful, and contributed not a little to the prosperity of the north of Ireland. It has proved the potency of a great land reform agitation to create occupying ownerships and the willingness of the taxpayer to come to the aid of the farmer, thus establishing a precedent that may be applied to other sections of the country when the necessity arises, and it has shown the costliness of the procedure, for, whatever may be the case when compulsory powers of purchase are granted, the tenant in Ireland without such powers has had to pay more than the market value for his land. It has proved the futility of attempting to run occupying ownerships and tenancies side by side, when it is cheaper to become an occupying owner than remain a tenant. It has proved these things. But it has not proved whether single ownership, where the landlord has provided everything, or dual ownership, where landlord and tenant have provided everything, is preferable. We would have wished at the present time that it had thrown light on this subject, but it throws none. It has had no opportunity of doing so, single ownership of the kind referred to being little known in Ireland. Nor has it proved whether tenancy or occupying ownership is the preferable system of land tenure. We are writing with the report of one of the Irish Land Commissioners before us, in which he proclaims the contentment that has followed in the train of the land-purchase movement. But it is too soon to speak of the result of that movement. Years will have to elapse before anything reliable can be said on the subject. Much, however, has been done to make land-purchase in Ireland a failure. The inequalities caused by the most confusing mass of legislation we ever tackled are a source of great trouble and irritation. The responsibility of proprietorship has been thrust upon the people before they were ready for it. They are paying more for their land than they would have paid under any of the Land Purchase Acts since 1885. Much is also being done to make land-purchase in Ireland a success. The Department of Agriculture is leaving no stone unturned to get the schoolmaster in front of the legislator, which is the supremely important work just now. If it succeeds in educating the people and in developing the characteristics that make for success, if it is able to develop minor industries, such as fruit-growing, market gardening, dairying, and poultry rearing, so that the produce of the land may be increased, if these industries are run on co-operative lines, so that better prices may be obtained—if these things are done and done in time the land purchase movement may succeed and Ireland may be another witness to the "magic of property."

GENERAL FARMING

IRELAND is basin-shaped. The mountains round the coast are the rim. The inside is the flat of the basin. It is a large plain, so level that it has been said a stream rising in the centre of the plain might run either to the Irish Channel or the Atlantic Ocean. Within this basin there are really two Irelands. There is the Ireland of the North, where the land is, comparatively speaking, poor land and the climate cold, where the farmers are shrewd, intelligent men, who have made the most of their circumstances. The farm steadings are trim and well kept. The land is well tilled. There is an air of prosperity about the country. There is the Ireland of the South, where the land is better and the climate milder, and the people, possibly to some extent because nature has done so much for them, are less energetic ; where the steadings are ill-kept and the land badly tilled, and waste and neglect are much in evidence. The difference between these two Irelands is so great that when the section of the Scottish Agricultural Commission which went North met the section which went South, they had formed entirely different conceptions of farming in Ireland. The Northern section was inclined to compare Irish farming, as they had seen it, to Danish farming. There seemed to be the same intelligence applied to agriculture as in Denmark. There seemed to be the same economy and thrift practised on the farms. There seemed to be something approaching to the same comfort. The Southern section, on the other hand, were disappointed. They saw good land in a good climate going to waste for want of energy on the part of the farmers. They saw bad and badly kept farm buildings. They saw an Ireland where to the outside observer the policy of the Department of Agriculture would, if followed, produce the earliest and most fruitful results, and yet that policy was making comparatively little headway.

Area of the Country

The Area of Ireland is 20,350,725 acres. It is divided as follows :—

	Acres.
Corn and green crops, including flax	2,398,123
Hay	2,328,958
Pasture	10,064,307
Mountain and land grazed	2,244,708
Fruit and fallow	13,000
Woods and plantations	305,684
Barren mountain land, bog, water, etc.	2,995,945

Soil

The rock formations give very little idea of the soil of Ireland. The soil is very often composed of drifts and local deposits. For example, the old red sandstone formations in Cork, Waterford, Kerry, Clare, Limerick, Tipperary, Kilkenny, and Mayo are covered with local deposits which yield a sandy loam, rich in plant food. On the other hand, the local deposits overlying the same old red sandstone in Tyrone also yield a sandy loam, but much less fertile than the soil on the other red sandstone rocks just mentioned. Again, the soil on the silurian rocks in Meath,

DONKEY CART WITH MILK AT PILTOWN

Queen's County, Tipperary, Clare, Kilkenny, and Waterford is a good soil, suitable for dairying, whereas the soil on the silurian rocks of Down, Cavan, Louth, Armagh, Monaghan, and Mayo is of poor quality. The richness of Irish soil is often due to the mixing of drift and local deposits with the soil derived from the underlying rocks. It has been well said in that inexhaustible book, "Ireland, Industrial and Agricultural," to which in the preparation of this Report we have always resorted when other sources of information dried up, that the richness of "alluvial and drift soils of the Golden Vein is attributable to detrital contributions from the silurian and red sandstone rocks of the Keeper Hills, and from the felsites, basalts, etc., of the Limerick basin, mingling with the materials derived from the rich limestone of the country." Similarly, the rich soils of Meath, Kildare, and Dublin are due to the mixture of red sandstone and granite with the limestone of the district, and the Lagan Valley owes its fertility to

drifts composed of basalt, red marl, silurian grits, and slate, mixed with the red sandstone of the valley.

Climate

The climate also varies, although not to the same extent as the soil. It is on the whole inclined to be wet. Rains, of course, are more frequent in the west. The rainfall in Kerry in 1905 was over 61 inches, whereas the rainfall in County Dublin was about 27 inches. But it is not the rainfall, it is the uncertainty of the rainfall which hurts in Ireland. Ireland, however, is favourably affected by the Gulf Stream, and this makes up for the disadvantages of a precarious climate. It is thus warmer than other countries in the same latitude. The rain and the heat together account to a considerable extent for the greenness of the grass in the Emerald Isle.

Size of Holdings

The farms of Ireland are small farms, as the following figures show:—

Size of Holdings.	Number of Holdings.	Assumed Average Size of Holdings in Statue Acres.
Not exceeding 1 acre	74,607	½
Above 1 acre and not exceeding 5 acres	62,864	3
„ 5 acres „ „ 15 „	154,437	10
„ 15 „ „ „ 30 „	133,984	22½
„ 30 „ „ „ 50 „	74,240	40
„ 50 „ „ „ 100 „	57,568	75
„ 100 „ „ „ 200 „	23,041	150
„ 200 „ „ „ 500 „	8,147	350
„ 500 „	1,521	1,296

But the farmers of Ireland are not intensive farmers such as you find on small farms in other countries. Farming varies greatly in Ireland but it is nearly all on the extensive system. The rearing of cattle is the most important branch meantime. There are over 10,000,000 acres of pasture, without taking into account the mountain land grazed, and these acres are used mostly for the purpose of rearing store cattle. The soil of Ireland, rich in lime and phosphates, is pre-eminently suitable for this purpose. But as the frames of the cattle are simply built in Ireland for the purpose of being filled up in Britain, the fertility of the soil, which goes to the production of bone, muscle, and tissue, is never returned, with the result that the soil is deteriorating, and will in course of time, if things are not changed, become exhausted. This kind of farming is carried on by two classes, by the farmers who rear calves and sell them as yearlings, and by the farmers who buy these yearlings and turn them out stores. There is a third class of grass farmer in Ireland, the farmers on the rich grass lands, who buy what stores are not sent to Britain and

finish them for the fat market. Dairy farming ranks next in importance to cattle rearing. It has lost instead of gained ground during the last fifty years, but it will almost certainly be the most important branch of farming in the near future, when winter dairying is more fashionable than it is to-day. Meantime, it is carried on in a leisurely way during the summer months on the pasture lands of Munster and in Ulster. There is another type of farming in Ireland—arable farming, such as you find in the North where oats and flax predominate, and such as you find in the South where barley is the main crop—a type of farming which will be exceedingly difficult to carry on in the future in view of the fierceness of foreign competition. These figures shew the live stock in the country, and the area under the different crops in 1906.

Live Stock

Horses	604,413
Asses	242,675
Cattle	4,633,924
Sheep	3,714,832
Goats	287,255
Pigs	1,244,542
Poultry	18,976,862

Crops

	Acres.
Cereal Crops	1,309,285
Green Crops	1,033,667
Hay	2,328,958
Flax	55,171

Typical Farms

We had an opportunity of visiting different farms. We may describe a few as typical of farming in general. We leave out of account the purely grass farms, about which little can be said, and also the smaller farms on which it is impossible to make a living by ordinary farming.

A Small Farm

We visited a small farm extending to 25 acres. There was 7 acres of permanent pasture and 18 acres under tillage. The rotation, which varies greatly in Ireland, was, roots (potatoes, turnips, or mangels), oats or wheat, and then another grain crop sown out with seeds. Seven cows were kept and their calves reared. Each calf got new milk for a month. Then the milk was mixed with linseed meal, and finally, the feed was skimmed milk and linseed meal. The stirks were fed in winter in open sheds on turnips and hay. Sometimes, Indian meal was added. They were sold when one year old at from £5 to £7, 10s. The milk not required for rearing calves was sent to a co-operative

creamery. A considerable number of fowls were kept, but no pigs. One horse did the horse work unless in the ploughing season, when a second was borrowed. The farmer with the assistance of his brother, did all the manual labour, save in harvest time, when additional hands had to be employed.

A Medium-Sized Farm

We visited another farm extending to 120 acres, about 70 acres of which were in permanent pasture. Thirty acres were devoted to meadow, and 20 acres were cultivated. The rotation was: first

STREET SCENE, CLONAKILTY

year, oats; second year, potatoes and turnips; third year, oats; fourth year, hay; fifth year, hay. Rye and vetches were grown for spring cutting. There was a five plot test of varieties of oats laid down by the County Agricultural Instructor — "Potato," "Abundance," "Tartar King," "Waverley," and "Black Tartarian" being the kinds selected. Each plot was a quarter of an Irish acre. The County Committee of Agriculture supplied the seed. This farmer kept ten cows and reared calves. Thirty ewes, bred to a Border Leicester ram, formed part of the farm stock. A premium bull was also kept. It was bought as a yearling at Dublin for £42. The Department stipulated, as they always do, that the bull must be well-bred and serve thirty cows, outside the farmer's own stock, in the first year at 1s. per cow, and afterwards forty cows per annum. The County Committee pays the farmer £15 per year as a premium.

A Large Farm

Lord Bessborough's farm, extending to about 1200 acres, may be taken as typical of the large farms. It is mostly composed of meadow and permanent pasture. Forty acres are devoted to crops grown in the following rotation: oats; roots; oats; hay (twice cut); hay. The turnips are alternated with other roots to prevent finger and toe. Silage is made freely in stacks in the fields. The top of the stack is covered with earth a foot deep. The sides are raked down carefully with a close-toothed rake as the building goes on, and consequently they require no covering. Lord Bessborough considers that carting grass to a central silo at the steading involves far too much labour. All Irishmen, however, do not agree. Colonel Everard has a silo at his steading and apparently prefers to make silage there rather than on the fields.

A prominent place is given to dairying on the farm. Sixty cows are kept, occupying a byre which by many would be considered novel, inasmuch as on the top of the byre there is a large hay shed capable of holding about 40 tons of hay. This might be thought detrimental from a ventilation point of view. But if we may judge from the state of matters on a warm June day, when we visited the farm, the ventilation is quite good. The machinery for working the dairy and preparing the food during winter is driven by water power carried overhead in large tubes. Lord Bessborough is a breeder of shorthorn cattle as well as a dairy farmer. The shorthorn cows we saw were a fine lot. They were the produce of two families of the "Mydaline" blood, bred by Mr Letham. The calves were sired by "Financier," a two-year-old bull by "Pride of the Vale," and by "Gold Drop," a young bull bought at Perth in 1905 for 80 guineas. They were mostly blood-red with velvety skins. They had every appearance of becoming good stock. In addition to the shorthorns, sixteen pedigree polled Angus cows were turned out, the greater part being of the "Vine" blood. They were served by two bulls of great substance. The produce is sold throughout Ireland for the purpose of improving the store cattle of the country.

Ireland has had more fame for breeding hunters than Clydesdales, but she breeds Clydesdales too, though some Irishmen believe to little purpose. We saw a stud horse and eight Clydesdale mares at Lord Bessborough's farm, six of them nursing foals. They were what we should call undersized. But size as a virtue in a horse depends on the work it has to do. The land in Ireland is as a rule free land, easily wrought, and the farms are small farms. The horse wanted is a lighter animal than is in favour in Scotland. The specimens we saw had been carefully selected for quality and pedigree, and had won many honours in the showyard. The harness room was literally papered with prize tickets.

This nobleman has also gone largely into the pig trade. He has a range of first-class piggeries. He breeds animals that are in great demand throughout the country, the Department of Agriculture being among his customers.

Tillage *versus* Grass

From the description which we have given of typical Irish farms visited, it will be seen that even the mixed farms of Ireland are largely composed of grass. Ireland has now become practically a grazing country, with a population almost entirely dependent on the land for a livelihood. It is not, therefore, surprising that rural depopulation has been going on in Ireland more than anywhere else in modern times, and Ireland has suffered in a way that other countries have not suffered. The cities of refuge for her migrants have not been the industrial centres of the country. There are too few of them to hold the migrants.

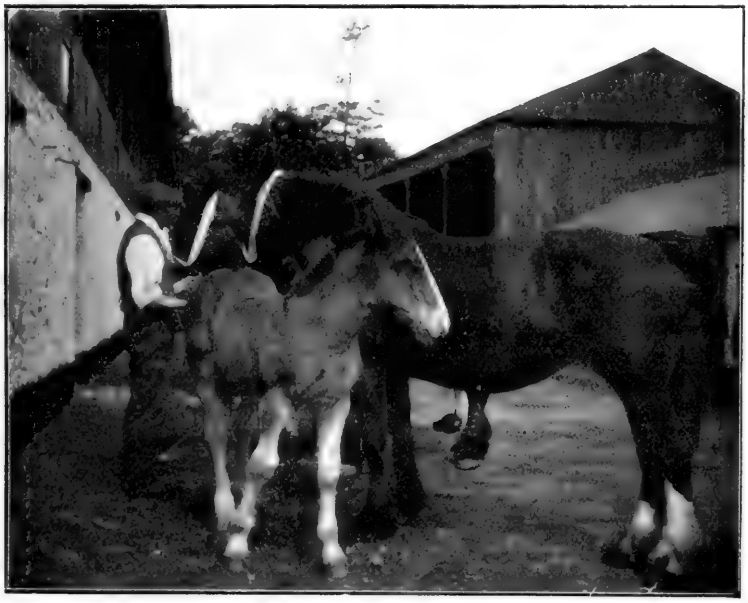
PREMIUM SPANISH JACKASS, DARRARA FARM SCHOOL, CLONAKILTY

The cities of refuge for them have been the cities of the Western Republic. In this way Ireland has lost, since 1841, 3,716,349 of her inhabitants. The Department is making strenuous efforts at once to stop the exhaustion of the soil occasioned by the production of store cattle, and the depopulation of the country occasioned by turning arable land into grass. It is doing this by endeavouring to encourage a revival of tillage. It appears to be succeeding, for the agricultural statistics of 1906 showed that there were 75,000 acres less of pasture in the country than in the preceding year. The vital question, however, is the question whether grazing or tillage is the more profitable. The Department has gone into the matter with great thoroughness, and has shown that, as a rule, tillage is not only better for the nation as a whole, which will be admitted, but that it is more profitable for the farmers. Is tillage, however, more profitable for the farmers on the rich grass

lands of Meath, for example? Are these fields, rich in phosphates and lime, and pre-eminently suitable for rearing store cattle, not more profitably used when left in grass? The Department has tackled and answered that question too. It is confident that tillage is more profitable even in Meath, provided up-to-date methods are employed and those crops only are grown for which the land is best suited.

Department's Policy

The Department's scheme of tillage is far reaching. It will revolutionise farming in Ireland. The man with an acre or a



MARES AND FOALS, EARL OF BESSBOROUGH'S FARM

few acres favourably situated is to practise the most intensive cultivation, and to concentrate his attention on fruit, flowers, vegetables, poultry, bees, and the like. The man with more acres where soil and climate are suitable is, without neglecting other minor farm industries, to become an intensive dairy farmer, ploughing up every available acre of grass and stall-feeding his cattle, thus at once adding to his stock and to the fertility of his soil. Where neither market gardening nor intensive dairy farming is possible, the farmers of Ireland are to increase their crops by the most up-to-date methods of cultivation, and turn them into beef, mutton, pork, butter, eggs, and poultry. It is hoped that the development of agriculture on these lines, coincident with the spread of a co-operative movement which is intended to encircle the land and reach its remotest corner, will go far to make the uneconomic holdings of Ireland economic.

CO-OPERATION

IRISH history is sad reading. Our part in it is not a part of which we need be proud. It has been characterised by oppression, sometimes oppression by intent, sometimes oppression by misunderstanding. The Irish themselves have been much to blame. They have not done what they might have done to make the most of things. But the result, whatever the contributing cause, has been the neglect of education, the destruction of trade, and the poverty of the people.

Foreign Competition

This was the condition of affairs when the small farmers of Ireland had to face a world-wide competition. There was, on the one hand, the competition of the prairie farmer, who gets his land for little or nothing, who can grow crops on virgin soil without manure, who, though far away, can place produce on the British market at less than the best and biggest British farmers can grow it. There was, on the other hand, the competition of the small farmers of the Continent, where education has been to some extent perfected, and land tenure is adapted to the needs of the farmer; where intensive cultivation has increased the produce of the soil, and at the same time added to its fertility; where co-operation is a fine art; and where transit by land and sea is so low that the Continental farmer is able to reach the English market at less expense than the Irish farmer.

Revival of Agriculture

In any circumstances, it would have been impossible for the Irish farmer to overcome the competition of the prairie farmer. The only hope of the Irish farmer lay in beating his Continental rivals, who possessed no natural advantages. Now, two things, above all others, have contributed to the success of the Continental farmer—education and co-operation. If it had been possible, Ireland would have perfected its education first, but you cannot educate a people at once, and Ireland had to do something at once, and put up with all the disadvantages which a bad education entails. It was possible, while laying the foundation of a national system of education which would stand the next generation in good stead, to teach the present generation the principles of co-operation or organised self-help. Much beyond this might have to be done before the Irish farmer could beat his Continental rival, but this had to be done first. It was reserved for Sir Horace Plunkett to do it. A member of an old Irish family, he was a man of independent means. He had been ranching in the Far West, and the aristocratic tendencies of the old home were interwoven with the democratic spirit of the Western Republic. It was while a ranchman in Wyoming and Montana that Sir Horace

realised, after much brooding, that the solution of the hitherto insoluble Irish problem was in the hands of the Irish people themselves. Visions of a new Ireland arose before him, and he came home in 1889 to do what he could to bring it in. He met Mr R. A. Anderson, now Secretary of the Irish Agricultural Organisation Society. He had previously communicated his ideas to an old friend—Lord Monteagle—on whose estate, and under whose guidance the first successful Co-operative Creamery was started, and the new self-help movement began. That was also the beginning of the revival of agriculture, which to-day has reached every corner of Ireland, and has done more for that unhappy country than all other economic schemes of amelioration put together.

Difficulties in the Way

The difficulties which Sir Horace Plunkett, Lord Monteagle and Mr Anderson had to face might have appalled them. There was, first of all, the ignorance of the Irish people, which prevented them realising their position. They knew they were poor, but they did not know that their poverty, in large part, was due to the fact that they had stood still, refusing to help themselves, while other nations had been going forward. They did not know that cheap transit had made the large Western farmer a competitor whose competition had killed much of their trade. They did not know that the scientific methods of the Continent had done much to kill what Irish trade remained. Suppose, however, they had known, their distrust of each other, a defect in their character which a good all-round education would have removed, was a barrier in the way of that co-operation, without which they never could hope to compete on favourable terms in the world market.

The education difficulty was a difficulty inherent in the people. There were other difficulties outside the people. The traders, who constitute a considerable section of an Irish community, were usually well-to-do. They traded in everything the farmer needed. They were at once his merchant and his banker. Their profits were good and their rates of interest high. Co-operation among the farmers, which was the general form the new self-help movement would take, would inevitably spoil the trader's business, and it was their interest to prevent the spread of the co-operative movement, and they did much to prevent it. Possibly, their direct opposition was less serious than their indirect opposition. They were the most powerful supporters of the Nationalist Party in Parliament. Naturally, they would press their members to oppose a scheme which was destructive of their own trade. If that had been the only question at issue, the Irish members, as honest and sincere as other members of Parliament, might have sacrificed their bread and their butter and joined the co-operators. But there seemed to be another question at issue. The Irish members were apparently convinced that the co-operative movement was a political dodge on the part of Sir Horace Plunkett, who was a Unionist, to bring some measure of prosperity to Ireland so that the farmers would be contented and cease to

demand Home Rule, which they believed was indispensable. There was something in the argument, just as there is something in the argument of those who oppose the management of the liquor trade on the ground that if the public-house were improved people would cease to work for its abolition. Whether there was enough in it to justify the Irish members in washing their hands clean of the whole affair is another matter. Be that as it may, they threw in their lot with the traders against the co-operators, and have done much to hinder and hamper the movement.

Apart from these considerations, co-operation, as applied to agriculture, had failed in England, where the co-operative movement generally had reached a unique position in the world. It was not widely known then—Sir Horace and his friends did not know—how successful agricultural co-operation had been in continental countries. Their critics might well have asked if, in the home of co-operation, agricultural co-operation had failed, what hope was there in Ireland?

Hopeful Signs

On the other hand, Sir Horace and his friends had three advantages that told in their favour. There was, in the first place, the poverty of the people. It is one thing to get poor men, who have nothing to lose and possibly something to gain, to co-operate. It is another, and a much more difficult thing, to get comparatively rich men to co-operate. Co-operation may mean to the poor men the difference between poverty and plenty; to the well-to-do it may mean only an increase of an already adequate income. The former may be forced to put everything aside and join the co-operative movement; the latter may prefer isolation. There was, in the second place, a lingering affection for the old clan system, observable in the Irishman's proneness to follow his leaders whether in Church or State. Had the Irish members thrown in their lot with the co-operators, the Irish people would have followed them like sheep through a slap in a dyke, and the movement by this time would have covered the land as the waters cover the sea. But there were other leaders in Ireland than the parliamentary leaders, and many of them threw in their lot with the co-operators, and that was an advantage. There was, in the third place, the Irishman's experience of combination for political purposes. He had combined for political purposes with wonderful results, why not for commercial purposes, particularly if it could be shown that the combination was to be to his advantage.

Sir Horace and his Associates at Work

Everything considered, however, it was no easy task which these co-operative pioneers had set themselves. But the future prosperity of Ireland, we now see, depended upon them. They met with the bitterest opposition. Sir Horace was a "Monster in

human shape," and his work—we are quoting from the Press of the time—was "Hellish." They were accused of forcing young women to emigrate and destroying industry. A co-operative creamery was well on the way to be started at Rathkeale. A local solicitor found that the Society was unpolitical and unsectarian. He declared that Rathkeale was a Nationalist town, Nationalist to the backbone, and that every pound of butter made at the creamery must be made on Nationalist principles

SIR HORACE PLUNKETT

or not made at all. That upset the Rathkeale creamery. On another occasion, the construction of a creamery was abandoned because the water to the creamery passed through a conduit lined with cement purchased from a man who occupied a farm from which another man had been evicted. These incidents give a fair idea of the kind of material upon which Sir Horace and his associates had to work, and the extraordinary objections which they had to meet. Mr Anderson has told us that he often despaired of ever being able to accomplish anything, but Sir Horace's perseverance and optimism kept them pegging on, and

slowly but surely they began to make headway. Then progress became more rapid, and in five short years after the movement was started they had brought 30 co-operative creameries into existence, with a membership of 1509, a paid up capital of £13,845, and buildings and plant of the value of £24,872. It had been demonstrated not only that co-operation was possible in Ireland in a technical manufacture, but that it was profitable, for the farmers were making from 30 per cent. to 35 per cent. more profit on their cows than they did before.

I.A.O.S.

The movement thus far had been a private movement, financed to a considerable extent by Sir Horace himself, and by the Irish Section of the Co-operative Union of Great Britain. It had now assumed such proportions and gave promise of such development that it was necessary to broaden its basis. A meeting was held in Dublin in April 1894, and the I.A.O.S. was formed, a Society whose sinews of war were to be provided by men of means, interested in the co-operative movement. Sir Horace was elected its first President, and Mr Anderson its first Secretary. The new Society was to be a continuation of the old. The object was "to improve the condition of the agricultural population of Ireland by teaching the principles and methods of co-operation, as applicable to farming and the allied industries; to promote industrial organisation for any purposes for which it might appear to be beneficial; and generally to counsel and advise those engaged in agricultural pursuits" — a great programme indeed, which included, the formation of dairy, agricultural, and poultry societies and trade federations; the development of market gardening; the establishment of experimental farms; the improvement of live-stock; the collecting, grading, and packing of produce; the promotion of rural industries; the creation of agricultural banks; much of which is now done by the Department of Agriculture, but all of which was done in the early stages of the revival of agriculture by the I.A.O.S. Observe that in all this the Society was not doing the work of the Irish farmer. That would have been foreign to its purpose. It was only showing the Irish farmer how to do the work himself. The foreword of the new movement in Ireland was still that the Irish farmer had to work out his own economic salvation, seeking help from the State only after he had proved that he was worthy of that help by having first helped himself.

An important staff and much money were needed to carry out such a programme. The staff grew in size and importance with the years, and though the Department of Agriculture has relieved the Society of some of its work, that has only meant greater activity in other parts of the field left untouched by the Department. In addition to Mr Anderson there is now an Assistant Secretary, and the usual office staff; organisers for creameries, agricultural, and other societies, home industries, and credit banks.

These organisers are lecturers, and several of them possess expert knowledge on dairying, poultry-rearing, and agriculture. There is also a journalistic staff to conduct the *Irish Homestead*, the organ of the movement, but it is now run as a society separate and distinct from the I.A.O.S.

When the Department of Agriculture was created there were some people who thought that the I.O.A.S. had done its work, and was no longer necessary. That was a mistake. The I.A.O.S. was

MR R. A. ANDERSON

essential to the success of the Department. It was to be the medium through which much of the work of the Department was to be done. In fact, without the organisation held together by that Society, the Department would have found its work more difficult. The misconception, however, reduced subscriptions. The Department came to the rescue, but this had the effect of further reducing subscriptions. What need to subscribe if the Department is to make up any deficiency? This year the Department has agreed to subscribe £3700, the largest sum it ever subscribed. It has come to an arrangement, however, with the

I.A.O.S. that its subscriptions are henceforth to bear some relation to other subscriptions, that the amount it subscribes is to depend upon the amount otherwise subscribed. The I.A.O.S. approves of the action of the Department. It goes even farther. It contends, and quite rightly, that the Societies themselves should see that the parent Society which brought them into existence is provided with funds to do its work, thus carrying out the principles of self-help which have been so well inscribed on the banners of the new movement.

Facts and Figures

We can only give in roughest outline the story of the Society's work. We give first of all the number, membership, and trade of the different Societies for the year ending December 1905:—

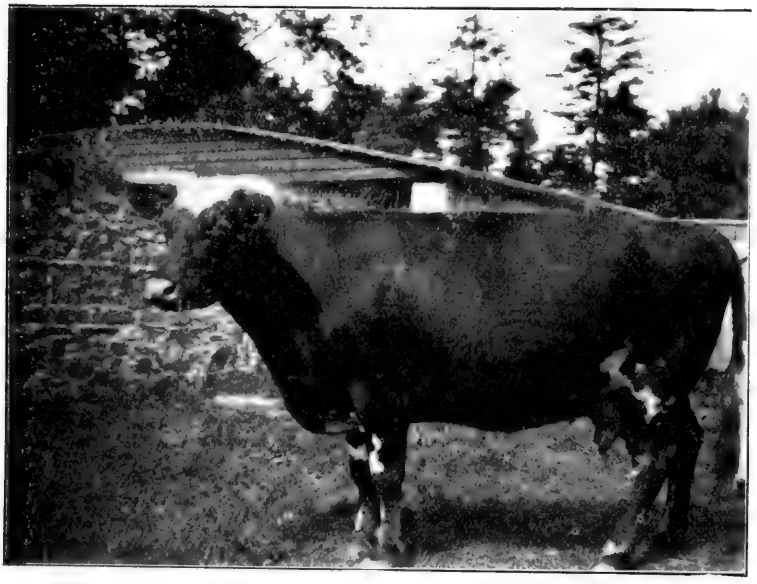
Societies.	No	Membership	Trade.
Dairies	331	42,786	£1,245,486
Agricultural Societies	151	14,096	64,083
Credit Banks	232	13,035	43,641
Poultry Societies	25	5,049	39,791
Home Industries	50	2,811	13,018
Flax Societies	9	426	13,813
Beekeepers' Societies	18	No statistics available	
Bacon-Curing Societies	2	Not yet in operation	
Miscellaneous	13	821	10,451
[1] Federations	4	330	51,575

It is not necessary that we should deal in detail with every Society and Federation. We single out a few—the Dairy, Agricultural, and Poultry Societies as examples of the Societies generally, and shall deal with them in detail. We shall then deal with two of the four Federations—the Irish Co-operative Agency Society, and the Irish Agricultural Wholesale Society.

1. Creameries

Sir Horace and his associates decided to introduce the co-operative movement first of all into the dairy trade, and that for two reasons. In the first place, the dairy industry was carried on for the most part in the province of Munster, and Munster was fairly representative of Ireland. If Sir Horace had gone to the north of Ireland and had met with success it would have been said that this was due to the shrewdness and skill of the Ulster farmers. If he had met with failure in the most prosperous district of Ireland that would have been the most insuperable barrier to progress anywhere else. In the second place, dairying was undergoing at this particular time a change which lent itself to the co-operative movement. The factory system had been introduced into Continental countries, and the factories to a great extent were in the hands of the farmers. Private companies had introduced the factory system into Ireland, and butter-making

[1] The above statistics do not include the statistics applicable to the Irish Co-operative Agency Society. The statistics of this Society are not available.



COW AT GLASNEVIN, YIELDING ELEVEN HUNDRED GALLONS OF MILK ANNUALLY

COW AT GLASNEVIN, YIELDING ELEVEN HUNDRED GALLONS OF MILK ANNUALLY

was passing from the farm to the factory. The time was therefore opportune for assisting the farmer to make the necessary change. The method was simple. Capital to the extent of £1500 or so was wanted. Every farmer who became a member of a creamery took usually a £1 share for every cow he had, whose milk of course was sent to the creamery. The shares were paid in four instalments. The first two were usually in cash and the last two in milk. From the very first the creameries succeeded, because they were able to pay more to the farmer for his milk than he would have got otherwise. There is nothing makes co-operation succeed like that. The following table shows the progress that has been made since the movement began :—

Year.	No.	Members.	Trade.
1889	1	50	£4,363
1890	1	50	8,500
1891	17	850	50,382
1892	25	1,084	98,969
1893	30	1,250	140,780
1894	30	1,641	151,852
1895	38	2,334	184,947
1896	94	8,750	266,969
1897	136	15,136	322,344
1898	191	20,844	401,771
1899	198	22,750	572,963
1900	236	26,577	703,826
1901	277	33,064	803,730
1902	322	41,299	1,039,615
1903	360	44,273	964,066
1904	329	42,432	1,089,620
1905	331	42,786	1,245,486

2. Agricultural Societies

These societies are composed of farmers. Each society is usually confined to a parish or a district. The limitation is made so that the character and reputation of every member, which is all important, may be known to every other member, and particularly to the Committee of Management. The shares are £1 shares; 2s. 6d. per £ is usually paid on each share, and, as a rule, there are no further calls. The object of the society is to do for the farmers what it is impossible that each farmer could do for himself. It receives orders from the individual members for seed, manures, feeding stuffs, agricultural implements. It purchases in bulk and, therefore, at a less figure than the farmer could purchase. The goods are received by the society and distributed among the members, each being charged 5 per cent. to cover working expenses, etc. It acquires thoroughbred sires for the purpose of improving the breed of farm stock. It purchases and hires out costly machinery. It borrows money on favourable terms. It disposes of the members' produce, and consigning produce in bulk,

it obtains important railway concessions and reduced rates. The profit on the business, after providing for a reserve fund, is divided among the members. The object which these societies had in view has not, however, in all cases been attained. They have not been strong enough to meet the competition of powerful private and limited liability concerns. They were, however, necessary steps in the co-operative movement, and they led up to the federations of which we shall speak presently. Apart from the creameries in connection with which co-operation began, and the credit banks, which in a country without capital are indispensable, and with which we shall deal in a separate chapter, the Agricultural Societies are more numerous than any other societies. Their rise and progress will be seen from these figures:—

Year.	No.	Members.	Trade.
1896	46	3,865	£39,741
1897	77	6,067	43,104
1898	99	11,025	56,254
1899	104	11,606	68,217
1900	106	11,961	74,202
1901	112	11,695	72,165
1902	124	12,692	75,521
1903	140	13,981	70,127
1904	130	13,454	67,523
1905	151	14,096	64,083

3. Poultry Societies

The Poultry Societies are composed of farmers and cottagers residing within easy distance of each other. The shares were originally 5s. shares, half of which was paid at the outset. The more recently formed societies issue £1 shares on which 2s. 6d. or 5s. only is paid up except on the dissolution of the society. The advantages of these societies are manifold. The manager of the society teaches the members everything that is necessary in connection with the profitable keeping of poultry. The society sells to them cockerels and pullets of the best laying breeds, furnishes them with the best feeding stuffs, disposes of their fowls and eggs at the best available prices. While the society is improving the income of the individual member, it is also improving the quality of the poultry produce of Ireland. The progress and development of these societies have not been so marked as one would have expected. The first society was formed in 1898, and there are only now twenty-five societies altogether. But it must not be supposed that these twenty-five societies represent all the societies dealing in poultry. Many of the Agricultural and Dairy Societies have poultry departments, and they are not included in the above. These are the figures relating to the Poultry Societies proper for each year since the start:

Year.	No.	Members.	Trade.
1898	16	1,682	£2,643
1899	21	1,837	7,952
1900	21	2,569	9,475
1901	26	4,769	16,669
1902	31	5,906	29,914
1903	35	6,576	26,776
1904	25	5,189	40,676
1905	25	5,049	39,791

FEDERATIONS

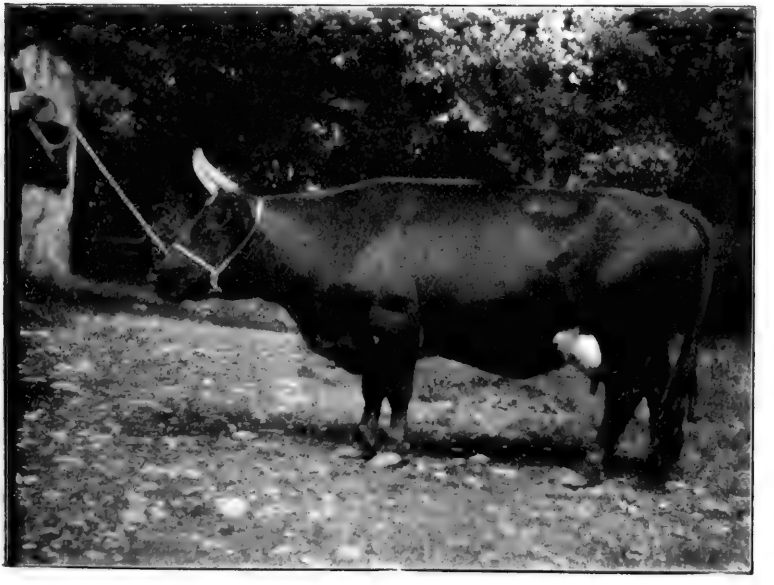
1. The Irish Co-operative Agency Society, Limited

The societies mentioned are only a step towards a co-operative organisation which is yet to embrace all Ireland. The next step is the federation of these societies. Some of the societies have already formed federations. The first attempt was made in 1893, before the I.A.O.S. came into existence at all, when sixteen of the Dairy Societies started a federation called the Irish Co-operative Agency Society. These Dairy Societies took shares in the Agency Society according to the amount of their trade. The capital raised amounted to £137, 15s. The societies pledged themselves to sell their butter through the Agency, a commission of 2½ per cent. being charged. The Agency was unfortunate. It was badly managed; bad debts were contracted; costly litigation was entered into. The result was that its capital was lost, and a severe blow was thus given to the federation of societies in Ireland. A number of the sixteen Dairy Societies cleared out. A few remained faithful, and the Agency got over the reverses of its early years. It does not, however, even yet get the support to which it is entitled, and a compromise was suggested by the I.A.O.S. It suggested that Dairy Societies turning out good butter should guarantee from 7 to 10 cwts. weekly to the Agency. It further suggested—though it did not insist upon this—that the societies entering into such contracts should become members of the federation by taking twenty £1 shares, 5s. payable on allotment. Matters, however, will not surely end in this sort of half-hearted co-operation. The societies, it is hoped, will yet federate in reality either in one or more than one federation. If in one federation it will be able to make terms with railway companies, and it will be able to secure top market prices, for it will be the most powerful, and probably the best, butter merchant in the whole country.

2. The Irish Agricultural Wholesale Society

This Society is a federation of the Agricultural Societies of Ireland. Each Society can become a member by taking one 5s. share for every member, 1s. being paid on allotment. The balance

is paid out of the Society's share of the profits. The Agricultural Societies, as we have already pointed out, came into existence in order to enable the farmer to get his agricultural requirements cheaper than he could get them himself. This Society was started with the view of enabling the different Societies to get their agricultural requirements cheaper than they themselves could get them, and for the purpose also of securing to the farmers of Ireland pure seed and manure. Unfortunately, like the Agency Society, it is not supported as it should be, with the result that the Agricultural Societies compete with each other, they compete with the Wholesale Society, and they compete with private concerns. This foolish competition means loss of money, and the loss of course inevitably falls on the Irish farmer. When all the Societies are wise enough to federate, the Irish Agricultural Wholesale Society will be one of the biggest dealers in the agricultural market, able to buy at figures which will put the Irish farmer in as good a position as the largest farmer in the United Kingdom.



DEXTER KERRY COW, FORTY INCHES HIGH, YIELDING THREE AND A QUARTER GALLONS OF MILK DAILY. (EARL OF BESSBOROUGH'S HERD)

CONGESTED DISTRICTS BOARD

We have seen that the self-help movement in Ireland began in 1889. The Department of Agriculture, which was to administer State aid after the Irish people had learned to help themselves, was not brought into existence till 1900. In the interval, the Congested Districts Board was created for the purpose, among other things, of administering State aid in congested districts. The creation of the Board followed so quickly on the back of the self-help movement, that, unlike the Department, it cannot be said to be the outcome of that movement. The Board gave State aid, not because the Irish people had helped themselves, but because at that time, and in consequence of the exceptional condition of things to be dealt with, it was considered right to give State aid. The creation of the Board thus constitutes a break in the continuity of the principle which underlies the revival of agriculture represented by the watchwords, "Self-help first, State aid afterwards." We must remember these things in considering the work of the Board. We must also remember that self-help, though not recognised as essential by the Board at the beginning, is now an indispensable part of its policy.[1]

The Congested Districts Board was created by the Land Act of 1891. It consists of eleven members—three *ex officio* members. viz., the Chief Secretary, the Under-Secretary, and the Vice-President of the Department of Agriculture. The remaining eight members are appointed by His Majesty. Three of them are temporary members. The Board came into existence because of the exceptional and deplorable condition of life in the poorer districts of Ireland. It was to continue in existence for 20 years, by which time it was hoped the Board might have made life more tolerable in these districts. If the work of amelioration was not complete in 20 years, the Board was to continue in existence till otherwise determined by Parliament.

The 36th section of the Act defines a congested district. The section is as follows:—"Where, at the commencement of this Act, more than 20 per cent. of the population of a county, or, in the case of the County of Cork, of either Riding thereof, live in electoral divisions of which the total rateable value when divided by the number of the population gives a sum of less than £1, 10s. for each individual, those divisions shall, for the purposes of the Act, be separated from the county in which they are geographically situated and form a separate county," referred to in the Act as a "congested districts county." 428 electoral divisions came within the sweep of this section. They were situated in the north-west, west, and south-west of Ireland, and formed part of the Counties of Donegal, Leitrim, Sligo, Roscommon, Mayo, Galway,

[1] This subject is discussed more fully than we can discuss it here by Sir Horace Plunket in his thoughtful pamphlet "The Problem of Congestion in Ireland," published by the Department of Agriculture.

Kerry, and Cork. The districts comprised 3,608,569 acres, and contained a population of 549,516.

It will be noticed from the foregoing figures that the districts were not congested in the sense that the population was too dense. The congestion was due to the fact that the land was poor and unable to maintain the population. The people, who were illiterate to the extent of 50 per cent. in some districts, occupied in many cases small scattered plots of undrained bog-land, extending from 2 to 4 acres, with certain rights of turbary and common pasturage. Their rents averaged about £6 per year. In the inland districts they were dependent almost entirely on agriculture. They were bad farmers. They observed no rotation of crops. They neither

SCHOOL OF THE FRANCISCAN MISSIONARIES OF MARY (FORMERLY THE MANSION OF LORD DILLON), LOUGHGLYNN

manured nor cleaned their land. Their breeds of stock were worn out. On the sea-board the fishing was more valuable than the produce of the land. In most cases, however, neither the land nor the sea was sufficient to maintain the people in anything like decent comfort. It was these districts which supplied our potato lifters and our harvest hands. Their wages made ends meet on many a farm in Ireland. Other farmers were able to keep their heads above water by subscriptions from relatives in America. When every available source of income was taken into account, the life of the farmers in the congested districts was anything but enviable. In a good year it has been said that they were little more than free from the dread of hunger, while a partial failure of their crops reduced them to something like semi-starvation. In the Appendix to the first Report of the Congested Districts Board

a number of balance sheets were printed showing the income and expenditure of families in the congested districts. The total income from every source in the poorest districts sometimes did not exceed £15 a year.

Such was the material upon which the Board had to work. Wide powers were needed for the development of these districts, and wide powers were granted—embracing three departments of industry, agriculture, fishing, and home industries. The development of agriculture necessitated the amalgamation of uneconomic holdings, and this involved the migration of farmers from one district to another, a task of the utmost difficulty in the West of Ireland, where the people stick to their native soil with great

LADY SUPERIOR (LEFT) OF THE FRANCISCAN MISSIONARIES OF MARY, LOUGHGLYNN

tenacity. But it meant more than that. It meant the application of science to all farming operations, a difficult enough work in a district where half the people could neither read nor write. The development of fishing necessitated better boats, better piers, better railway facilities. The development of home industries included pretty much the development of everything that made life tolerable, and was not included in agriculture and fisheries. Intimately connected with all three branches of industry was the making of roads and bridges, without which much of the other work accomplished would have been useless.

For the effective discharge of its multifarious duties, the Board had placed at its disposal a fixed income of £41,250, being interest at $2\frac{3}{4}$ per cent. on the Church Surplus Grant. There was also

placed at the disposal of the Board the Irish Reproductive Loan Fund, amounting to £66,000, and a portion of the Sea and Coast Fisheries Fund, amounting to £18,000. In addition, the Board was allowed to accept gifts for the purposes of the Act.

Thus equipped the Board began its work, roughly outlined nearly half a century before by W. T. Thornton in his book, "A Plea for Peasant Proprietors." The work was hindered by limitations of the Act constituting the Board, but these limitations were removed as the years passed by. The Congested Districts Board Act of 1894 dispensed with the guarantee deposit demanded by the Land Commission in other cases till 1896. Thus, the Board when purchasing estates received the whole of the purchase money

FRANCISCAN MISSIONARIES OF MARY AT WORK PAINTING RAILINGS

at once from the Land Commission. Till 1896, if it bought estates at all, it had to pay them out of its own income. The Land Act of that year sanctioned advances to the Board to enable them to buy estates, but section 43, sub-section 6, of the Act provided that the Land Commission could not make an advance to enable the tenant of a holding of a rateable value of less than £10 to purchase his holding from the Board. Most of the holdings in the congested districts were of a rateable value of less than £10, and the result was that the Board was little able to avail itself of the provisions of the 1896 Act. This difficulty was removed by the Congested Districts Board Act of 1899, and the Parliamentary grant to the Board was increased from £6500 to £25,000. The Land Act of 1901 gave the Board power to deal with tenants who obstructed their plans for the rearrangement of holdings, and enlarged the

boundaries of the congested districts by enabling the Board to have scheduled as congested any land purchased by them outside the congested districts. The 1903 Act did much to facilitate the work of the Board. It introduced a bonus of 12 per cent. as an inducement to landlords to sell. It enabled the seller to obtain an advance for the repurchase of his demesne. It extended trust securities, relieved the seller to a considerable extent of legal expenses, increased the maximum amount of advances to be made in each county, reduced the yearly annuity from 4 to 3¼ per cent., and added £20,000 to the income of the Board.

The money at the disposal of the Board has also greatly increased with the years. The following figures show the fixed income, the receipts, and the expenditure of the Board from 5th August 1891, when it was started, to 31st March 1905:—

Year.	Fixed Income.	Total Receipts.	Total Expenditure.
1891-2	£16,590	£16,590	£3,660
1892-3	43,750	45,436	50,266
1893-4	41,250	62,036	47,259
1894-5	42,250	69,254	74,886
1895-6	48,759	93,943	81,907
1896-7	42,404	78,499	87,196
1897-8	42,250	92,299	99,200
1898-9	43,750	98,385	107,082
1899-1900	55,950	439,910	417,411
1900-1	66,250	157,949	168,864
1901-2	66,250	190,380	199,626
1902-3	76,250	223,247	210,054
1903-4	86,250	184,419	197,451
1904-5	86,250	231,361	229,065

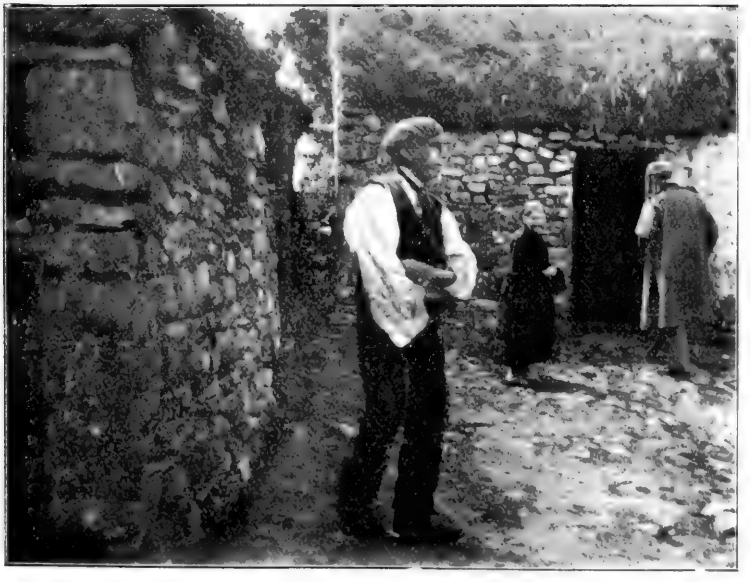
These figures represent the receipts and payments of the Board for all purposes. We are, however, more particularly concerned with agriculture. The money expended by the Board on agriculture alone from 5th August 1891 to 31st March 1905 amounted to £1,157,863. What has the Board at its credit for all this expenditure?

1. It purchased before the 1903 Act came into operation 48 estates of the value of £597,925.

2. It expended on main drainage operations £22,731. On the Dillon estate alone, not to speak of others, it spent £13,651 on main drains, covering a distance of 300 miles. We had an opportunity of examining this estate, and can certify that without an extensive drainage system, such as is being carried out, it would have been impossible to bring much of the land into a state of cultivation.

3. It spent £65,608 on buildings, over £22,000 of which was spent in connection with the migration scheme to be mentioned presently. Some of these buildings were erected by the Board itself, and some by the farmers assisted by the Board. Thus, amid much generosity, the Board tries to keep self-help to the

HOVEL ON THE BOGLAND, NEAR CASTLEREA, FORMERLY THE DILLON ESTATE



OCCUPANTS OF THE HOVEL ON THE BOGLAND, NEAR CASTLEREA

forefront. The houses, many of which we saw, were at once simple and serviceable. They were of different sizes. Some of them contained a kitchen and two bedrooms, and some a kitchen, three bedrooms, and a small dairy. The larger houses complete cost £116 18 0
To this has to be added, outhouses . . 22 10 0
Fencing for a 25-acre farm 20 0 0

Together . £159 8 0

After carrying out these and other operations, it carried out

NEW COTTAGES AT LOUGHGLYNN, OUTSIDE THE GATE OF THE FORMER DILLON MANSION. BUILT BY THE CONGESTED DISTRICTS BOARD

a migration scheme, by which it transferred from congested districts 207 farmers and planted them on untenanted land extending to 5927 acres, part of the estates purchased, at a total cost of £96,263, which has resulted in a loss to the Board of £17,571, or £84 per migrant. It had now sold, or had ready for sale, 35 estates at £590,062. The remainining 13 were valued at £62,393. The following figures shew how matters stood financially at 31st March 1905, without taking into account 84 estates purchased for £1,106,333 under the 1903 Act, which do not appear in the books of the Congested Districts Board because the Land Commission distributes the money itself:—

Expenditure.

Purchase money	£597,925
Improvement works, including drainage, fencing, road-making, building, etc.	158,513
Cost of Surveys	9,413
Annual Charges, head rents, rates, purchase of cattle, etc.	32,139
Miscellaneous Expenditure	15,014
Interest on Capital	60,948
Total	£873,952
Deduct—Adjustments for land transferred to be sold with other estates	£878
Total Expenditure	£873,074

Receipts.

Estimated profits on sale of estates	£655,195	
Total sums from permanent tenants for rent or interest on sale price of holdings	128,428	
Receipts for cattle sold, grazing rents, etc.	36,660	
Sums received from tenants for occupation interest of additional land given to them	11,629	
Miscellaneous receipts and stores in hand	7,126	
Total Receipts		£839,038
Leaving a loss of		£34,036

without charging anything for administration expenses and for interest on money lent by the Board from its own funds.

But the Board did much more. The steps thus far enumerated were all preliminary steps. They simply placed at the disposal of the farmer the raw material out of which he was to produce sufficient to maintain himself. The Irish farmer, however, needed something more than the raw material. He needed to be taught how to use it, and the Congested Districts Board, which is a very paternal Board, has done this at a cost of £207,065. It has established experimental plots in different districts with the view of introducing rotation cropping and showing the farmers how to cultivate their land. It has sent half a dozen or more agricultural instructors to give the necessary instruction. It has provided sires sometimes for nothing, and always on easy terms, for the purpose of improving the breed of stock, and it has developed minor industries, such as the feeding of pigs, the rearing of poultry, and the keeping of bees. It gives a grant to the I.A.O.S. to teach the farmers how to co-operate. It has even marketed the farmer's produce.

Nobody who has studied the question and seen the work of the Board on the spot will think lightly of the difficulties which have to be overcome, nor will they doubt that the Board is doing the work with all its might. If the Board does not succeed, it will not be its fault. We are afraid it has been set the impossible task of making bricks without straw, of creating economic holdings without either the men or the land. The first need—and it is a great need—is education. Education apart, is the land capable of supporting the people? Science will do much in the future to add to the productiveness of the soil. Co-operation will lessen expenditure and increase income. Will both, combined with such home industries as it is possible to start, or will anything else, do enough to make many of these Irish holdings pay? That is a question of supreme importance which the exigencies of the moment did not press on our legislators. It was not fully considered at the outset, and it is difficult to consider it now. The movement having begun cannot easily be stopped, with the result that the Board is getting ever wider powers and the State is advancing ever-increasing sums of money, and nobody knows whither the movement is leading.

STREET SCENE, CASTLEREA

DEPARTMENT OF AGRICULTURE AND TECHNICAL INSTRUCTION

Its Origin

Six years after the meeting of Sir Horace Plunkett and Mr Anderson, when they initiated the self-help movement in Ireland, Sir Horace wrote a letter to the Irish press, suggesting that the Nationalist party should name three or four practical men, that the Independent party should name two, and that the Unionist party should name two, as a committee—afterwards known as the Recess Committee because it met in the recess of 1896—with power to add to their number any practical Irishmen, whether members of Parliament or not, to consider specially the establishment of a Department of Agriculture for Ireland and the passing of a Technical Education Bill. Justin M'Carthy, the then leader of the Nationalist party, refused to join the Committee on the ground that it had for its object the seeking of a substitute for Home Rule. Mr John Redmond, who was then leader of the Independent party, had no such scruples. He joined the Committee, although, after Sir Horace published his remarkable book—"Ireland in the New Century"—which no student of rural economy much less of Irish agriculture can afford to neglect,[1] Mr Redmond publicly repudiated further connection with the new movement on the ground that Sir Horace's object, then made clear, was to divert the minds of the people from Home Rule, the only thing he believed which could ever lead to a real revival of Irish industries. Nationalists, Unionists, and Tories joined the Committee along with certain captains of industry and others whose politics were not so pronounced as the politics of their fellow-members. It was predicted that such a conglomeration of Irishmen would fall foul of each other and that the Committee would break up without any good result. These predictions were falsified.

The Recess Committee at Work

Sir Horace was appointed Chairman, and the Committee set to work. It first devoted its attention to the economic condition of Ireland and the immediately available resources of the country. It then appointed one of its own number, Mr T. P. Gill, editor of the *Dublin Daily Express*, and Mr Michael G. Mulhall, the eminent statistician, as Commissioners to Continental countries, to obtain information as to the development in each country of its industrial resources "through the agency of State aid and the active co-operation of the inhabitants." Mr Gill visited France and

[1] "Ireland in the New Century" is published by John Murray at 1s.

Denmark. Mr Mulhall visited Holland, Belgium, Wurtemburg, Switzerland, Bavaria, Hungary, and Austria. The Commissioners' Reports were in due time laid before the Committee, along with a valuable memorandum on "A Ministry of Agriculture and Industry for Ireland," by M. Tisserand, probably the greatest authority on State aid to agriculture on the Continent of Europe.

Self-Help on the Continent

The reports revealed the fact that in the countries visited self-help as a rule preceded State aid. In the countries where this was not the case it fell to the Government to assist the farmers to co-operate. This was sometimes done by suggestion, sometimes by Act of Parliament. Whether the self-help movement preceded, accompanied, or followed the State-aid movement, it was necessary that the farmers should be organised before the State could adequately help them.

Continental Departments of Agriculture and Industries

It was also found that the Departments of Agriculture in the countries visited usually included industries, and were as a rule democratic in their constitution, inasmuch as they had Consultative Councils of Agriculture, partly composed of men elected by the Department of Agriculture, but mostly of men elected by the different Agricultural Societies throughout the country. These Councils had to meet before any measure affecting agriculture was introduced into Parliament. The agricultural experts of the country had thus an opportunity of discussing with the Department of Agriculture every measure before it became law. That was of vast importance, even although the Department had, as was usually the case, the last word on the subject.

Education on the Continent

Continental governments displayed great wisdom in demanding that farmers should help themselves before the State helped them. They were equally wise in deciding as they did, that education was the best kind of State aid, and the kind which should be pressed forward in season and out of season, though they gave State aid in other and more objectionable forms. The education given included nature knowledge in the primary school, elementary agricultural instruction in the secondary school, and higher agricultural instruction in schools and colleges suitable for those who were destined to be professors and teachers of agriculture. The theory of agriculture taught at these schools was put into practice on example plots and at experimental stations. Technical instruction was also given in connection with rural industries. Such was the education the Commissioners found in vogue on the Continent—an education which has turned out as successful farmers and as capable craftsmen as are to be found anywhere.

Recommendations of the Recess Committee

These, then, were the findings of the Commissioners: self-help first, then a democratic Department of Agriculture administering State aid for the most part in the form of education. The Recess Committee, after carefully considering them, and no doubt remembering that Irishmen had been helping themselves for some years, recommended that a Department of Agriculture and Industries similar to those on the Continent should be established. This recommendation, which had the support of the country in a very marked degree, was forwarded to the Government on 1st August 1896, and practically adopted by them.[1] The Agricultural and Technical Instruction Act, which created the Department of Agriculture, was passed in 1899. We proceed briefly to explain the constitution of the Department and outline its work.

Constitution of the Department

The Department, which is called the Department of Agriculture and other Industries and Technical Instruction, consists of a President, Vice-President, Secretary, two Assistant-Secretaries, one in respect of agriculture and one in respect of technical instruction, and the usual staff. The President is the Chief Secretary. It was intended, though not enacted, that the Vice-President should be a member of the Government of the day. Sir Horace Plunkett was appointed the first Vice-President, and held that position until recently, although he had ceased to be a Member of Parliament. Now that he has retired, so that the spirit if not the letter of the law might be fulfilled, we believe it would be well for Ireland if he were appointed to a permanent position at the head of the Department, with the same powers of control and direction that he exercised as Vice-President, for the work of the Department is yet in its initial or experimental stages, and it does not seem wise that the man responsible for the creation of the Department should just now cease to control its affairs.

Consolidation of Boards

The Act had two objects in view. In the first place, it consolidated different Boards. The Veterinary Department of the Privy Council and the Office of the Inspectors of Irish Fisheries were merged into the new Department. Hitherto, the Irish Land Commission and the Registrar-General collected and published agricultural statistics. This work was handed over to the new Department. There was also handed over the administration of the Science and Art Grants, and the Grants in aid of Technical Instruction. Besides, the Department got control of the following, among other educational institutions: the Munster Institute, Cork; the Albert Institute, Glasnevin; and the Royal College of Science, Dublin.

[1] The Report of the Recess Committee, which had been for some time out of print, has recently been re-issued in a new edition. It is published by T. Fisher Unwin, of London; Browne & Nolan, Dublin; W. Mullan & Son, Belfast.

Revival of Agriculture

The other and the principal object which the Act had in view was to provide means by which the revival of agriculture, begun by the I.A.O.S., might be carried to full fruition. This object was to be attained, not by the Department doing for the Irish farmer what he could do for himself, but by the Department educating, encouraging, and stimulating the Irish farmer to work with his own hands and his own brain, giving direct financial help in the case only of infant industries, which private initiative could not alone create, and in the case of needy individuals—there were many of them in Ireland—sunk in the depths of a poverty out of which, without help, they could not rise.

Council of Agriculture

For the carrying out effectively of this work a Council of Agriculture was brought into existence similar to the Councils of Agriculture in Continental countries, only more democratic than some of them, and going farther than one would have expected in the direction of allowing Irishmen to manage their own affairs. Two members were appointed by each County Council, Cork returning 4 members, thus making the number elected by County Councils 68. The Department appointed 34. The President and Vice-President were members *ex officio*. The Council of Agriculture, representing the agricultural interests of the country, thus numbered 104. It was appointed for three years from 1st April 1900. It must meet once a year. It discussed matters of public interest to the agriculturists of the country. The Department is not bound to follow the advice of the Council, but it invariably does so.

Board of Agriculture

Besides the Council of Agriculture there are two Boards. There is the Agricultural Board to advise the Department in connection with all matters relating to agriculture and industries. It is created in this wise. The Council of Agriculture, at its first meeting every three years, divides itself into four Provincial Committees. Each of these Committees elects two members, who represent it on the Agricultural Board. The Department elects four members, one from each province. The Board thus consists of 12 members, and is as democratic as the Council of Agriculture. The power is with the direct representatives of the people. It is an important body, for it controls most of the funds that are devoted to agriculture, so that practically all the agricultural operations of the Department are governed by this Board.

Board of Technical Instruction

The other Board is the Board of Technical Instruction, which advises the Department on matters relating to, and controls the

funds available for, technical education. The Board is elected as follows: The Department appoints four members. The Council of Agriculture appoints one member for each province. Each of the County Burghs of Dublin and Belfast appoints three members. The remaining four County Burghs appoint one member each. A Joint Committee of the Councils of the large urban districts around Dublin appoint one member. One member is appointed by the Commissioners of National Education and one member by the Intermediate Board of Education. Here again the democratic spirit has full play, and absolute trust is reposed in the Irish people. Are not these instalments of Home Rule, and, if used wisely, will they not lead to other instalments? Nationalists might now without hesitation join this peaceful revolution, which will lead to what they have been striving for, by whatever name it may be called.

Consultative Committee of Education

In addition to these Committees there is a Consultative Committee of Education. It is composed of the Vice-President, one member appointed by the Commissioners of National Educa-Education, one member by the Intermediate Education Board, one member by the Agricultural Board, and one member by the Board of Technical Instruction. Its duty is, according to the Act, to co-ordinate educational administration and nothing more, but it is really a council of experts who advise the Department on all educational matters, a council which, without compulsory powers, largely controls the educational policy of the Department.

County Committees

The foregoing Committees constitute the central authority responsible for the working of the Act. It is provided, however, that any County Council, or any Urban District Council, or two or more public bodies jointly, may appoint Committees for the purpose of carrying out the provisions of the Act locally. They select the subjects specially suited to their own district, and they send up a scheme for the approval of the Department. If it is consistent with the general scope of the Department's work it is passed, but the Local as well as the Central Authority must contribute to the cost of the working of the scheme. The County Councils are given power to rate with this object in view, and the Central Authority only provides the Local Authorities with funds when the Local Authorities themselves subscribe. This is a safeguard against money being frittered away, and it tends to keep ever in front of the people what Sir Horace Plunkett and his friends are never tired preaching, that they must help themselves if they want the State to help them.

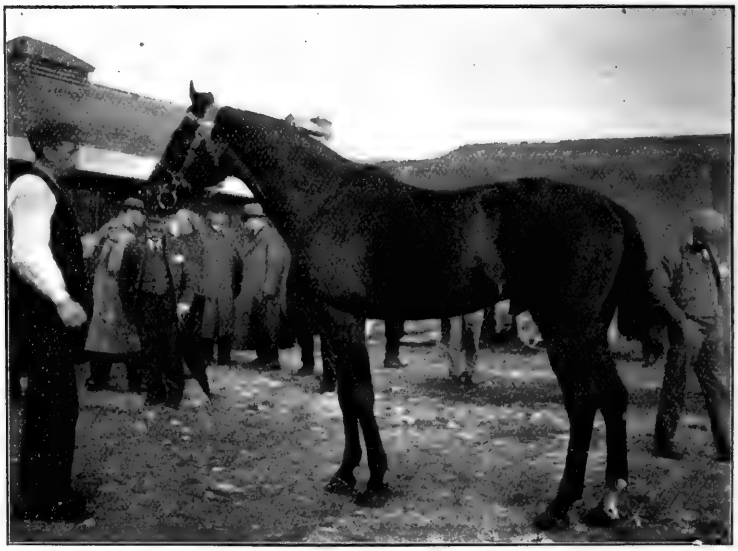
Work of the Department

The Department of Agriculture thus constituted began its work, recognising that it was making an experiment, feeling its

way, and that time and experience alone would reveal the best methods to adopt in the varying circumstances that would be met with. We propose now to describe the work of the Department generally, leaving the reader to gather the details from the other sections of this Report.

Agricultural Instruction

The Department had two objects in view in its educational policy. It had to educate the present generation as far as it was capable of receiving education, so that it might be the better able to compete in the markets of the world; and it had to devise a



"ORMALIE," PREMIUM THOROUGHBRED (BY "ORME"), AT DARRARA FARM SCHOOL, CLONAKILTY

system of education which would enable the Irish farmer of the future to compete on favourable terms with farmers anywhere. It called in the itinerant instructor to accomplish the first object, and it took command of the education of Ireland so far as applicable to agriculture, so that it might accomplish the second object. We have outlined its educational policy in the article on "Agricultural Education."

Technical Instruction

Just as agricultural instruction aims at preparing the youth of Ireland for work on the farms of Ireland, technical instruction aims at preparing them for carrying on subsidiary and rural industries, with the view of making the uneconomic holdings of

Ireland economic; and the pupils are trained with this object in view from the time they leave the primary school until their education is complete. We have dealt with this part of the subject in the article on "Domestic Economy and Rural Industries."

Special Investigations

The special investigations of the Department are intimately connected with, if indeed they are not an actual part, of its educational work. Foremost among them are the experimental plots. These plots are situated in different parts of the country, and are meant as object lessons to the farmers. They constitute part of the work of the itinerant instructor. They are the demonstration plots in connection with his lectures, and show to the farmer more clearly than any lecture could show the advantage of good seed and the proper cultivation of the soil. Experiments have also been carried out with marked success in the production of early potatoes; in fruit-growing and fruit and vegetable preserving; in tobacco culture, for which it is believed the soil and climate of Ireland are suitable; in the growing of flax, linen being one of the staple trades of the country; in seed-testing; cheese-making; afforestation, etc.

Improvement and Preservation of Live Stock

Less closely, but still to some extent connected with the educational schemes of the Department, is the scheme for the improvement of live stock, a scheme of the utmost importance in Ireland, and one on which vast sums of money have been spent. The Department provides sires, sometimes for nothing—always on easy terms—for the improvement of live stock, thus teaching the farmers the good points in farm animals and the value and importance of them, and at the same time improving the breed of stock throughout the country, and adding materially to the national wealth. Intimately connected with the improvement is the preservation of live stock. This is entrusted to the Veterinary Department, which prepares the necessary Orders under the Diseases of Animals Acts, sees that the Acts and the Orders are enforced throughout the country, doing the work which falls to the Veterinary Department itself to do, and seeing that the work falling to the Local Authorities is done by them.

Fisheries

The Department takes to do with fisheries for the same reason that it takes to do with rural industries. The fisheries of Ireland are as necessary to agriculture on the seaboard as rural industries are to agriculture inland. They help to make the uneconomic holdings on the seaboard economic. The Department has, therefore, helped to develop them. It has, for example, taught the men

on the seaboard how to fish and how to cure fish; it has given loans for the purchase and repair of boats and gear; it has erected piers and made harbours; it has tackled the question of transit; it has marketed the produce of the sea.[1]

Statistics and Intelligence

To the successful carrying out of the work of the Department it was necessary that there should be a Statistics and Intelligence branch. Such a branch was formed by the Department, and is of supreme importance in these days of foreign competition. The duties of the branch are twofold, as indicated by the name. The Statistical section prepares and publishes statistics relating to agriculture, fisheries, industries, and trade. The Intelligence section edits the *Quarterly Journal* of the Department, a periodical of the greatest interest to farmers. It issues numerous Parliamentary and other Reports, bulletins, leaflets, etc. It keeps in touch with State Departments in foreign countries and the colonies, finding out as far as possible the causes and conditions of progress and success abroad. The farmers of Ireland are in this way kept informed of the state of trade in their own country, and of the state of trade in competing countries, and of the best and most up-to-date methods of rearing stock, growing crops, and combating disease.

Transit and Markets

To have left transit and markets outside the range of the Department's operations might have been to stop short on the very threshold of success, for it was not less important in Ireland to facilitate transit and find markets than it was to assist in the production of crops. Transit and markets were not, however, left outside. The Department has to do with the transit of animals; the carriage and distribution of produce; railway rates; the enforcement of the "Sale of Food and Drugs Acts" as regards butter, margarine, and milk; the "Fertilizers and Feeding Stuffs Act"; the "Markets and Fairs (Weighing of Cattle) Acts"; and the "Merchandise Marks Act," and it discharges with ability all the duties imposed on it by the Act which brought it into existence, and by the various Acts just mentioned.[2]

[1] The work of the Fisheries' Branch of the Department and of the Congested Districts Board are both under the supervision and control of the Rev. W. S. Green, who is the Chief Fishery Officer of the Department, and has always been a member of the Congested Districts Board. It happens that the part of the coast which is scheduled as congested, possesses richer and more neglected fishing-grounds than any other part of Ireland. The Department had neither the funds nor the opportunities for development which are at the disposal of the older institution.

[2] In addition to these statutory functions, a great deal is done much on the lines followed by foreign and colonial governments, whose farm produce is imported into the British markets, to bring Irish produce under the notice of the large distributing agencies in Great Britain, and to keep Irish producers informed as to the tastes and requirements of British consumers.

GRANTS IN AID

Sir Horace Plunkett has overlooked nothing. Nowhere has he been more careful and painstaking than in considering the lines on which State aid should be given. He decided that it should be preceded by self-help on the part of the Irish people. This was easy of accomplishment, for the self-help movement began in 1889. State aid to agriculture, apart from the State aid given by the Congested Districts Board, did not follow till the Department of Agriculture was brought into existence in 1899. This order of things is excellent, and on approved economic lines. There is room to doubt, however, whether too short a time had not elapsed between the beginning of the self-help movement, when self-help was at a great discount, and the time when State aid was the order of the day.

State aid having been decided upon, Sir Horace had to consider in what shape it was to be given. He resolved to proceed along two well-known lines. Along one line—the indirect line—lay the education of the Irish people. Sir Horace Plunkett believed that along that line there was most hope, and he set about the development of an educational policy, which we have outlined in the next chapter. He was not so enamoured of progress along the direct line, though the Irish people, as might have been expected, saw the advantage of advancing along this line, and took to it more naturally. They could not always see far enough ahead to understand the advantages of a sound education. They could always see the advantage, as Sir Horace put it, of a bull, a boat, and a handloom. Sir Horace, however, has done his best to make advance along this direct line as limited, and within its limits, as national, and as educational as possible. He has been pressed, but has refused, to spend money in assisting private industries. He has been urged, but to no purpose, to purchase grass lands, and divide them up into moderate sized farms. He has refused to advance money to increase the live stock of Ireland, while he has advanced money for the purchase of sires to improve the breed of the live stock, believing that this would be an object lesson to the Irish people of the value of good stock. He has not given money to individual farmers to enable them to make ends meet. He has established, as already mentioned, experimental plots in different parts of the country to show the farmers how they can themselves make ends meet. He has spent money experimenting on the drying of fruit and vegetables, because the fruit and vegetable trade is in its experimental stage, and may yet be of national dimensions. He has lent money to agricultural banks, because agricultural credit is a *sine qua non* of Irish farming. He has advanced money for

various other objects, but always with the view of helping the people to help themselves.

Sir Horace is not, however, supreme in Ireland, and much is done there with which he has no concern, and the principles of State aid enunciated by him are not always followed. For example, upon no sound economic principle can the advances made under the 1903 Act, by which a farmer can become a proprietor by paying from 20 to 30 per cent. less than remaining a tenant, be justified. But even within the province of the Department there is some reason to doubt whether everything is right. It is possible to give State aid on sound economic principles, and give too much of it. Small blame to Sir Horace if, amid much temptation, this one has been too strong for him. We shall give the figures, and allow the intelligent reader who knows the circumstances to judge for himself. We take first the funds at the disposal of the Department of Agriculture and Technical Instruction for Ireland, and then the funds at the disposal of the Congested Districts Board, for the year 1904-5.

1. Funds at the Disposal of the Department

(a) *Parliamentary Grant*

The Parliamentary Grant for the year ending 31st March 1905, including appropriations in aid, amounted to £192,021, 19s. 3d., £25,000 of which really belonged to and was handed over to the Congested Districts Board. Most of this money, however, is devoted to other than agricultural purposes, and some of it is devoted partly to agriculture and partly to other purposes. The Royal College of Science, the Metropolitan School of Art, the National Museum, the National Library, and the Royal Botanic Gardens, are all financed out of this money. It includes the Science and Art Grants formerly administered by South Kensington, and now under a greatly extended scheme of practical education administered by the Department. It also includes the salaries and wages of the members of the Department, the travelling expenses, special services, and incidental expenses. Two other items paid out of the Parliamentary Grant apply wholly to agriculture, and these alone can find a place in our summation, viz.:—

Grant in aid of Diseases of Animals Act .	£16,200	0	0
Amount paid for collection of Agricultural Statistics	2,794	17	3

(b) *Endowment Fund*

The Endowment Fund for the year ending 31st March 1905 amounted to £234,532, a considerable portion of which, however, was applicable to subjects other than			
Carry forward .	£18,994	17	3

Brought forward .	£18994,	17	3
agriculture. The payments made for agricultural subjects—some of which will not have to be made again, such as the purchase of agricultural stations—were as follows:—			
(1) Purchasing and stocking additional land and providing suitable buildings, fittings, and appliances for the Munster Institution . .	530	11	0
(2) Albert Institution and Farm .	6,182	3	3
(3) Munster Institution and Farm .	3,118	10	3
(4) Agricultural Instruction . .	33,818	12	10
(5) Purchase price of Athenry and Avondale Agricultural Stations .	36,967	0	0
(6) Horse-breeding and other live-stock schemes	26,074	17	8
(7) Grants to County Councils' agricultural schemes . .	14,946	15	1
(8) Miscellaneous expenses, which include the cost of experiments in calf-feeding, cheese-making, tobacco-growing, fruit and vegetable drying, etc. etc. . .	25,461	12	2
(9) Grants to Agricultural Societies .	2,750	0	0
(10) Grants for local Horse and Cattle Shows	3,826	1	1
(c) *General Cattle Diseases Fund*			
This Fund is created by an assessment on the Poor Law Unions, and the amount expended per year is about . . .	8,000	0	0
	£180,471	0	7

2. Funds at the Disposal of the Congested Districts Board

We do not give the figures applicable to land purchase in Ireland, either generally or within the congested districts, for it is difficult, if not impossible, to find out exactly the assistance given by the State in connection with land purchase. Nor are we able to give the sums applicable to agriculture alone. We content ourselves by adding to the foregoing figures the fixed income of the Board for all purposes for the year 1905 . . . . . 86,250 0 0

Total . .	£266,721	0	7

Possibly the significance of the foregoing figures, applicable to Ireland, may be best brought home by comparing them with the relative figures for Scotland. This has also the advantage of showing us, who are so much in need of money for research and educational work, how little we really get. Of course, one must keep in mind that the past history of Ireland, for which we are largely responsible, created the present abnormal condition of Ireland, and that condition is the justification for a considerable portion of the State aid given to Ireland. If the amount of financial assistance, therefore, which was required to stimulate self-help, appears to be large, there is something to be said for the expenditure. But Scotland does not even fare well, when we come to compare the treatment of the so-called congested districts in both countries where the condition of things is not dissimilar. The people in these districts belong to the same nation. They are Celts, and equally poor. Their land is the same land in both countries—equally bad. To make ends meet, the Highland crofter, like the Irish farmer, is a fisherman on the seaboard and a weaver inland, and anything else that pays. The problem which the Congested Districts Board is tackling is the same problem in both countries. Keeping these things in view, the figures for 1904-5, which we now submit, are instructive:—

	Ireland.	Scotland.
Salaries and wages of the Board of Agriculture	£40,888 10 0	£7,074 0 0
Travelling expenses	6,883 14 11	1,798 0 0
Special services and incidental expenses	967 18 7	583 0 0
Collection of Agricultural Statistics	2,794 17 3	903 0 0
Grant in aid under Diseases of Animals Act	16,200 0 0	3,972 0 0
Building and equipment of Agricultural Institutions and Stations	46,797 0 0	[1] 9,670 0 0
Agricultural Instruction	33,818 12 10	14,768 3 5
Horse-breeding and other live-stock schemes	26,074 17 8	...
Grants to Agricultural Societies	2,750 0 0	...
Grants for local Horse and Cattle Shows	3,826 1 1	...
Miscellaneous	25,461 12 2	...
Amount spent by the Congested Districts Board	229,065 0 0	135,512 10 9
Fixed income of the Board	86,250 0 0	35,000 0 0

[1] This represents the whole Government Grant to our Agricultural Colleges, not for one year, but for all the years since the Colleges were established.

AGRICULTURAL EDUCATION

THE Department of Agriculture lays the greatest possible stress on education, believing that it is the only satisfactory foundation on which to build. But it recognises facts, as the I.A.O.S. did before it. Like that Society, it knew that a generation would have to pass away before the Irish people could be educated, and that something had to be done at once. The I.A.O.S. had begun their work by teaching the Irish farmers the principles of self-help, and it had been backed up by the Department. But the Department went a step farther. It began its work with a determination to impart somehow or other to Irish farmers more technical knowledge of agriculture than they possessed, impossible as it might be to make that technical knowledge perfect, in consequence of the want of a proper foundation of primary education. It believed that it could in this way help the existing race of farmers, and at the same time fire them with a passion for the education of their children.

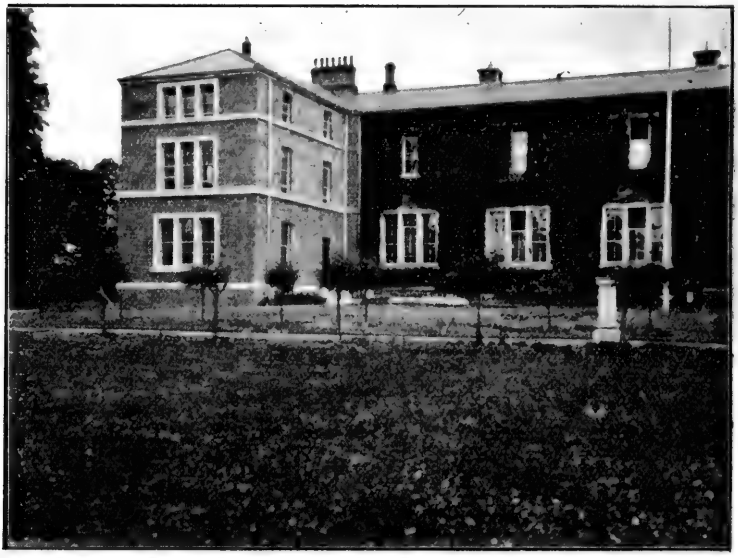
Itinerant Instructors

In the forefront, therefore, of the educational movement stands the itinerant instructor, who goes from district to district giving to the farmers all the technical instruction they are able to receive, advising them on all practical questions which come within the sweep of agriculture, improving the condition of things in existence at the present time as far as they can be improved, and laying the foundation of a better state of things for the future.

Winter Schools of Agriculture

The Department's scheme of education for the future is more ambitious. The Department has nothing to do with primary education, and therefore the foundation of its work is not in its own hands. But the National Education Commissioners, who have charge of primary education in Ireland, are working in conjunction with the Department. Both bodies deprecate the teaching of practical farming in the primary school, but they agree that the children should be interested in the rural life around them, and taught as far as possible nature knowledge. The Department is strongly of opinion that secondary education, with which it has a deal to do, for it administers the Science and Art and Technical Education Grants, should be far different from what it has been. It has hitherto had very little reference to agriculture, almost the sole occupation of the people. The Department, without forgetting the value and importance of education for its own sake, resolved

that secondary education should be a preparation for the after-work of most of the scholars on the farms in Ireland. But how was the Department to get hold of the youth of Ireland at 13, when they leave the elementary school, and keep hold of them till 17, when their secondary education might be complete. That was a problem very difficult of solution. The Department seems to have solved it in a satisfactory way. It provides evening classes in the secondary schools of the country during the winter months, when work is slack on the farm, where elementary science is taught. The young lads of Ireland are thus able, during their spare time, to prosecute their studies. Agricultural schools or classes are carried on by the Department and the County Com-



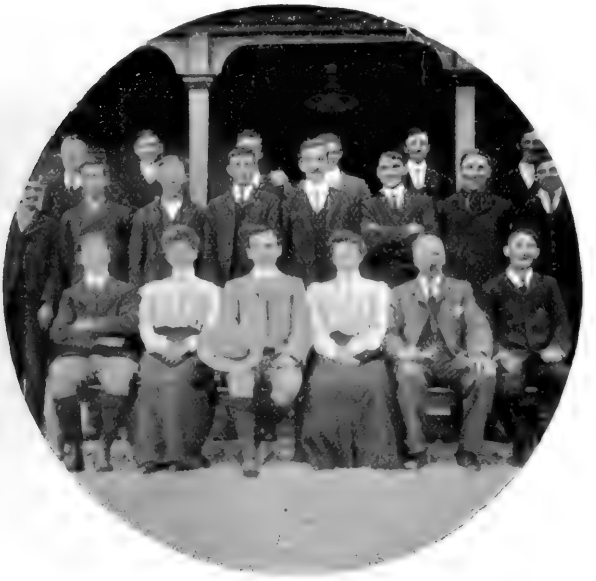
ALBERT AGRICULTURAL COLLEGE, GLASNEVIN

mittees in different parts of the country. These schools are winter schools. Boys of 16, who have taken advantage of the science instruction in the secondary schools, have an opportunity of continuing their education at these winter schools, where the science they learned at the secondary school is applied to agriculture. At 17 years of age, the pupil thus trained should have a fair knowledge of agriculture, and be able to hold his own against the sons of peasant farmers anywhere.

Agricultural Stations

. The Department have started three agricultural stations: one at Athenry, County Galway; one at Ballyhaise, County Cavan; and one at Clonakilty, County Cork. They are stations in connection with the agricultural schemes of the Department. But they are

more than that. They are educational centres, and some day, when the Albert Institute, Glasnevin, instead of throwing open its doors to all Ireland, will confine itself to Leinster, these agricultural stations may become Colleges of a similar kind for the three provinces in which they are situated. Meantime, each station takes a number of young men as apprentices. The applicants are supposed to belong to the province in which the station is situated. They must not be less than 17 years of age, and each must give an undertaking that it is his intention to become a farmer in Ireland. His application will be all the more favourably considered if he produces a certificate that he has attended a



SUPERINTENDENT, MATRON, TEACHER, AND PUPILS OF DARRARA FARM SCHOOL, COUNTY CORK

course of lectures by an itinerant agricultural instructor. He must pass an examination in English and arithmetic. If he is successful, he will enter the station in October and remain a pupil till the following September, paying in fees according to the valuation of his father's holding. Where the aggregate valuation does not exceed £20, the fee for the session, which includes board, lodging, and education, is £3. Where the aggregate valuation exceeds £20, but does not exceed £30, it is £5. Where the aggregate valuation is over £30 but under £75, it is £10. Where it exceeds £75 it is £15. It is evident that the fees are altogether inadequate to provide for the pupils, and the only reason for the fees at all must be that the Department is desirous of making the Irish farmers, to some small extent, contribute towards the keep and education of their own children.

Theory and Practice

Theory and practice go hand in hand at these agricultural stations. In the class-room instruction is given, in the evenings and at other times when outdoor work is not pressing, in English, arithmetic, surveying, book-keeping, and technical agriculture. On the farm pupils are taught practical agriculture. It is not necessary that we should describe the work at all three stations.

DORMITORY AT ATHENRY FARM SCHOOL

That indeed would be difficult, for we visited only two of them. But the stations are all more or less alike. It will be sufficient if we describe the work generally.

Pot Culture

At Clonakilty we found the students carrying out experiments to ascertain the manurial dressings required by different fields. They took from the field under experiment six or eight potfuls of soil. Every pot was sown with the crop to be tested and treated with different artificials. The dressing which produced the best crop was the dressing which the field most needed. It was thus hoped to find out the needs of the soil without analysis.

Work in the Fields

The students rough it in the fields like other men, for tillage is of supreme importance in Ireland, and no student is allowed to neglect it. At Clonakilty it is less important than in some other

DARRARA FARM SCHOOL, COUNTY CORK

SUPERINTENDENT'S HOUSE, ATHENRY FARM SCHOOL

parts of Ireland. Grain-growing there is almost an impossibility in consequence of the drought in July. The oats grown on the farm in 1905 weighed only from 25 to 28 lbs. per bushel. If, however, grain-growing has proved a failure, the growing of early potatoes has been an undoubted success. The potato ground is near the sea, and subject to the influence of the Gulf Stream. The earliest potatoes in Ireland come from Clonakilty, and get into the market before the early potatoes of Ayrshire. At the

SUPERINTENDENT, MATRON, AND PUPILS OF THE MUNSTER INSTITUTE, CORK
(MR WOOD, INSPECTOR OF THE AGRICULTURAL DEPARTMENT, ON THE LEFT)

time of the Commission's visit the potatoes were lifted and the ground sown with turnips. Two crops instead of one were thus harvested in one year.

Live Stock

The fact that these stations are breeding stations and provincial distributing centres for pure-bred stock is of supreme importance to the students. Thus, they have an opportunity of studying the breeding and rearing of stock to some purpose. At Athenry, at the time of the visit of the Commission, there were twenty-four shorthorn cows of good quality, particularly those of the "Rossie" blood. The sire used was "Bapton-Ranger," which is a sufficient guarantee of the breeding. Experiments were proceeding in horse-breeding. A beautiful mare of great substance and symmetry, standing well on good, clean legs, was mated with a specially selected half-bred animal. The object was to produce a more suitable horse than there is in existence at the present time for farm work in Ireland. This department of the work will

grow more interesting, and will be, from an educational point of view, much more important as these agricultural stations, only recently established and not yet fully equipped, get into proper working order.

Agricultural Colleges

When the Department of Agriculture was created there were two intermediary schools of Agriculture in Ireland, schools that stand midway between the local agricultural schools and the Royal College of Science. The Department resolved to make these as serviceable as possible, leaving the establishment of other schools of a similar kind for the future. These schools were the Albert Institute, Glasnevin, and the Munster Institute, Cork. They gave instructions both to men and women. The Department altered this. They turned the Albert Institute into a school of agriculture and horticulture for men only, and they turned the Munster Institute into a school of domestic and rural economy for women only. These schools take up the work of agricultural education where the local schools and agricultural stations have left it, providing such instruction as will enable the young men and women of Ireland to be thoroughly qualified to do all the work on an Irish farm on the best and most up to date principles.

1. The Albert Institute

The resident staff of the Albert Institute consists of the Principal, who is responsible for the conduct of the College in all its branches; a house matron, who looks after the general welfare of the students, all of whom are resident students; and a farm manager, who teaches agriculture. The other teachers are visiting masters.

At the time of our visit there were 34 students. 25 of them held scholarships from the Department of Agriculture, consisting of free board and instruction. These scholarships are awarded by competition to the best educated farmers' sons. The ages of the pupils vary from 17 to 32, the average being about 22. The course is limited to one year or session of twenty weeks, and is of necessity of an elementary nature, as the standard of education was found at first to be low, but it is satisfactory and hopeful that it is gradually being improved. Sons of farmers are admitted without scholarships on payment at the rate of 10s. per week. Students from the city have to pay more.

The College Farm

While there is everything indoors that could be desired for successful teaching, there is the great advantage to both students and teachers that the work is carried on in what we may call a most practical atmosphere, for the College farm, extending to 176 acres, on which the students work 15 hours every week, is unequalled by any similar institution. The excellent use to which

it is being put in the hands of the capable staff of the Department shows what it is possible to accomplish in this direction.

The farm is composed of a stiffish boulder clay, rich in humus. Part of it is set aside for experimental work. Different varieties of potatoes and seeds are tested. Manurial experiments are carried out. A good deal of space is devoted to horticultural demonstration plots. About 70 acres is farmed in an eight-course rotation, which provides scope for growing in the most up-to-date fashion a variety of crops for winter-feeding of stock. The remainder is in grass, and some of it is very fine, having been

MUNSTER INSTITUTE, CORK

greatly improved by the application of basic slag. The rotation of crops is as follows: lea oats, followed by potatoes, which at present embrace extensive variety tests. Wheat or oats is the next crop, followed by green crops, such as mangolds and turnips. Then comes another oat crop, which is succeeded by a variety of green crops, care being taken to arrange the areas devoted to the respective crops so as not to have turnips too frequently on the same ground. These green crops are followed by oats, sown out with seed for the succeeding year's hay crop, in which red clover seemed to be grown in profusion.

Stock-Breeding

The farming, in addition to crop-growing, includes the management of a great variety of live stock, comprising a herd of breeding pigs; about two score of breeding ewes; a great number of breeds of poultry in the adjoining poultry establishment—which,

however, is a separate concern, and not part of the farm proper; 30 non-pedigreed shorthorn cows, and a small herd of pedigreed shorthorn cattle. The non-pedigreed shorthorn cows are kept for the production of milk. They are liberally fed, and give a heavy yield, the record, which is regularly kept, showing that some of the cows give in 9 or 10 months as much as 1100 gallons. The milking is done at 5 A.M. and 2 P.M., and it is interesting to note that the average percentage of butter fat in the morning's milk is just 3 per cent., while the percentage in the afternoon's milk is 3·5 per cent. The cows are not used for breeding, and they are not kept long, being sold in the fat market as soon as they become unprofitable in the dairy. In summer the cows are kept out night and day on the grass, and the additional feeding consists of 10 lbs. of draff and 3 lbs. of a mixture of decorticated and undecorticated cotton cake, which is simply laid down on the grass. The winter feeding is 56 lbs. mangels, 4 lbs. cotton cake, 3 lbs. bran, 10 lbs. draff, and as much straw as they care to consume per day. The mangels are pulped and mixed with chopped straw. The cows are fed three times a day. The dairy premises are all that can be desired for the trade. The milk is mostly sent to Dublin, and disposed of at 1s. 4d. retail and 1s. 2d. wholesale. The herd of pedigree cattle consists of about 20 shorthorn cows and several bulls, selected with great care, a good draft having been introduced from the displenishing sale at Upper Mill. The cows include representatives of the "Clipper," "Princess Royal," "Butterfly," "Rosewood," "Secret," and "Missy" families mated with such grand bulls as "Bapton Banner" and "Lavender Lad," bred by Mr Dean Wills. They are producing stock of such merit as to give promise of the fulfilment of the aim of the Department, which is, to breed superior animals for sale or distribution as premium bulls, with the view of improving the common cattle of the country.

2. The Munster Institute

The Munster Institute is a palatial building situated in County Cork. The theory of agriculture so far as applicable to a woman's department of work on a farm is taught in the Institute and the practice of agriculture on the adjoining farm, which extends to 126 acres. The students must be 17 years of age and of good health and character, and must pass a preliminary examination. There are four sessions in the year, of about 11 weeks each, commencing in January, March, June and October. The fee for tuition, board, and lodging during one session is three guineas. The course of training includes: (1) the practice of dairy work—the treatment of milk and the making of butter on a large and on a small scale, with the most modern machinery and implements as well as with the appliances generally used in all farm dairies; (2) instruction in the feeding and management of cows, calves, and pigs; in the keeping of small gardens;

and in the manipulation and caring of bees; (3) instruction in poultry-keeping breeds, their suitability for different purposes and different localities; housing, feeding, and management; hatching and rearing of chickens; fattening, killing, plucking, trussing, and preparation for market: (4) instruction in domestic work, embracing plain cookery, plain needlework, and laundry work.

Students who attain the required standard of proficiency at the examination at the conclusion of the first session are admitted to a second session, and those who are proposing to be itinerant

A PUPIL OF THE MUNSTER INSTITUTE, CORK

instructors are admitted to a third session if they pass the second terminal examination. In the same way, if they pass the third examination at the end of the third session, satisfactorily, they are admitted to a fourth session. Attendance during six sessions qualifies students for admission to the examinations for instructorships.

There are a number of free places and half-free places awarded to students who display special merit at the first terminal examination. This enables a clever student to take a second session entirely or partially free of expense. Similar opportunities are offered to successful students at the end of the second session.

3. Royal College of Science, Dublin

There was another educational institution in existence at the time the Department was created. It was the Royal College of Science, Dublin. A Chair of Agriculture was instituted, and

the copestone was thus put on the agricultural education of the country. Pupils who have decided not to return to farm work, but to prosecute their studies still further with the view of becoming teachers of science, are drafted from the Glasnevin College to the Royal College of Science. The poorest lad, if he has a fair education, may enter the College with a scholarship, which includes free admission to the first year's course of instruction, railway fare to Dublin at the beginning of the session, and railway fare from Dublin at the end of the session, one guinea per week of an allowance for maintenance while at the College, or free board and lodging at the Glasnevin College. The scholarship is only for one year, but if the student shows ability, it may be continued for two or even three years, which constitutes the agricultural course at the College. Thus the best agricultural education Ireland can offer is within the reach of the poorest of her sons.

HEIFERS SUCKLING CALVES, FARM SCHOOL, ATHENRY

DAIRYING

For centuries the name of Ireland has been associated with bullocks and butter, and her butter once had a foremost place in the markets of the world. About twenty years ago, when Danish butter began to make headway on the British market, Irish butter gradually fell in public estimation, and ultimately sold at less than that produced in Denmark or Sweden. This continued until quite recently, when Irish butter recovered some of its lost ground, principally through an improvement in the quality, brought about by the increase of the number of co-operative creameries. At the present time it is increasing in public favour, and it is to be hoped that this improvement will continue in the future.

Farmhouse Butter

A large quantity of butter is still made in farmhouses, but the amount is gradually decreasing. This butter is either sold as lumps or is put up in firkins. As a rule, the salt is added dry, but in winter, in a limited area of the south-west, hot brine is worked into the butter. This has the effect of partially melting the butter, while at the same time the water is increased from, say, 12 or 14 per cent. to from 18 to 22 per cent. Butter so treated is said to keep very well, and, after treatment, to have a higher melting point than before, but this is doubtful. The farm-made butter is brought into the provincial market towns, where it is sold to the local merchants, who take delivery on the spot, and redistribute it among their customers in England and Scotland. This butter, as a rule, varies much in flavour, colour, solidity, and percentage of water, and, of course, sells at varied prices. The conditions under which it is made do not admit of much uniformity in quality, and as the quantity made at one time is generally small, the casks often contain several qualities, as it often varies from day to day. The variation in quality has a considerable effect in lowering the price of the whole to near the value of the lowest quality which the cask contains. This is a difficulty which cannot very easily be overcome under farmhouse conditions, and is best guarded against by the manufacture being carried out at a creamery, where skill and machinery can be employed in a manner seldom available in a farmhouse, and never on a small farm of the ordinary Irish type.

The Introduction of Creameries

Before the introduction of co-operative creameries a considerable number of proprietary ones had been established in Ireland,

particularly in the south. It was in the introduction of these that the first glimmerings of daylight appeared in the recovery of the position which had been lost in regard to the quality of Irish butter. Little headway was, however, made till after the introduction of co-operative creameries. The first of these was established in 1889, and none were added during the following year, but the success of the first was so satisfactory that in 1891 the number had increased to 17. The following year there were 25, and in 1893 they had increased to 30. At the present time they number 331.

Introduction of Auxiliaries

Soon after the introduction of co-operative creameries a demand sprang up among the more successful of them for what are called auxiliaries or separating stations, so as to save the heavy cartage of the whole milk from farms situated at a distance from the creamery. At these stations the only machinery is a steam engine and boiler, a separator, vessels for holding the milk and cream, a pump, a milk tester, a cooler, and a pasteuriser. On delivery the milk is separated, and the separated milk returned to the farms, while the cream is carted or sent by rail to the central factory, to be there ripened and made into butter. Each auxiliary draws from a radius of its own, but in no case does the Department of Agriculture or the I.A.O.S. advise the erection of an auxiliary, unless the milk of from 300 to 400 cows is assured, and the prospect of the supply of milk being obtained from 500 cows. With smaller supplies of milk the working expenses are too high, and it is cheaper to cart the milk to the central creamery. In most cases the auxiliaries may be treated as separate societies, as they have usually full control of their own affairs. Besides paying the cartage of their cream from the separating station to the central creamery, they pay to the central creamery about ½d. per lb. to meet the expenses of churning, packing, and selling. In this way the farmers at a distance from a central creamery, and in insufficient numbers to run one of their own, may obtain advantages equal to those obtained by the central creamery, if the separating station is within easy carting or rail distance of it.

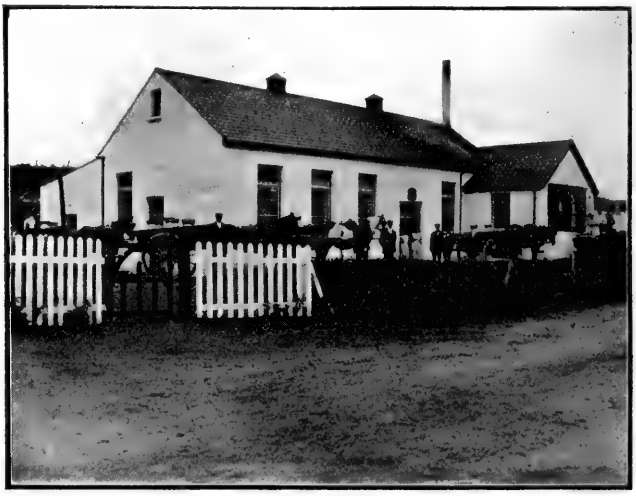
Creameries Visited

The Commission in their wanderings inspected representative creameries at Ballyrashane, Urney, Omagh, Enniskillen, Dromahair, and Solohead. The members of the Commission were much impressed and highly delighted with what they saw at each of these places. The buildings were substantial, the machinery up to date, and the managers well qualified for their positions, which has not always been the case in Ireland. In every instance the butter produced was of the very highest quality, and, as far as could be seen, nothing was omitted which skill and cleanliness could suggest.

All creameries are more or less alike. We do not attempt to give a detailed description of any one. We think it preferable to give a general description applicable to most of them.

Erection of Creameries

Many of the original creameries were seriously hampered by mistakes made at the outset. The sites chosen were not ideal. In most districts a successful movement of this kind depends on the energy of one or two individuals. If a creamery is to be erected, these men naturally wish it to be as near their own farms as possible. The consequence was that those conducting the



CREAMERY AT URNEY

negotiations often influenced others to erect a creamery on a site which, had better counsel prevailed, never would have been chosen. A mistake of this kind is not easily rectified, for stone and lime buildings cannot be moved from one place to another, and the enormity of the mistake is not realised until it is too late. In a few instances, old buildings which had been standing empty had been utilised. Inadequate machinery was crushed into them at comparatively small cost, and the promoters fancied they had done a good stroke of business. Sometimes insufficient provision was made for the supply or storage of water, and little or no attention was paid to the manner in which sewage was to be disposed of. The Ballyrashane Creamery, which was erected in 1897, is said to have spent £1000 in schemes of sewage disposal.

The result of this haphazard method of procedure was detrimental. In one case, a creamery was not sufficiently central; in another it was badly supplied with water; in a third there was no room for extension; in a fourth the disposal of the sewage was

almost an impossibility. Other creameries were unnecessarily far from railway stations, and sometimes it happened that one creamery trenched on the territory of another, so that neither had room from which to draw a sufficient supply of milk to run the creamery economically.

In order to guard against mistakes such as the foregoing, the Department of Agriculture, which has several Creamery Inspectors, gives advice in connection with the erection of creameries. In one of their leaflets, the Department suggests that creameries should, as far as possible, be erected at a distance of six miles from each other, in situations where there is an ample supply of good water, where there is a fall from the creamery of 10 feet in every 200 yards, where a number of roads converge on the creamery, and where good railway facilities are available.

The Department of Agriculture is now also prepared to supply plans for creameries of various sizes. These plans are not intended to supersede the work of the local architect, who may have the supervision of the building operations, but rather to assist and guide him in his work. They provide among other things for ample room, so that the walls may not be splashed with milk and the attendants can get freely round the machines, for smooth floors with a sufficient fall, for an abundance of light and ventilation, for an efficient well-trapped drainage system, and the like.

Water Supplies

No creamery or auxiliary should be set down anywhere unless the members are thoroughly satisfied that an ample supply of good water is assured, as without such no creamery can be run at a profit. The quantity of water required is usually calculated at three times that of the maximum amount of milk likely to be supplied. In some cases river water may be used for cooling purposes. River water will, however, scarcely ever be so cold as well water, and in that respect it will be deficient for dairy purposes, as an ample supply of pure cold water is a great acquisition to any creamery. The Department recommend that where a well is sunk it should be at some part of the ground where no surface water will drain into it, and of such a capacity below the water level as will meet all the requirements of the creamery. They also suggest that the lining of the well should be backed with puddled clay for 15 feet down, and that the upper portion of the well should be covered with concrete.

Delivering Milk at the Creameries

Over a great part of Ireland the bulk of the farms are so small that the number of cows usually kept only ranges from six to twelve, and in many districts there are numerous farms with under six cows. Those with the smallest number of cows occasionally bring in their milk in two cans hanging on each side of a donkey. Sometimes the mode of conveyance is the donkey

cart, while the larger farmers use a horse cart. Generally, however, throughout the north and west of Ireland the farmers combine and send their milk in bulk to the creameries. In the south the farmers deliver their milk direct. As a rule, however, they have large supplies, and live near the creameries. In only a few cases is the milk collected by vans or lorries belonging to the creamery. This system, so much in vogue in Denmark, Canada, and the United States, is not in very great favour in Ireland.

Routine of Creamery Work

The first deliveries of milk begin to arrive at the creameries about six o'clock in the morning, and from that time forward there is a continuous stream of donkey and horse-carts till well on in the forenoon. At the creamery the receiving platform is usually 4 feet or 4½ feet above the roadway, and the cans are thus easily transferred from the carts to the platform. On this platform there is always a weighing machine with a can on it sufficiently large to hold several churns of milk. As the milk of each member arrives it is emptied into the weighing-can, weighed, stirred, and a sample taken, after which the outlet valve in the can is opened and the milk passes through a fine strainer into a large receiving tank.

In the north no milk is received on Sunday, but in the south most of the creameries work more or less on that day. Where no milk is received on Sunday the Saturday evening milk is usually sent in separately that night. In some of the districts the farmers churn at home the milk of Sunday morning, that of Sunday evening coming in on Monday morning. These arrangements are only necessary for a very short time during the hottest of the weather, for as soon as it becomes colder there is no difficulty in holding milk over from Saturday evening to Monday morning.

Sampling

Each member is known by a particular number, and has a sample bottle labelled with that number, into which a part of each delivery of milk is put. Each bottle contains a little of some preservative, usually bichromate of potash, so that in any kind of weather the milk remains fluid for at least one or two weeks. In most of the creameries provision is made for testing a portion of the samples every day, so that all may be tested once a week or once a fortnight. These mixed samples, which have been gathered during the previous week or fortnight, are held as being a fair average of what was delivered during that period, and payment is made, usually once a month, according to the quantity of butter fat contained in the milk and the price of butter.

Arrangements for Heating and Cooling the Milk

Owing to the cost of fuel in many districts in Ireland numerous devices of an ingenious kind have been resorted to

to economise fuel, the most notable of which are used in connection with the heating and cooling of the milk. The new milk passes from the receiving platform into the pasteuriser *via* the *outside* of the regenerative heater. From the pasteuriser it passes *through* the regenerative heater to the separator. In this process the cold new milk is considerably heated before entering the pasteuriser, and thus a saving of feul is effected. Subsequently its temperature is considerably reduced between the pasteuriser and the separator by the action of the cold new milk on the *outside* of the heater, and thus a saving of cold water is effected.

Separated Milk

The pasteurised separated milk is pumped to tanks on the delivery platform. Here a can is usually arranged on a spring balance, and when the required quantity has been run into it, a valve in the bottom is opened and it runs into the farmer's can. In order to prevent any spilling of the milk, a tube of canvas or other suitable material, conveys the milk from the weighing can to the farmer's can. Each member is usually given back about 80 per cent. of separated milk and 10 per cent. of butter milk, of the weight of new milk delivered by him.

Ripening the Cream

After being cooled to about 60° F., or lower if possible, the cream is conveyed to the ripening or souring vats, where it has added to it the necessary quantity of freshly-prepared starter or pure culture of the lactic acid ferment. After the cream has been kept for from 12 to 24 hours, the ripening is complete and the cream is ready for churning. In warm weather the ripened cream is often too high in temperature to permit of churning being done satisfactorily, in which case it is passed over a cooler to bring it down to the proper churning temperature. If there is an ample supply of cold water it is usually employed for this purpose, but where such is not available, a refrigerating machine may be profitably used.

Churning

Several patterns of churns are in general use, but the circular one known as the "Anglo Hibernian," with fixed outside and moving dashers inside is generally preferred, especially in the larger creameries. In each end of the churn there is a small window, on the glass of which the first grains of butter can be seen as soon as they appear, so that there is seldom any necessity to stop the churn in order to see how churning is progressing. There is therefore no difficulty in continuing the churning until it has reached the proper stage for extracting the largest percentage of butter, and yet have the best quality of grain. This pattern of churn is usually made with a door in the top for

washing and repairs, and a sluice door in the end to let out the butter milk and butter. When the churning is finished the butter milk and butter are run out into a large trough or butter-box where the butter, which is now in the granular stage, is washed and separated from the butter milk. The latter is pumped into a tank on the delivery platform for distribution among the farmers.

Making up the Butter

As the butter is lifted from the trough it is put on a circular butter worker, and after the water has been thoroughly extracted,

DRUMCLIFF CREAMERY AND MANAGER'S HOUSE

salt to the extent of 3 per cent. or so may or may not be added, according to the taste of the market for which it is intended. If the butter is soft it may be laid aside till it firms up, or if there is a cold store in connection with the creamery it may be put into it for a little, but as a rule, the butter is washed and made up as it comes from the churn. After having been sufficiently worked it is packed into boxes or barrels, or made up into 1 lb. or 2 lb. packages, according to the wishes of the people of the district where it is intended to be consumed.

Refrigerating Machinery

A modern creamery is incomplete without a cold store, and many of the Irish creameries have cold stores. The aim of every creamery is to sell their produce as quick as it is made, but there are always times in the experience of everyone when it is

impossible to effect sales at the rate of production. For this reason a store of some kind must be provided, so that these periods may be tided over. If a refrigerating plant is available, it may not only be used for cooling the store but for lowering the temperature of the ripened cream before churning, or for cooling the water for any of the coolers. The solidity to which butter attains while standing in a cold store is retained for a long time, and enables it to travel well by road and rail, and to be delivered to the merchants in very much better condition than would otherwise be possible, and ensures more rapid sales later on. Some of the creameries have found considerable difficulty in raising capital to put in refrigerating machines, but the result has always justified the expenditure.

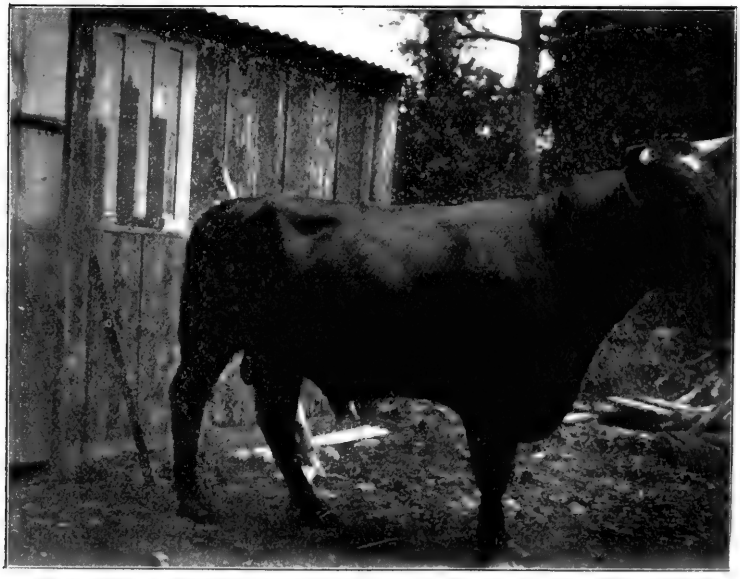
Composition of Irish Milk

When the enormous differences which exist in the conditions under which cows are kept in the different districts of Ireland are considered, it is wonderful how little has been the variation in the average quality of milk supplied to the co-operative creameries. The I.A.O.S. Report for 1903-4 states that from 46¼ millions of gallons of milk supplied to the co-operative creameries, the average quantity required to produce 1 lb. of butter was 2·39 gallons. This is particularly gratifying when compared with the results which were obtained by the proprietary creameries fourteen years ago. At that time an enquiry was made at a large number of proprietary creameries in Ireland as to the quantity of milk required to produce 1 lb. of butter, and the replies received showed that the quantity ranged from 2·75 to 3 gallons of milk. Since then, methods of quickly testing milk have been very much improved, and that, doubtless, is one of the principal reasons for the smaller quantity now required. A noted American authority on dairy matters once said that "the Babcock milk tester had done more to make the dairymen of the United States honest than all the Bibles ever printed in it." We do not know whether the same thing can be said about the dairymen of Ireland, but since the introduction of the Gerber tester, which is universally used in Ireland, the improvement in the milk has been undoubted.

The Value of Milk in Ireland

In Ireland scarcely any cheese is made, and the quantity of milk sold for consumption as milk is trifling compared with the total production of the country. The conversion of milk into butter is the main outlet for the bulk of the milk of Ireland. The co-operative creamery system gives an opportunity for getting at average prices of dairy products, which is not obtainable where the milk is converted into butter or cheese on the farm. Owing to the bulk of the butter which is produced in Ireland being summer butter, the average price realised is necessarily less than would be the case if the production was spread over the whole year. The average price realised for butter by the co-operative

STUD BULL AT GLASNEVIN



PREMIUM BULL, "LOCH LOMOND," RATHDRUM

creameries for the year ending 31st December 1904 was 10·22d. per lb. In all the Irish creameries the separated milk and butter milk is returned, and the price paid for the milk is exclusive of these. The average price paid for the milk was about 3¾d. per gallon. The value of the separated milk and butter milk would add about another penny to this, making the total value of the milk 4¾d. per gallon delivered at the creamery door. During the period under review, on the average it cost 1·36d. to make and sell each pound of butter, which is, roughly speaking, about ½d. per gallon of milk required. The cost varies greatly at the different creameries, some being about double that of others. As a rule, the larger creameries work more economically than the smaller ones.

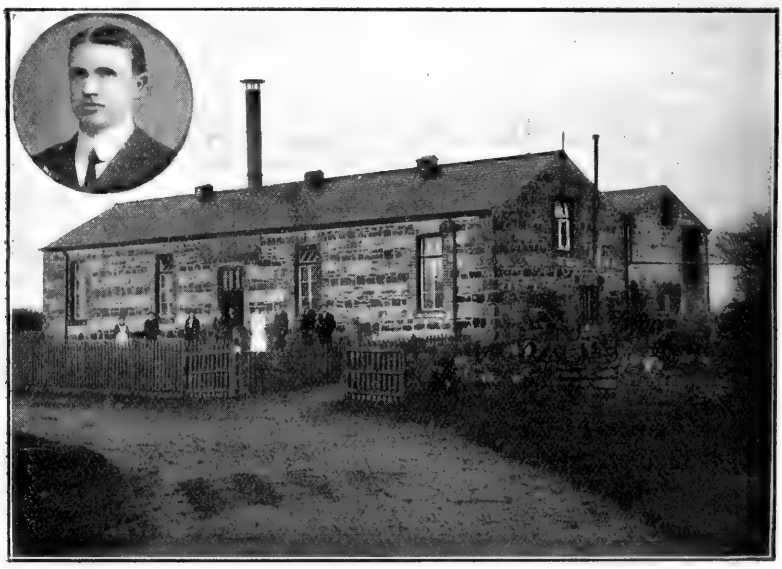
Effect of Season on Supplies

Notwithstanding the number of co-operative and proprietary creameries in Ireland, the bulk of the butter is still produced during the grass season. Probably no country in the world is so well situated as Ireland for the production of grass butter, but in the manufacture of any article the cost of production has not alone to be taken into account. There must also be taken into account the selling price of the product. In Ireland, as in some parts of Britain, the cheapest food for cows is probably pasture, but for that very reason the season of pasture is also the time when butter is most plentiful and lowest in price. The probability, therefore, is that the margin between cost of production and value when produced is no greater during the grass season than in mid-winter.

The principal markets for Irish butter are the large towns of England and Scotland. There the demand for butter is constant, and is probably greater in winter than in summer. Creameries such as those in Ireland, which produce only during the grass season, compete under great disadvantages in these markets. Wholesale merchants, in their desire to meet the requirements of their customers, naturally desire to buy from those who supply them steadily all the year, and fight shy of those with a flood of butter at one season when it is little wanted, and none at another when everybody wants it. Danish, Swedish, and Siberian butters come in large quantities during winter, and shippers of it get a hold of the wholesale merchants at that time. In early summer, when butter becomes more plentiful, wholesale merchants are very unwilling to take on new customers and leave off the old, knowing full well that the new will only continue producing for a limited period. The consequence is, that new customers can only effect sales at a reduced price, and as most Irish creameries are in the same position in this respect, each forces the price down on the top of the other, and for a time Irish butter falls to a lower value than is warranted by its quality. This goes on year after year, and will continue to go on, new customers being found the one year and lost the next, till more is done to produce a fair quantity all the year round.

Winter Dairying

The bulk of Irishmen think that with them winter butter cannot be produced at a profit, and as long as they depend on the pastures to supply their cows with food in summer and the meadows in winter, they are probably correct. If, however, cultivation was more general than it is over a large part of the country, there is no reason to believe that butter could not be produced at as good a profit in Ireland during the winter as in any other country. The winters in Ireland are comparatively mild, and the summer crops on the arable land are equal, if not superior, to those of many countries which supply us with winter butter. Every district in



CREAMERY AT SOLOHEAD

Ireland can grow vetches, cabbages, Swedes, turnips, mangolds, and potatoes. These are the crops which it is necessary to grow in moderate quantity before it can be hoped to make winter dairying a success. The area of these need not be great; but, unless cows in full milk have a moderate supply of succulent food, they can scarcely be expected to give a very large yield. An increase in the area of green crops would cause an increase in the grain crops, which would produce both food and litter for the stock, which at present is very limited in many districts. This in its turn would produce more work, not only in winter, but all the year round, which, sooner or later, would have a considerable effect on the prosperity of the country.

Strangers to Ireland are sometimes surprised to find that so small an area of the hay crop is composed of Timothy. No country is better adapted by nature for growing this crop than

Ireland, yet it is only at extremely wide intervals that even small patches of it are met with. The bulk of the hay crop in the north is perennial rye grass for seed, fiorin, and natural meadows, all of which are useful in their way, but none of which gives a large supply of hay of the best quality, such as is necessary for winter dairying, and might be produced by Timothy. In the damp and uncertain climate of Ireland it is at all times difficult and sometimes impossible to make good hay from fiorin or natural meadow grasses, whereas Timothy is easy to make into hay, and two acres of it can at all times be secured at the cost of one of any of these other grasses. The Department have been attempting to encourage the growth of this crop and have issued a leaflet on it, and offered seed on favourable terms to all who care to try it, so that in the future some increase in the area of this crop may be expected. Nothing has done more to make dairying profitable on the clay lands of Scotland than the growth of Timothy, and all experience seems to indicate that if given a fair trial it would have the same effect in Ireland.

Cow-Houses

The cowhouses on the medium sized and small farms would not come up to the requirements of a Scottish County Council in regard to cubic space, ventilation, lighting, or general cleanliness. It is, of course, only fair to remember that in the south the cows are generally milked in the fields, and that in the north they also live in the open, though they are brought to the byres to be milked. But when every allowance is made for this, there is still great room for improvement.

PIG-REARING AND BACON-CURING

PIG-REARING is an old industry in Ireland. When it began no one can tell, but for generations the pig has played an important part in the rural economy of the country. The improvement of the breed is of more recent origin. The native Irish hog was a long-legged, flat-hammed animal of the greyhound type, difficult to feed, and therefore unsuitable to the farmer: containing a large amount of offal, and therefore unsuitable to the bacon-curer. In the early part of last century various attempts were made to improve the breed, but with little result. In the 'sixties a more systematic attempt was made. Prince Albert sent from his herd at Windsor to Albert Farm, Glasnevin, several boars known as the "Improved Yorkshire." These were crossed with sows from native herds. A better animal was thus produced. Subsequent importations of the "Large Yorkshire" from herds belonging to Lord Ellesmere; Mr Sanders Spencer, St Ives; Mr John Barron, Barrowash, Derby; Mr Philo Mills, Nottingham, and others, have further improved the breed. Between 70 and 100 of these well-bred swine are sold annually to the farmers of Ireland, and they have done much to improve Irish stock. In 1905 the foundation of a herd of large black pigs was laid at Albert Farm by the purchase of boars and sows from herds belonging to Mr Banister, Essex; Mr Kenneth Clarke, Suffolk; and Messrs J. & H. Robinson, Sussex. These have been most successful as breeders, and are in good demand, particularly in Ulster.

But it was the bacon-curers of Ireland who gave the greatest impetus to the improvement in the breed of swine. There were bacon-curers in Ireland from of old, but the public were less fastidious then than they are now, and the ancient bacon-curer did not concern himself much about the quality of the pig. The bacon-curers of Munster, in 1877, however, probably realising that they were soon to be face to face with a world-wide competition, set about the improvement of the breed in that province. Ten years afterwards an organised effort, with that object in view, was made. But for that the competition of Denmark, which was then just beginning, would have killed the Irish trade. The South of Ireland Bacon-Curers' Pig Improvement Association was formed. It established three breeding stations, one at Limerick, one at Cork, and one at Waterford. This Association is still carrying on its work. An inspector is attached to each station. He keeps in touch with the boar-keepers in his district and sees that the right sort of animals are kept, with the view of still further improving the breed. The Association has sent boars into many parts of Ireland, and has spent thousands of pounds in developing its scheme.

The Department of Agriculture, when it came into existence,

recognised the importance of the pig trade, and set about its development. It sent a deputation to Denmark to find out all that could be found out about the bacon-curing industry of that country. The report of this deputation turned out to be the well-known report on "Comparative Agriculture and Rural Conditions in Denmark." But the Commissioners set out with the view of studying specially the bacon-curing trade, and this department of Danish farming received a greater amount of attention than any other. The Department also instituted a swine scheme with the view of improving the breed of swine. The ideal of the Department is a pig with a neat head, neither too long nor too short, for both point to defective breeding; light neck and shoulder, which

"CHOICE GOODS" AT GLASNEVIN

improve the quality and price of the side; deep heart and well-sprung ribs, which are indispensable in first-class animals; thick loins, which indicate a strong constitution; stout thighs, which mean well-developed hams; short legs, which make for plumpness; long silky hair, evidence of general good health—a pig that will feed in seven months to twelve stones dead weight. To begin with, the Department awarded a premium of £5 for one year to boars approximating to the above description, and eligible for entry in the Register of Pigs of the Royal Dublin Society. This scheme was not entirely successful, and in 1905 the Department awarded two premiums, one of £5 for the first year and one of £3 for the second year. They went further. They facilitated County Committees in enabling farmers to purchase boars by a deposit of £2, the balance being obtained from the premium at the end of the season. There were, of course, conditions attached in all cases. We cannot enumerate them here. It is sufficient to say that each

yearling premium boar must serve at least thirty sows, and each two-year-old boar forty sows. The service fee must not exceed 1s. After the minimum number of sows have been served the farmer can make his own terms. The result of the scheme may be gathered from the following table:—

	1901.	1902.	1903.	1904.	1905.
No. of premiums to boars . .	151	154	181	129	205
Money allocated for premiums to boars . .	£ 2395 s. 0 d. 0	£ 2685 s. 0 d. 0	£ 2530 s. 0 d. 0	£ 2070 s. 0 d. 0	£ 1740 s. 0 d. 0
Money expended in premiums to boars . .	752 6 8	726 0 0	878 13 4	624 0 0	845 0 0

Notwithstanding all the efforts that have been put forth, and in spite of the good quality of Irish bacon, the trade has not developed. From 1880 the number of pigs in Ireland on the whole increased, until 1887 was reached, the year in which Denmark went into the trade in earnest. From 1887 till 1891 the number of pigs in Ireland was well maintained. After that the number began to fall, and the tendency on the whole has been downward ever since. Moreover, the export trade has been growing. Pigs do not, therefore, seem to be maintaining their old position in Ireland, and bacon-curing is apparently losing ground. The following table shows the number of pigs in Ireland and the number exported to Great Britain from 1881 till 1905:—

Year.	Number of Pigs.	Number Exported.
1880	859,269	372,890
1881	1,095,830	382,995
1882	1,430,128	502,906
1883	1,348,364	461,017
1884	1,306,550	456,678
1885	1,269,092	398,564
1886	1,263,142	421,285
1887	1,408,456	480,920
1888	1,397,825	544,972
1889	1,380,670	473,551
1890	1,570,366	603,162
1891	1,367,712	503,584
1892	1,113,472	500,951
1893	1,152,417	456,571
1894	1,389,324	584,967
1895	1,338,464	547,220
1896	1,404,586	610,589
1897	1,327,450	695,307
1898	1,253,912	588,785
1899	1,363,310	688,553
1900	1,268,521	715,202
1901	1,219,135	596,129
1902	1,327,680	637,972
1903	1,383,516	569,920
1904	1,315,126	505,080
1905	1,164,316	363,823

Marketing

Pigs are bred all over Ireland, but much of the trade is confined to the province of Munster. The reason for this is obvious. Munster is, and has been for long, the principal dairying province in Ireland. Skimmed or separated milk is a bye-product of the dairy, and there is no more profitable way of utilising it than by feeding pigs. In the north less attention has been paid to breeding, because the pig has been a less important animal on the farm. But while the shrewd farmers of Ulster have never had quite the best breeds, they turned out, in the days when well-bred pigs were not in vogue in the south, and they are turning out to-day, very serviceable saleable animals. The methods of marketing in north and south are different. It is needless to say that while Irish cattle are sold as stores, and carry with them to the farms of Scotland and England the fertility of Irish soils, pigs are finished and sold fat. In the north the farmers usually kill them on the farm. They utilise the offal in the farmhouse and send the carcases to market. It is different in the south. The southern farmers sometimes sell their pigs when they are ten weeks old. The buyers feed them for six weeks. They are then sold as stores. The purchaser finishes them and sells to pig-dealers, and ultimately the fat pig finds its way to the curing-house. There is a good deal of middleman's profit from the birth to the death of the Irish pig thus marketed, but all the southern pigs are not so dealt with. Sometimes the breeder feeds and sells fat, which is the most profitable method. In recent years, too, the large southern curers have sent agents into the country to buy from the farmers direct. The agent, on a sale being completed, attaches a numbered tin label to an ear of each animal. He consigns them to the bacon-curer, leaving with the owner a notice stating the number on the label and the conditions on which they are received, as well as the price for each quality of pig. The same particulars are sent to the bacon-curer. The animals are killed the day after they are purchased, and cheques for the amount sent to the different owners. The pigs are paid for, not according to weight, but according to quality, the biggest price being given for "sizeable" pigs, the class which is in most demand by the public, and the worst price being given for "heavy overweights," which are of comparatively little value. This method of marketing is said to have had a good effect on the farmers, inasmuch as it has taught them to be good judges of pigs, both in regard to weight and quality, and has shown them the necessity of proper breeding and feeding if their pigs are to obtain top prices.

Bacon-Curing

Tradition says—with what amount of truth we know not—that the birthplace of the curing industry was Baltinglas in County Wicklow. When it began there, or elsewhere, the methods were not the methods of to-day. The pig was knocked down with a

mallet and then its throat was cut. Straw was burned round its carcase to take the hair off. Hot water was applied and the skin scraped. It was hung up and disembowelled. After twenty-four hours it was weighed and paid for as dead weight. How different the methods are now. You see the pigs enter the factory. They are run into a court to the number of eight or ten. A butcher attaches a chain to the right hind leg of a pig, pulls another chain, and the pig swings in mid-air from a sky railway, which runs along the factory about five feet from the wall. The butcher, who is an artist in his way, cuts a hole very deftly in the pig's throat and slides it along the railway, the blood spurts out, the pig squeals and shivers, the blood spurts again; it is dead, or ought to be, for it drops into a scalding pot. It is scraped in a few seconds. Swung along the rails, it enters a singeing furnace. It comes out in water at the other end, is douched twice, its internals removed, and is ready for the curing-house. If you were to take a leisurely walk from the live pigs at the one end to the carcases at the other, you might be out-distanced by some pig on the road, which would be a carcase when you arrived. The difference in curing is equally great. In the old days the carcase was laid out on a flag floor and salted, and that was all. There was no artificial cold, and the work could only be carried out in the winter months. The factories usually commenced operations in October and finished in the beginning of May. About 1860 this system was improved upon. Ice was obtained and put in the centre of the curing shed in crates. The Harris Patent Icehouse was the next development. It consisted of a room with an iron floor supported by heavy beams. Ice was placed on this floor, and the curing was done in the cellars below, where the atmosphere was kept cold by the ice above. These primitive methods were entirely superseded in the year 1887 by the introduction of machinery for producing cold by ammonia. No need now to stop working because of the heat. In the hottest summer day it is bitterly cold in the curing cellars, where salted sides are piled six layers high with no danger of going bad. This invention was coincident with the introduction of co-operative bacon-curing factories in Denmark, and no doubt made the great development of the trade in Denmark possible. It is said that the initial cost of introducing refrigerating machinery in the curing-houses of the South of Ireland was £100,000. We have no doubt that the money was well spent. In any case, it was an absolute necessity if the Irish bacon-curers were to compete with the curers in other parts of the world.

Bye-Products

In Ireland the manufacture of the bye-products of curing establishments is an important part of the trade, important alike to the manufacturer and to the public, for the manufacture of the bye-products employs a great many women. A big trade is done, for example, in sausages for home consumption

and tinned meat for export purposes. Besides, livers are sent to Germany to be transformed into liver sausages, and sweetbreads are used by chemists in the making of pepsine.

Co-operation

There are now fifty-seven curing establishments in Ireland, some of them as good and as well equipped as you will find anywhere, but there is not one of them run on co-operative lines. Some years ago an attempt was made to establish co-operative factories in Roscommon and Galway. Both schemes failed. The curing-houses offered tempting prices for the farmers' pigs. The farmers withdrew their supplies from their own factories, which had to be closed down. Now, the farmers, and not the curers, were to blame for the failure. The farmers had started the factories. They had pledged themselves to support the factories, and they had proved disloyal. The curers were fighting for their existence, employing methods common enough in such circumstances, fighting not only the farmers, but the farmers backed up by the I.A.O.S. The curers, however, were well able to stand alone. They had money at their back. Money was their most powerful weapon, and they used it to some effect. They would not, however, have given fancy prices if they had not good reason to believe that co-operative bacon-curing establishments would injure their trade. Their fighting was a confession that a co-operative factory would be a serious competitor. The curers' very fear lest they should lose their trade may have suggested to the farmer, in the first place, that it was possible to gain that trade, and, in the second place, that it would be well worth gaining. In any case, a very determined attempt is now being made to start a co-operative bacon-curing establishment in Ireland. The fight this time is to be in the very citadel of the bacon-curing trade. It is proposed to start the factory at Roscrea. A local organiser is scouring twenty parishes in the interest of the scheme. The I.A.O.S. has issued a very outspoken leaflet on the subject. Matters are not minced in that leaflet. The farmers are told plainly what their duty is. In the first place, it is pointed out that the great factor upon which the success or the failure of the enterprise will depend is a guaranteed supply of suitable pigs all the year round. The leaflet does not say so, but every one of the members pledges himself to supply all his pigs to the factory for five years under a penalty of 10s. per pig. The temptation which will be offered them to break through this arrangement is clearly stated. It is pointed out that the present curing establishments will raise prices to kill the competition, and that the farmers who join the co-operative factory may find that they will be able to get 5s., or even 10s., more from these curing establishments than from their own factory. But the leaflet proceeds to state that the committee of the factory should be able to adjust their working so that they can allow the ordinary bacon-curing to stand over while these fictitious prices are being paid. In any case, it is

hoped that on this occasion the fiercest opposition may be beaten down. That, however, will depend altogether upon the loyalty and steadfastness of the Irish farmer to support the bacon-curing establishment which he himself has brought into existence. The Roscrea Co-operative Factory may or may not succeed, but there can be little doubt that if Irish farming is to go on it must be on the basis of co-operation, and ultimately the farmer must own the bacon-curing establishments as well as the creameries of Ireland.

RIVER SHANNON AT ATHLONE

POULTRY

IRELAND seems to possess almost all the necessary and natural advantages required for the successful rearing of poultry. The climate in the south and west, if a little moist, is almost entirely free from frost and snow in winter and spring; and if the north and east is colder in winter and later in spring, a little extra shelter is all that is necessary, and is easily provided. The soil is also on the whole very favourable. The loamy land in the south, carrying pasture unequalled in the kingdom, and capable of growing crops of all kinds, is also rich in animal life, which forms so important a part in the diet of fowls. Add to this a sunny climate and the abundant natural shelter of hedges and trees, and you have the essential conditions of successful poultry-keeping. Even the bog-lands and wastes can be profitably utilised, as they are the natural home of geese and ducks. Of few parts of Ireland can it be said that the natural conditions for successful poultry-keeping are wanting. Compared with Denmark, which has done so much in the poultry industry, Ireland can claim far superior natural advantages. Apart from soil and climate, the development of poultry-keeping requires that the land should be farmed in small holdings. The 15,000,000 acres available for cultivation and pasture in Ireland are divided up into 500,000 holdings, excluding those under one acre. Thus the average Irish holding is about thirty acres. From the general agricultural point of view, it may be a disadvantage that 200,000 of these holdings run from one to fifteen acres, but from the poultry-keeper's point of view, the more holdings there are the better. Ireland has thus the necessary qualifications for poultry-keeping—suitable soil, favourable climate, natural shelter, small holdings. Besides, it has the best markets in the world for the disposal of its produce. Glasgow, Liverpool, Manchester, and London are all greedy buyers of poultry produce, and we see no reason why Ireland, so closely in touch with these great centres, should not in the near future capture their markets, which are at present supplied so largely from the Continent.

A great deal is required, however, before Ireland can hope successfully to compete with the Continent. At present too little attention is paid to the breeding of poultry. Nine out of ten farmers keep cross-bred fowls, very few have pure breeds solely. In the more advanced counties, however, pure-bred birds, especially male birds, are commonly seen, and also first-cross hens. A greater number of fowls might also economically be kept on the holdings. With so much waste and bog-land, exceptional opportunities exist for the keeping of ducks and geese when the conditions are none too favourable for hen-fowl.

Considerable improvement has taken place by the introduction of the Indian Runner variety of ducks, which give such a good return in eggs, and which so readily forage for themselves. The general housing could be improved, and much greater advantage taken of the colony system. Although this colony system of putting birds out in movable houses in the fields and beside hedgerows has not made very rapid progress, in some counties there is evidence of steady advancement.

Whilst saying that Ireland has still a great deal to do, it must be admitted that she has done a great deal. There seems a general tendency in most counties to improve the type of fowls kept, and the varieties selected for this purpose are the White Leghorn and Minorca to improve the laying breeds, and the Buff Orpington and Plymouth Rock for the general purpose breeds. Faverolles and White Wyandottes are also a good deal used and have given good results. To assist the development of the poultry industry the Department of Agriculture and Technical Instruction spent last year £9915, distributed as follows:—

Poultry instruction . .	£5,500
Egg stations . . .	2,525
Turkey stations . . .	850
Geese	40
Poultry fattening instruction .	1,000
	£9,915

The scheme approved by the Department and carried out by the County Committees for the encouragement and development of poultry-keeping is briefly as follows:—

Itinerant Instructor

The Department is prepared, provided a suitable instructor in poultry-keeping be obtained, to approve of at least one such person for each county in Ireland, whose duty it will be to deliver courses of lectures on poultry-keeping, including the selection of breeds; the hatching and rearing of chickens; the feeding, housing, and cramming of fowls; the plucking, trussing, and preparation of them for market; and the grading, packing, and marketing of produce. The instructor will visit poultry runs in the district in which he is lecturing, and give such information as the circumstances may suggest. He will also visit all egg distribution stations in the county, at least four times between October and April.

Distribution of Settings of Eggs of Pure Breeds Hens and Ducks

In counties where an instructor in poultry-keeping has been provided, the Department is prepared to sanction a limited number of premiums of £5 each being awarded to selected applicants who

distribute during the season at least seventy settings of eggs. Those who distribute less will be paid in proportion to the number they distribute. Applicants for premiums must keep pure breeds. One of the following laying breeds of hens must be selected:—Minorcas, White Leghorns, Brown Leghorns; and one of the following general purpose breeds of hens:—Houdans, Plymouth Rocks, Orpingtons, White Wyandottes, Salmon Faverolles, and Sussex. The ducks must be Indian Runner, Aylesbury, or Pekin. Applicants must see that the breed is maintained. They must not keep fowls of any kind of which the instructor does not approve; they must provide proper and sufficient housing accom-

POULTRY HOUSES AT MUNSTER INSTITUTE, CORK

modation; must feed and care for the birds as required by the instructor, and must supply settings of eggs to any person in the county at 1s. per dozen.

Turkeys

The Department offers premiums of £2 each to persons who are prepared to keep one or more pure-bred American Bronze stock turkey cocks for the service of turkey hens, the property of any person residing in the county, at a fee of 6d. per service. Each cock must serve twenty hens exclusive of the owner's. If a smaller number are served, the premium will be proportionately reduced. After twenty hens have been served the owner may refuse to allow the bird to serve more or may charge a higher fee. The stock birds must not be less than the following weights on 1st January 1906, viz., cockerels, 22 lbs.; adult birds, 28 lbs.

Birds more than three years old are not eligible for premiums. Applicants for premiums must keep no turkey cock other than those approved of, and they must provide proper housing accommodation, and feed and care for the birds in such a manner as the instructor and the Department may require.

Geese

The Department also offers a premium of £2 each to selected persons who sell not less than twelve settings of eggs within the county at 1s. per setting of eggs, on condition that the selected persons each purchase a gander and three geese of the Embden breed at a cost not exceeding £3, of which the Department shall pay £1, and on condition that the selected persons provide proper housing and feed and care for the geese to the satisfaction of the instructor, and keep no other geese on the premises unless with the consent of the instructor.

During the season 1905-1906 twenty-nine counties took advantage of the poultry scheme, and in twenty-seven of these poultry instructors were employed. Dublin, Donegal, and Limerick were the only counties that did not take advantage of the scheme. In Mayo and Leitrim there were no instructors, but inspecting work in connection with egg distributing and turkey stations was done from headquarters. In both Cork and Tipperary there were two instructors employed. Antrim has not taken up the egg distribution scheme, but has a poultry farm instead, and the turkey scheme has been in operation. In 1902 there were no turkey stations in the country, and only 36 egg distributing stations. In 1906 there were 496 egg distributing stations and 416 turkey stations.

County Tyrone is perhaps the most advanced in technical instruction, and was the first to establish a travelling poultry farm. This farm, at the time of our visit, was established eleven miles out from Omagh, where it was to remain for six weeks, and then be moved on to another district for a like period. Here the instructress had a class of 42, 9 men and 33 women, divided into three divisions for convenience and better instruction. There were two portable poultry houses with runs attached, one containing a pen of pure Sussex fowls and the other a pen of White Wyandottes. Trap nests were used to record the number of eggs laid by each hen. The practical instruction began with the general management, housing, and feeding of the stock birds. A Cypher Incubator was running its course. Chickens in various stages, from the newly hatched, when so much care and attention is required, to those in the fattening pens, were in evidence. The latter were being fattened by cramming before being killed, plucked, shaped, and packed for market. In 1904-1905 the poultry instructors in Tyrone delivered 80 lectures, besides giving instruction in various districts in fattening, killing, plucking, trussing, and packing poultry for market; also in testing, grading, and packing eggs, and paid besides 474 visits to farms. In this

county alone there are 15 egg distributing centres which sent out the following eggs for hatching:—

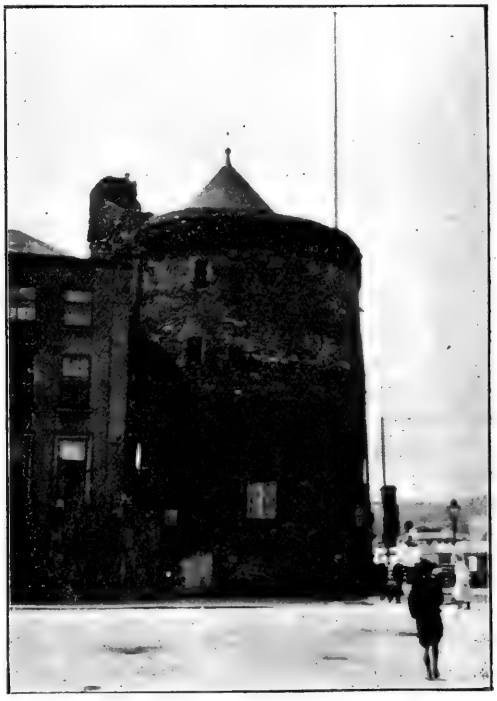
Breed.	No. of dozens distributed.
Minorcas	170½
White Leghorns	667¾
Buff Orpingtons	399
Plymouth Rocks	127
White Wyandottes	156
Brown Leghorns	218
Indian Runner Ducks	172
	1,910¼

There were, besides, 20 turkey premium stations and 6 goose stations.

We have seen what the Department of Agriculture and technical instruction is doing for the poultry industry, and now let us see what co-operation is doing. In 1905 there were 25 co-operative poultry societies, with a total membership of over 5000. The first co-operative poultry society was registered in February 1898, and the trade turnover in 1905 of all the poultry societies was about £40,000. In May 1905 the Irish Federated Poultry Society was registered, and 9 poultry societies have now joined this Federation, which is worked on a commission basis of 2½ per cent. on all business transactions for the affiliated societies, in consideration of which it guarantees them against all bad debts. On joining the Federated Society the Poultry Societies are required to take shares—which are of the nominal value of £1—equal to one-fifth of their own nominal share capital. In the case of other Societies dealing in poultry and eggs, they must hold not less than 25 shares. Five shillings per share is paid on application, and the balance of 15s. only called up in the event of the dissolution of the Federation. Preference shares may be held by individuals only, and are payable as follows: 5s. on application and the balance on allotment. Interest on both classes of shares is paid at the rate of 5 per cent. per annum. The liability of shareholders is limited to their shares. The chief object of the Federation is to dispose of poultry and eggs on behalf of Societies to the best advantage, and to procure for such Societies at wholesale prices all the requisites for the poultry industry. It also undertakes to collect all accounts, and guarantee payment within fourteen days of the date of the Society's invoice, and to furnish account sales weekly of all sales made; to advise all Societies which transact their wholesale business through the Federation, regularly of the state of the markets, in order to guide them as to the price they ought to pay for poultry and eggs, and to do the same for any Society which, although not conducting its business through the Federation, is willing to pay an annual subscription for such market reports. The Societies on their part must enter into an agreement to transact all wholesale business through the Federation for

one year at least; to allow the Federation fourteen days' credit for payment of accounts; to furnish to the Federation returns of all stock, and undertake to test, grade, pack, and (if necessary) stamp all eggs in accordance with instructions; and to dispatch all eggs promptly as ordered by the Federation, and advise the Federation immediately of their consignments.

When the Department's scheme of technical education has been developed, and all the Poultry Societies have joined the Federation, it is certain that Ireland will make an enormous advance in the development of the poultry industry. Then, the great markets of the sister countries will be largely supplied from Ireland. To-day, we in Scotland cannot successfully compete in the poultry market with a country so perfectly organised as Denmark. To-morrow, it will be equally difficult for us to compete with Ireland. Our only hope is to adopt the co-operative methods of our rivals and fight them with their own weapons.



TOWER BUILT BY THE DANES, WATERFORD

SMALL CULTURE

The Department of Agriculture is devoting a great deal of its time to the development of minor industries, which, along with the production of roots and grass or other agricultural crops will make it possible, as it is necessary, for an Irish farmer to live on less than thirty acres of land, which is considered the minimum economic holding when ordinary agricultural crops are grown. We deal with some of these minor industries in other sections of this Report, viz. : Dairying, pig-rearing, and poultry-keeping. In this section we propose to deal with others.

1. Early Potato Growing

The production of early potatoes, quite a different thing from the growing of potatoes as part of a rotation crop, depends largely upon soil and climate. Where conditions are favourable, few agricultural crops pay better. Fortunes have been made in the Channel Islands where it is possible to market the produce in May. The farmers on the seaboard of Ayrshire, saved to some extent from spring frost by the influence of the Gulf Stream, have also done well. Ireland will never rival the Channel Islands, but it may easily compete with Ayrshire, where the crops are not ready till the middle of June. The Department of Agriculture saw that there was money in early potatoes, and they looked about to see whether in their own country they had the soil and the climate essential to success. On the seaboard, at different parts of the coast, they found the soil everything that could be desired,—a light, sandy loam, similar to the soil where the earliest potatoes grow in Ayrshire. Moreover, the seaboard of Ireland was more suitable than Ayrshire. Like the Scotch coast, it was influenced by the Gulf Stream, but in addition it had the advantage of being farther south. But the Department of Agriculture had already proof that early potatoes could be grown in Ireland to advantage. The trade had been carried on for a hundred years or more at Rush, about fourteen miles north from Dublin, where soil and climate are favourable, though the climate is not so favourable as it is in the south of Ireland. In the winter of 1901, the Department arranged for lecturers on early potato growing in four of the most likely potato districts, viz. : Rush, Sligo, Tralee in Kerry, and the South of County Cork. Early in the following spring the Department supplied boxes to the farmers in these localities, boxing having been proved advantageous in securing an earlier as well as a heavier crop, and the experiments began. The varieties used were :—" Puritan," " Duke of York," " Nonesuch," and " Ninety Fold." The earliest crop was reaped at Tralee in the last week of May. The next crop was harvested at Rush. The crops in

LISSADELL EARLY POTATOES ON THE WAY TO MARKET

Sligo and Cork were somewhat later, although Cork has been earliest in recent seasons, but they were all harvested before the end of June. The experiments were so successful, that they have been since repeated at the places mentioned, though extension has stopped in Kerry because of the difficulty of transit which is just as important in early potato growing as soil and climate. Experiments have also been carried out at other places in Ireland, and the trade is now beyond the experimental stage.

It is not every place that will grow early potatoes, but where soil and climate are suitable—and both are suitable in many places—and where railway facilities are available, the addition of this minor industry to the ordinary agriculture of the farm will make the once bankrupt holding of less than thirty acres an economic holding with a fair margin of profit. The following figures go far to bear this out. At Clonakilty, in 1905, one grower, said to be representative of the growers generally, had under potatoes, 1 acre 3 roods. In the first week of June he lifted 8 tons, 10 cwts., which were sold at prices ranging from £10 to £12 per ton. The nett amount received for the whole crop was £71, 2s. 6d., or fully £40 per acre. At Youghal, a grower had 2 roods, 1 pole, planted, which produced 2 tons, 9 cwts., 2 qrs. The crop was lifted in the second week of June and realised £18, 15s. 6d. The Munster Institute in the third week of June, from 1 acre, harvested 8 tons, which they sold at £7 per ton in Manchester. The nett return was about £45 per acre. In the Kilkeel district, County Down, a number of growers had each a quarter of an acre under cultivation. The crops, other than those sold locally, were harvested from the 21st to the end of June, and they realised from £31, 12s., to £45, 10s., per acre nett. The Sligo experiments were not less successful. The largest grower in the Sligo district is Sir Josslyn Gore-Booth, whose estate we had an opportunity of visiting. In 1905 he had sixteen acres planted with early potatoes. He grew them on three different kinds of soil. On the farm he had a light, sandy soil; his garden was a rich loam, and his nursery a stiff clay. The average yield per acre on the light soil was 6 tons, 2 cwts., 1 qr.; on the rich loam, 6 tons, 7 cwts.; and on the clay, 7 tons, 5 cwts. The earliest crops were on the sand and the latest on the clay, but the difference in earliness was not so great as one would have expected, due to the fact that the weather conditions were most unfavourable for the crops grown on the sand. The following figures show the total results of the potatoes dug and sold up to 22nd July 1905 :—

	Area (Statute.)			Yield.			Gross Receipts.			Expenses of Marketing, etc.			Net Receipts.		
	A.	R.	P.	T.	C.	Q.	£	s.	d.	£	s.	d.	£	s.	d.
Farm .	4	2	1	27	11	0	173	2	11	37	19	1	135	3	10
Garden	0	3	11	5	4	0¼	44	16	4	5	5	8	39	10	8
Nursery	0	1	8	2	3	2	12	12	2	1	0	3	11	11	11
	5	2	20	34	18	2¼	230	11	5	44	5	0	186	6	5

DIGGING EARLY POTATOES (IN JUNE) AT LISSADELL

These figures work out at £41 per acre. After deducting all the expenses in connection with the marketing and without taking into account the cost of labour, manure, seed, and carting, the nett return per acre was £33. In 1903 it was £45. The difference in price was due to early frosts which put back the crop, and prevented the potatoes reaching the market ahead of the Ayrshire consignments.

2. Fruit-growing

The total area under fruit in Ireland is 10,588 acres. The principal district is the Loughgall district in Ulster, which stretches from Richhill to Anaghmore. It has been a fruit district beyond the memory of man. The fruit grown until recently has been tree fruit,—pears, damsons, plums, and apples,—but the tree fruit most favoured has been apples. In fact, the district is best known as an apple district. It is too cold, both in soil and climate, for either the plum or the pear. During the last ten or fifteen years, part of the district in the vicinity of Anaghmore has become an important centre for small fruit culture. Raspberries, strawberries, gooseberries, black and red currants are all grown, sometime in open fields as they are in Scotland, sometimes under tree fruit as they are in Worcestershire. It is estimated that there are about 3000 acres under fruit cultivation in the Loughgall district, and of this there are about 1000 acres devoted to small fruit. Strawberries used to be grown extensively and marketed in Belfast, both in punnets and in tubs. Sir Horace Plunkett, at a Horticultural Show in Dublin, in October 1904, pointed out that the consignments of strawberries railed at Anaghmore had risen from 100 tons in 1898 to 700 tons in 1904, the money return for which in 1904 he estimated at £14,000. Meantime, it looks as if the raspberry were to become first favourite. The acreage under this fruit is extending every year. Different varieties have been tried. The Falstaff was for a time popular, but it has fallen into disrepute. The Superlative meantime has taken first place, and will bear good crops, for it is a gross feeder, delighting in good soil, and the soil in this part of Ireland is good soil. It is, however, too dark in colour ever to become a favourite with the jam preserver.

The success of fruit-growing in the Loughgall district arrested the attention of the Department of Agriculture when it was created, and at once it began to make enquiries on the subject. Experts visited the district and bore testimony to the enterprise, industry, and success of the Northern farmers. Then the Department turned its attention to the inspection of different districts throughout the country where fruit might be grown. It was soon convinced that different varieties of fruit could be grown in different parts of Ireland. It was no doubt also convinced that a few acres of fruit would make many a holding of less than thirty acres capable of supporting a man and his family in comfort. But it had to prove this to the Irish farmer. It is proving it now. It arranged to carry out experiments in eight districts in Ireland, at Broadway, County Wexford; Pilltown, County Kilkenny; Dungarvan, County Waterford; Clon-

HARVESTING BULBS AT RUSH

akilty, County Cork; Newmarket-on-Fergus, County Clare; Mount Bellew, County Galway; Naas and Nurney, County Kildare, and Moneymore, County Londonderry. At Pilltown, 40 farmers, at Clonakilty, 15 farmers, and in the other districts, 20 farmers, were selected, whose lands were close together and within reasonable distance of a railway station. The farmers undertook to fence and plant with fruit trees one acre each. They bound themselves to cultivate and manure the land, to gather, grade, pack, and sell the fruit, and to keep a record of the receipts and expenditure, and to do all other necessary work, for a period of not less than five years. The Department on the other hand, agreed to provide free of cost, fruit trees, to give the services of an expert, to supply information with regard to the best and most convenient markets, and refund one-half of the cost of the carriage of the fruit to any market in the United Kingdom, during the five years the experiment was to last. Different kinds of fruit are being planted, and when the experiment is complete the Department will have found out, not only whether the districts are suitable for the different kinds of fruit grown, but to what extent the fruit trade is a profitable trade.

The Department not only thought it was its duty to take in hand the development of the fruit trade, a matter which has been left in Scotland to the fruit-growers themselves. It felt justified in doing very much more. It concerned itself with the marketing of the fruit. It found that it was necessary, in order to get top prices, to pay particular attention to the grading and packing of the fruit, and by leaflet and lecture it impressed this upon the Irish grower. There was much fruit, however, not fit for table use, and the Department also felt justified in finding an outlet for this second-class fruit. There are preserve works in Ireland whose supplies of second-class fruit are got to a considerable extent from abroad. Ireland has therefore an outlet within its own borders if it can get the custom of the Irish preserver. It is also within reasonable distance of the great preserve works in the midlands of England, though the question of transit will be a difficult question with the Irish grower as it is with the Scotch grower. The Department, paternal to a degree, was not satisfied with these outlets, and it started factories at Portadown and Drogheda for the pulping, drying, and bottling of fruit. The object the Department had in view was to see that these industries were profitable. When that had been done its purpose had been served and the works were to be sold to individuals who would carry them on commercially. The experiment was a success and the Department ceased operations in 1904. Private concerns for the bottling and canning of fruit have since been established at Portadown, Richhill, Drogheda, and Belfast. Thus, the fruit trade in Ireland has had a good start. We hope it will develop, but we cannot forget that its development means keener competition for the Scotch grower, who has to fight for himself, with no Government Department at his back.

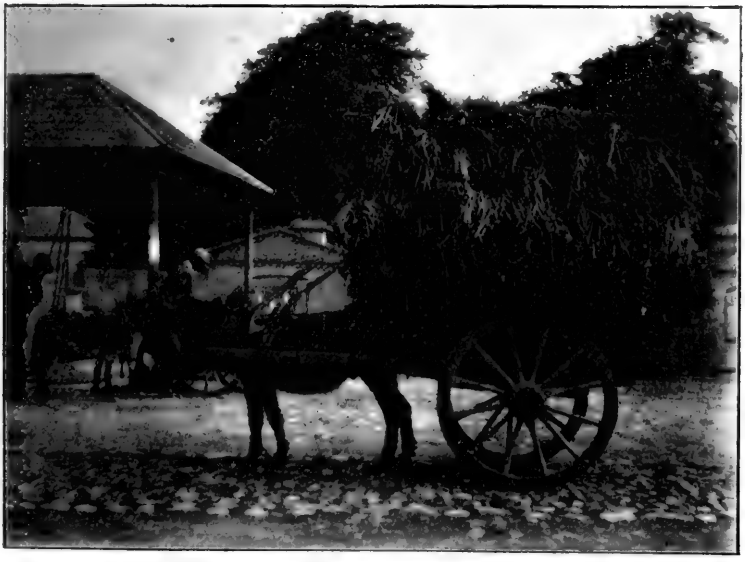
3. Bulb-Growing

It is not very difficult to grow early potatoes, nor is it very difficult to grow the hardier kinds of fruit. The man of intelligence of course has the advantage, but the stupid man may do fairly well. It is more difficult to grow good bulbs. The production and the marketing require more than ordinary intelligence. Given that, there is more profit in bulbs than in potatoes or fruit. But a man of ordinary intelligence may very well grow the cheaper class of bulbs, and make money. If the right sort of Irishman could be got and put on the right sort of soil in Ireland, he would very soon in the bulb trade make his holding, though less than thirty acres, an economic holding.

Holland has hitherto been the land of bulbs. It has had pre-eminence in bulb-farming for many years. It has supplied the world with bulbs. But the days of its monopoly are gone. England is producing bulbs, both for the bulb and the bloom, and consigning them to Holland itself by the ton. Ireland has also entered the trade. It was reserved for Mr Robertson of the firm of Hogg & Robertson, Seedsmen, Dublin, to make a beginning. We have said that fourteen miles north from Dublin, there is a village by the sea called Rush. It lies in a desert of sand. It was on this dreary waste that Mr Robertson, about twelve years ago, decided to start bulb-growing. Apart from extending his own business he wanted to assist in the development of minor industries in Ireland. At the outset he bought only a small plot that could best be described in yards rather than in poles or acres. To-day his firm holds forty acres, cut up in little fields, sheltered from fierce winds by turf dykes and privet hedges and hurdles with the branches of trees twisted in them. They have even sometimes had to lay straw above the planted bulbs, pressed into the ground with the flat of a spade to keep the sand from leaving them. They manure at the rate of 100 tons per acre without creating a very marked impression. But the sandy soil is suitable. It is the same soil in which bulbs grow in Holland. Bulbs must have plenty of moisture. The rainfall at Rush is less than the rainfall anywhere else in Ireland. But still there is plenty of moisture. Just as the canals in Holland give moisture to the land the sea supplies the moisture at Rush. The climate is better than the climate of Holland. Moreover, Holland has grown bulbs on the same ground since the sixteenth century. Rush is just beginning and the soil in its virgin state, with the addition of cow manure, may be better suited to the production of bulbs than soil that has grown little else for generations. At any rate, Messrs Hogg & Robertson have succeeded beyond their expectations. They have a great trade. They send bulbs to Scotland, England, the Continent, the Colonies. The Department of Agriculture might do worse than enlist the services of these shrewd Scotchmen in the development of the bulb trade in suitable districts in Ireland.

The other bulb farm which we had the pleasure of visiting was at Lissadel, the residence of Sir Josslyn Gore-Booth, some ten miles from Sligo. Sir Josslyn is an Irishman interested in the welfare

and the development of his country. Since 1900, when he succeeded to his estate, he has developed it in various ways, with the view of giving employment to the work-people in the district and showing what can be made of the land of Ireland. Lissadel is a place by itself in Ireland. It is a model estate, carried on on commercial lines. There are pedigree cattle; there is a dairy and a poultry farm; there is market-gardening and fruit-growing; and recently, Sir Josslyn added to the other departments, the bulb farm. It is situated on the sea-shore, sheltered by trees from Atlantic winds. The soil is not unlike the soil at Rush. Lissadel is not, however, so much dependent as Rush is on subterranean moisture, for the rainfall is greater on the West than on the East coast of Ireland. Although the bulb farm has been in existence for only two or three years, Sir Josslyn, who deals in blooms as well as bulbs, is already the owner of entire stocks of several new varieties, and Lissadel claims to have one of the finest collections of daffodils in the world.



MARKET, CASTLEREA

AGRICULTURAL CREDIT

ONE of the great difficulties of the Irish farmer has been the want of capital. Capital is needed for two purposes in Ireland,—for the purchase of the land which in ordinary circumstances and to a limited extent would be accepted as sufficient security for the loan. It is also needed for the working of the land and must as a rule be got on personal security. There has been no difficulty about capital for land purchase. The State has advanced it. The difficulty has been, as it generally is, about capital for working the land. The I.A.O.S., which has done so much for the Irish farmer, made investigations into the systems of Agricultural Credit in Continental countries. Ultimately, they decided that the system most suitable to Ireland was the Raiffeisen system.

Raiffeisen, the creator of the system, was born in the year 1818, in Westphalia. He was a burgomaster and came into contact with the poor peasant cultivators in the Rhineland. He first started a co-operative bakery, and the price of bread fell by 50 per cent. He then started a co-operative cattle-buying society, and in the year 1849, recognising that the great difficulty in the way of the co-operative movement was the want of capital, he started on a very small scale his first bank. There are thousands of Raiffeisen banks on the Continent now, and it is generally admitted that they are of all banks the best adapted to the needs of the poor agriculturist.

If we are to understand these banks we must understand the object which the founder had in view. It was not merely the lending of money to poor farmers. That of itself might be very far from a good thing. One of the objections brought against the small holding movement in Continental countries is, that much money has been lent to the small-holders and that their debt is growing rather than decreasing with the years. We are not anxious meantime to controvert that statement. We are content to say that in so far as it is true the development of character in general will remove the evil. Now, one of the objects Raiffeisen had in view was the development of character. Raiffeisen wanted so to advance money that it would inspire in the borrower, courage, thrift, self-help, unselfishness, while at the same time it inspired the outside public with such confidence that capital would be freely attracted to the Societies. The object Raiffeisen had in view has been attained to a wonderful extent in the countries which have adopted his system of banking.

Now, the first thing a bank wants is just what the members start the bank to get, capital, and how do the Raiffeisen banks get capital? They refuse to take it as a gift or as charity. Raiffeisen even deprecated State aid. His successors have not followed him in this. In Ireland the Congested Districts Board in congested districts, and later on, the Department of Agriculture in other dis-

tricts, came forward and advanced money at 3 per cent for the starting of the banks, and for carrying on their transactions. Sometimes individuals have advanced the money as an ordinary business transaction. But from whatever source the money is obtained, the personal security of the members is always accepted as sufficient, and that although the members are poor, because they are honest, because each is liable for all, and because the loans are for productive purposes.

Honest Men

Let us suppose that a bank is to be started. It must be in an agricultural district for these banks, differing in many respects from the Schulze-Delizcht Banks, differ in this,—that they are for purely agricultural purposes. The membership is purposely limited to a parish or district, which should not have less than 200 or more than 4000 inhabitants. One reason for the limitation is, that the bank transactions may not be so extensive as to necessitate a paid staff. These banks are not meant to create situations for anybody or even to pay dividends to the shareholders. Here again there is a difference between the Schulze-Delizcht banks and the Raiffeisen banks. The former provided that the members must take a share. The share was orignally £30, which was paid by instalments. The founder did this with the view of teaching the members to save money. He paid high dividends with the same object in view, and the result was that the banks were not suitable for the poorest classes because the possession of money was a *sine qua non* and because the interest payable for money was high of necessity because the dividends were high. The Raiffeisen banks, on the other hand, made their shares merely nominal and they purposely pay no dividend. Their object is not to make money out of the bank transactions but to make it possible for the members to get money easily with which to make more money. The income of the bank, less expenses, is therefore not paid to members. It is put to a reserve fund out of which more money may be borrowed in future. There is another reason why the membership is limited. It is necessary that the members should know each other intimately, and unless the area over which the members are spread was limited they would not know each other intimately. But why should they know each other intimately ? One reason is that the bank is thus able to secure as members only honest men. Without that, it could not borrow money and therefore could not carry on its operations.

Unlimited Liability

But there is another reason—a reason personal to the members themselves, which makes it imperative that they should know each other, and is a further security to the lender against the introduction into the bank of any but honest men. The members are as a rule jointly and severally liable for the debts of the bank. Every member is liable for the whole obligations of all the members. Thus, when these banks are started it is not usual to advertise for members as an agricultural society might do. The bank must be select from the

first. There was nothing but unlimited liability in Germnay at the start. At that time and until 1889 it was illegal to start a Co-operative Credit Society without unlimited liability. Since the founder's day the law in Germany has been altered, and there are many Raiffeisen banks in Germany which have now a limited liability. But there is still much to be said for making the liability unlimited, and where the members are all poor alike the liability should be unlimited. Each then takes upon himself a similar obligation. In order to protect himself he is thus forced to pay the closest attention to the working of the bank. This is the surest safeguard against loss. The farmers of Ireland are pretty much on the same level of poverty, and the banks there are all founded on the basis of unlimited liability. If banks were to be started in the Western Highlands of Scotland, for example, where the situation of things is pretty much what it is in Ireland, the principle of unlimited liability might with advantage be followed. If, on the other hand, banks were to be started in other districts in Scotland, where the small farmers occupy financially different positions, unlimited liability would practically make the success of the bank impossible, for, however necessary and unselfish it might be for a comparatively well-to-do farmer to pledge his whole means and estate for the debts of many less well-to-do farmers, he would not do it. He might be quite willing to pledge his goods to the value of the goods of his fellow-members, thus putting himself on a similar footing to every other member, which no doubt would be acceptable to the lender of money to the bank, or he might be willing to pledge his goods to a greater extent than every other member, but it would be too much to ask him to pledge his whole means and estate. We know these banks have been singularly free from loss but that is not enough. If there were loss, the creditor would seize upon the goods of the well-to-do farmer as being greatest in amount and most available, and he would be left the unpleasant duty of selling out his poorer fellow-members.

Productive Purposes

The money is lent to members only for productive purposes. This is important from the point of view of the man who lends money to the bank, because it increases his security. It is important from the bank's point of view for the same reason. Possibly, it is most important from the borrower's point of view for, while it sets him on his feet, it develops his character. Borrowing may be carried on by this system not to the detriment but to the great advantage of the borrower. It is an inducement to the farmer to stick in. It enables him to reap where he has sown, which is not always the case with borrowed money. A farmer may borrow for example from an auctioneer and be tied hand and foot for years, forced to sell his stock not at the best time for himself, but at the time the auctioneer wants it. It is far otherwise with these banks. The farmer gets his money for the purpose of making more money and has not to part with his stock until he can do so to advantage. We may illustrate this by some typical examples from Ireland. A

man borrowed £3 for ten months. He purchased a calf which he sold after six months for £5, 5s. He paid up his loan and invested the balance in pigs. Another borrowed £2 for ten months. He bought pigs which he sold nine months afterwards for £6, 10s. A third borrowed £4 for ten months, bought four pigs, and sold them before the loan expired for £16. Similarly, the Irish market gardener will by-and-by borrow money to enable him to crop his garden, paying the money when the harvest has been reaped in autumn, and the fruit-grower will borrow money to pay the planting out of his land and later on the reaping of his harvest, redeeming his debt when the land yields its fruit.

The loans vary in amount, ranging from a few pounds up to £50. The average loan in Ireland has been £15. The amount of the loan, of course, depends upon the trade transactions of the farmer. The rate of interest depends upon the price of money. If the Credit Bank can borrow at 3 per cent. it charges the members 5 per cent. The difference covers expenses and helps to form a reserve fund. The period of the loan depends upon the object for which the money is wanted. It ranges from months up to years. When any member wants a loan he brings with him to the bank two sureties, who become with himself jointly and severally liable for the debt. These sureties will look after the borrower in their own interest. This is further security to the bank and to those who have lent money to the bank. The bank makes enquiries as to the borrower's own character. It will have done this when he was admitted to the bank, but seeing that he is now asking money it will be done over again. It also makes enquiries as to the soundness financially of the sureties. Further, it enquires for what purpose the money is wanted. It must of course be for a productive purpose, but it is necessary that the bank should know what that purpose is. If on these points the bank is satisfied, the loan is granted. In the interests of the members and of the bank itself, a strict outlook is kept on the man and the money. There is no spying, but the members keep themselves informed as to the man and satisfy themselves that the money has been put to the purpose for which it was borrowed. There is not much objection to the length of time for which a loan is granted, provided it is reasonable. There is, however, objection to a loan being granted and not being met when it is due. It is better that the period should be long than that the debtor should fail to meet his obligations and have to get an extension of time. This is enforced upon the members, with the result that comparatively little difficulty has been experienced in Ireland in getting farmers to meet their debts when they fall due.

The Raiffeisen banks of Ireland have been the most successful system of co-operation in Ireland. There were three banks started in 1896, with a membership of 138, and during the year they lent £388. In 1905 there were 232 banks, with a membership of 13,035, and a loan capital of £43,641. There have been fluctuations in all the other Agricultural Societies, though in most of them there have been very little. There have been practically no fluctuations in the banks. They have made steady progress from the beginning.

We give the figures for every year from 1896, when they were started, till 1905 :—

Year.	No. of Banks.	Membership.	Loans.
1896	3	138	£388
1897	15	900	475
1898	48	2,085	3,306
1899	61	2,481	5,550
1900	76	3,138	7,270
1901	101	4,258	10,357
1902	145	6,611	16,480
1903	201	7,917	20,436
1904	200	11,257	31,743
1905	232	13,035	43,641

OLD CASTLE, ATHENRY

DOMESTIC ECONOMY AND RURAL INDUSTRIES

1. Domestic Economy

Domestic economy—cookery, laundry work, housekeeping, dressmaking—plays an important part in the revival of agriculture in Ireland, and so it is entitled to a place in this Report. It plays an important part, because the revival of agriculture to a greater extent than the casual reader is able to realise, is based on character, and character is developed in the home more than anywhere else. If there be carelessness and waste in the home there will be carelessness and waste in the fields. Successful farming will be out of the question. The revival will stop. If there be thrift and economy in the home, there will be thrift and economy in the fields, and the revival will go on. Thus, domestic economy forms part of the foundation on which the new movement in Ireland is built.

The Department, realising this, has sent abroad the itinerant instructor to teach domestic economy as well as agriculture, with strict injunctions not to teach domestic economy applicable to the mansions of the great, but domestic economy applicable to the homes of the poor. The object is not even, in the first instance at any rate, to train the young women of Ireland for domestic service in the big houses of the country, but to train them to be thrifty, economical, resourceful housewives, capable of cooking simple and wholesome food without waste, and of making the farmhouses of Ireland models of cleanliness and confort, fit nurseries for the future farmers of Ireland. For those who desire more information than the itinerant instructor can give, there are residential schools of domestic economy throughout the country. We had an opportunity of visiting a school which embraces both domestic and rural economy in its curriculum, the one now occupying the old Dillon mansion, near Castlerea. The girls are taught cookery, laundry work, housekeeping of the simplest and most serviceable kind. They are instructed in carpet-weaving, lace-making, crochet, and embroidery; they attend to the poultry and the cows; they work the garden; they are taught, in fact, all that it is necessary for them to know, to play a woman's part in making the small farms of Ireland pay. For those who want to prosecute their studies still further, there is the Irish Training School of Domestic Economy in Dublin. This school was established and managed by the Royal Irish Association for promoting the training and the employment of women. It was taken over by the Department of Agriculture in 1903, and is now under its control. There is also the Munster Institute, Cork, devoted exclusively to the teaching of women. The subjects taught include both domestic and rural economy.

2. Rural Industries

It was more difficult to teach the Irish people rural industries than it was to teach them domestic economy or agriculture, inasmuch as they knew something about domestic economy and agriculture, because both were part and parcel of their lives. They knew nothing about home industries. The industrial habit had died out in the country. Housekeeping and agriculture had to be improved; home industries had to be created. But the creation of them was an absolute necessity. Many of the holdings in Ireland are uneconomic and until Ireland becomes a much more industrial country than it is to-day they will remain uneconomic, for there is not available land in the country to provide economic holdings for all those who are dependent on the land for a living. The only hope for them is that they may be made economic by the assistance of some kind of subsidiary industry. Sir Horace Plunkett and his friends were cheered by the example set them in connection with home industries by different Continental countries, particularly Wurtemburg. There, fifty years ago, agriculture was depressed. There was no home industry, and the people were in a state of extreme poverty. Home industries were introduced and developed and the people of Wurtemburg to-day are carrying on a great industrial trade in their homes side by side with their agricultural work, facing and fighting the competition of steam and electricity, and succeeding beyond their wildest dreams.

The Department desires to follow in the footsteps of Wurtemburg. It provides, with that object in view, instruction in carpentry, building construction, wood-carving, metal and glass-work, boot-making, lace-making, crochet, embroidery, hosiery, weaving, shirt-making, etc. It not only gives technical instruction in regard to these, it gives financial assistance on the ground that these industries are in their experimental stage, that they are infant industries, and that they are necessary for the good of the country. Once on the inclined plane of State aid, it is not difficult to go far and justify the going. There is even a temptation to go too far. This is one of the temptations in Ireland.

We should explain that there is no attempt in Ireland, as there has been no attempt in Wurtemburg, to create home industries by which the people of the country could wholly maintain themselves. The object in view is to create industries which will fill up spare time, give occupation to the members of the family who would not otherwise be occupied, and supplement the income of the farm proper. We had an opportunity of visiting a shirt factory in the hills, eight miles from Dundalk, which is typical of the industries we refer to. The farms in that district are small and there is no occupation for the farmers' daughters. The factory gives employment to them. They earn from 7s. to 10s. per week, not of course a great wage but a wage which goes a considerable way to supplement the income of the farm and to stem the tide of emigration.

We are witnessing the beginning of the industrial movement in Ireland. We do not know where it may end. It may not be

possible for many a day yet to bring electricity, which is to be the great driving power of the world in the near future, to the assistance of the small farmer in the production of his industrial products. In the not distant future, we should not be surprised if the little villages of Ireland should become great centres of industrial activity, feeding the farms and fed by them, electricity generated by water or by wind as it is in Denmark, being the motive power. Then shall Ireland not be entirely dependent upon superior artistic skill, such as has been displayed by the farmers of Wurtemburg and such as is meantime necessary to enable the cottager by his own fireside to compete successfully with the factory in the manufacturing centres of the world. Then it will be possible to do by the fireside the same kind of work as is done in the factory, the power in each case being the same, and the cost of labour in the home considerably less than in the factory, inasmuch as the farm folk will be employing only their spare time and only partly dependent upon their industrial products for a livelihood.

But meantime the progress made is creditable. There are fifty Home Industry Societies in Ireland with a membership of 2811, and a turn-over of £13,018.

TRANSIT

We have shown in this Report that the Department of Agriculture in Ireland is setting about the development of minor and special industries such as the production of butter, bacon, and eggs, the cultivation of early potatoes, fruit, and flowers. Now, the development of such a trade presupposes proximity to the market. The market may be near because it is at the door. Many people think it is only then that it is near. But it may also be near because the steam engine and the motor car have brought it near. Sometimes in such circumstances it may be as near to the farmer fifty miles deep down in the country as it is to the farmer five miles away. When that happens the industries mentioned may be carried on at the end of the fifty miles, just as well as at the end of the five miles. Ireland, apparently, is to take advantage of the wider limitation, and the Department for that reason and for others connected with farming generally, is as much interested in transit as it is in agriculture, in the marketing of produce in the busy centres of population as in the manufacture of that produce on the distant farm.

The Department at once recognised that before it could do anything worth doing in the way of helping the Irish farmer to market his produce, it was necessary that reliable information on the subject of transit generally should be obtained. It appointed transit inspectors with this object in view. They wandered up and down the country taking note of the methods adopted by the Irish farmer in the marketing of produce and by the Railway Companies in the handling of produce. They visited Scotland and England with the view of finding out all that could be found out about the marketing of continental produce in these countries and the position which Irish produce occupied compared with continental produce. The Department was very soon in possession of a vast amount of information which enabled it to come to the conclusion that the farmer was to blame as well as the Railway Company. Acting on the well-known principle which it endeavours to enforce on all occasions that the farmers should first help themselves before they are otherwise helped, the Department pointed out to the farmers the defects in their own methods, defects in the construction of butter and egg boxes, and defects in handling produce. It also pointed out that so long as they persisted in sending small parcels instead of combining and sending their produce in bulk, it was impossible for the Railway Companies to put them on a satisfactory footing. It further pointed out that in many cases their complaints against the Railway Companies were without foundation in fact. The result of the representations by the Department to the farmers has been a very considerable improvement in the construction of the butter and egg boxes and in the consigning of produce generally.

On the other hand, it dealt as faithfully with the Railway Companies. It pointed out to them that the trucks in which they conveyed butter, for example, were often in an unclean state, that there was very considerable carelessness in handling all consignments of produce, that there was unnecessary delay, and, quite frequently, excessive rates. The Railway Companies seem to have fared worse on the rates question than on any other. A few examples may be given. The Great Southern & Western Railway Company applied to the Railway and Canal Commissioners for consent to increase their rates for the carriage of artificial manures, feeding cake, grain, etc., between Dublin and certain stations on their line. The Department were given power by the 17th Section of the "Agriculture and Technical Instruction (Ireland) Act, 1899," to appear on behalf of aggrieved farmers and others before the Railway and Canal Commissioners. They appeared in this case and successfully resisted the increase. In other cases, the Department obtained considerable reductions in the rates. The rate for the conveyance of Indian corn from Dublin to Castlerea was 11s. 6d. per ton; the rate for Indian meal was only 9s. 4d. The Company, on a representation being made to them, reduced the rate on Indian corn to 9s. 4d. Butter from Fiddown Station to Belfast was charged 40s. 5d. per ton, and from Wexford to Liverpool, 40s. per ton. Representations were made by the Department, and in the case of the Fiddown to Belfast rate, it was reduced by way of experiment to 35s. per ton. The Railway Company pointed out that there was practically no trade in butter between Wexford and Liverpool, but it reduced the rate from 40s. to 20s. per ton. Blackberries were charged at 30s. per ton from Drogheda to Manchester. The Company agreed, on a representation being made by the Department, to make the rate 25s. Potatoes were charged 7s. 6d. per ton in barrels from Rush to Dublin during the months of April, May, and June, and 4s. per ton at other seasons of the year. After a correspondence with the Department the Company agreed to issue a rate of 4s. per ton during the months mentioned, as well as for other parts of the year. There were other cases in which excessive rates were charged by mistake, which but for the Department might not have been discovered. For example, it was complained by the Department that the rate for the conveyance of a consignment of butter from Limerick to Southend-on-Sea was excessive. A re-entry of the consignment was made by the Company and the charge was fixed at 1s. 10d. instead of 4s. 6d., the amount originally claimed. A rate of 45s. 10d. per ton was charged for a consignment of butter from Limerick to Tirphill. The Railway Company admitted that the 45s. 10d. was a clerical error and reduced the amount to 35s. A charge of 2s. 2d. for the conveyance of an empty dog crate from Cork to Dublin was made. On examination, it was ascertained that an overcharge of 5d. had been made, and this was refunded. Salted skins were charged at 30s. per ton from Mullingar to Liverpool. The Company admitted the rate was a mistake, that it should have been 24s. 2d., and made the necessary alteration.

The Department may be congratulated on the work which it has

accomplished thus far. Would that it were possible to have such a Department in Scotland. More suitable vans are now put at the disposal of the Irish farmers than formerly. Some Companies have already put on refrigerator cars and other Companies are to put them on. Delays in transit are less frequent than they were, and rates have been considerably reduced. Will the Department, however, be able to secure such reduction in rates as will put the Irish farmer on a footing to compete favourably with the Scotch and English farmer and particularly with the Continental farmer? That will depend upon the co-operation of the farmers and the amalgamation of the Railway Companies.

Co-operation

If the farmers of Ireland continue to stand alone the Department will be able to do very little more than it has done to reduce rates. If rates are to be reduced the farmers must combine and send their produce in bulk. It is scarcely necessary, that this point should be laboured, for the success of Irish agriculture depends upon co-operation among the farmers. Co-operation is a necessity apart altogether from the question of transit. The question of transit only emphasises the necessity.

Amalgamation

The amalgamation of the Railways is not less necessary than the co-operation of the farmers if the Irish farmer is to be put in a position to compete favourably with his home and foreign rivals. A passing glance at the railway question in Ireland will leave one in no doubt on this subject. Ireland stood at the beginning of the railway era in a position by itself as it does now. There was never any question raised as to whether the railways of Great Britain should be private or State railways. There was no difficulty in running them as private concerns. It was otherwise in Ireland. The state of the country was against the development of the railway system. About 1834, after the first railway in Ireland was opened, the railway from Dublin to Kingstown, a Royal Commission was appointed to consider the extension of the railway system in Ireland. The Commission reported in favour of State assistance. A resolution was passed in the House of Commons advocating State assistance and State control, but the matter dropped, and the development of the system was left to private individuals. Numerous small railways were brought into existence. While trade increased in Great Britain generally from the beginning of the railway era, it decreased in Ireland—a fact that should never be forgotten in considering the Irish railway system. Further, amalgamation has not taken place among the railways of Ireland to the same extent as it has done in other parts of the Kingdom. The result is, that to-day there are in Ireland twenty-five or twenty-six railway companies, each with a Directorate, a Secretary, a Manager, and a staff of its own, running railways with a mileage not greatly exceeding the mileage of the Caledonian, the North

British, the Highland, and the Great North of Scotland, put together, and not carrying on anything like the trade of these four Scotch Companies. The following figures bring out the comparison :—

	Mileage.	General Merchandise.	Receipts.
Caledonian Railway Company	1,095	5,767,614 tons	£1,273,657
North British ,, ,,	1,305	4,966,073 ,,	1,253,080
Highland ,, ,,	509	237,949 ,,	111,390
Great North of Scotland	336	413,370 ,,	140,264
	3,245	11,385,006 ,,	£2,778,391
Irish Railways . . .	3,312	3,755,775 ,,	£1,288,908

In Ireland, which is making such strides in co-operation nothing seems more natural than that the railways should combine but while co-operation is admirable in connection with farming in Ireland, it is deprecated so far as transit is concerned, and not without reason, for it would kill competition and this would put the trader entirely at the mercy of the carrier. It was fear of this to a considerable extent which caused the State to interfere in the working of railways generally throughout the United Kingdom. There will not therefore be uncontrolled amalgamation. There may, however, be controlled amalgamation. There is good ground for believing that there will be. The Department is moving in that direction. It was given power to deal with the question of transit generally, and to appear before the Railway and Canal Commissioners on behalf of the farmers, and it has done both. Before long, the Department will see that it is necessary to go further than it has yet gone. More and more pressing representations will be made as agriculture revives and as competition grows more keen. Then it will be seen that the limit of reduction in rates under present circumstances has been reached. Rates must remain at a figure which will enable the Directors to pay a dividend. It will be apparent that further reduction could be made if the Companies were amalgamated and the entire system controlled by one body. There will then be amalgamation under State control,—an alternative the more easily accepted since the Government has already advanced money for the construction of Irish railways and since the Department has already endeavoured with some success to control them. The amount of State control will depend upon circumstances. If the same result can be got by less rather than more State control, then there will be less. If, on the other hand, it is necessary that there should be more, even to the taking over of the railways altogether, Ireland will not hesitate. Certain it is that the railways will not be allowed to stand in the way of the revival of Irish agriculture.

When the farmers combine and send their produce in bulk and the Railways amalgamate and run at a minimum of cost, Ireland will be a serious competitor to us on this side of the Irish Channel and to her foreign rivals, for the Irish Railways will be able to reduce rates below the level of rates in either Scotland or England and to something like the level of rates in Continental countries. They will be

able to do this because the cost of the construction of railways in Ireland, as indicated by the paid-up capital has been much less than in either Scotland or England, much less than in Germany, France, Belgium, and the Netherlands. Denmark alone has the advantage. The following are the figures. They are applicable to "route" and not to "track" mileage :—

Country.	Year.	Miles.	Paid up Capital.	Cost of Construction per mile.
England	1900	15,187	£970,147,581	£63,880
Scotland	1900	3,485	166,088,736	47,660
Ireland	1900	3,183	39,765,573	12,493
Belgium	1901	2,515	79,300,000	31,537
France	1900	26,720	676,550,000	25,320
Germany	1902	32,314	664,100,000	20,825
Netherlands	1897	1,653	28,700,000	17,350
Denmark	1893	1,286	11,100,000	8,626

COMPARATIVE OBSERVATIONS AND SUGGESTIONS

Small Holdings

ALL parties in the State are agreed that there should be more small holdings in Scotland than there are at the present time, particularly in view of the depopulation of the country and the congestion of the town, and the ever-increasing procession that is heading from our shores to the new lands of the far West. That does not, however, mean that there is to be nothing but small holdings. The consensus of opinion is in favour of a graduated scale of holdings, ranging from the small holding to the large farm, so that the man beginning at the foot of the ladder may, with perseverance and ability, reach the top. Nor does the increase of small holdings mean that the small holdings are to be—if one may so phrase it—large farms on a small scale. A man here and there, with uncommon shrewdness, skill, and thrift, may make such a farm pay, but the average man never. The small holder of the future must specialise. It is not necessary that he should entirely give up ordinary farming, but it is necessary that, where situation and climate and soil are suitable, he should develop one or more of the special departments of farm work, such as dairying, pig-rearing, poultry-keeping, market gardening. These branches of farming are best suited for small holdings, and the market for their produce is within our own gates. To ensure a general success, however, even when the small holder specialises, it is desirable that the holdings should be in colonies, worked on a co-operative basis.

Land Transfer

We believe that it would be a general advantage to the agricultural interests if the transfer of land were less cumbersome and less expensive.

Co-operation

There is not the same need in Scotland as there is in Ireland to teach the principles of self-help, though it is to be feared that both self-help and thrift in Scotland are virtues which were better known and more practised in bygone days than now. But what energy can be spared from the inculcation of these virtues is

needed, and more than needed, to teach our people the principles of co-operation, which are foreign to the self-reliance and independence of the Scotch character. The Scottish Agricultural Organisation Society has begun the work. The proposed new Department of Agriculture, of which we are to speak presently, might with advantage take it up and carry it forward. The lines along which progress should be made have been clearly defined in other countries where the co-operative movement is in existence.

Creameries and Egg Depots

The first branch of agriculture tackled in Denmark and in Ireland was dairying, and in both countries co-operative dairying has succeeded beyond the expectations of the most sanguine. Every district in Scotland where situation, climate, soil, and other conditions are suitable, should contain a co-operative creamery and a co-operative egg-collecting depot. They might be separate Societies in the larger districts, and in the smaller districts the work of both might be done by one.

Bacon-Curing Factories

The establishment of Bacon-Curing Factories has almost invariably followed the establishment of creameries, for the bye-products of the dairy constitute to a considerable extent the food on which pigs are reared. Thus, there might also be a co-operative bacon-curing establishment, belonging to and run by the farmers. Inasmuch as it requires a larger membership to run a bacon-curing establishment than a creamery, it might be necessary for the bacon-curing establishment to go further afield than the creamery for the necessary raw material, but that would be no great disadvantage.

Market Gardeners' Association

In every market-garden district there should be an association for the purchase of market-garden requirements, and for the sale and despatch of market-garden produce.

Credit Banks

Some system of agricultural credit might with advantage be brought within the reach of the small farmer in Scotland. The Raiffeisen Bank system has been an inestimable benefit to the small farmers of Ireland. In Scotland the individual advances would probably require to be greater in amount than they have been in Ireland.

Department of Agriculture

Great differences of opinion exist as to the creation of a Department of Agriculture for Scotland. The difference of opinion is not so much as to the need for a Department of Agriculture but as to whether the Department is to be an independent Scotch Department, like the Fishery Board or the Congested Districts Board or the Local Government Board, or whether it is, unlike these and other Scottish Boards, to have no independent existence, but to be a Sub-Department of the existing Board of Agriculture and Fisheries. Whether the new Department is or is not to be an independent Department, it will be an important body with the opportunity of doing splendid work, and we should like to see it manned by the most efficient Scotchmen available. We may mention some of the things which would naturally come within the sweep of such a Department.

1. Agricultural Education and Research

Perhaps there is no work in Scotland more urgently in need of development at the present time than that of agricultural education and research. Our system of agricultural education is incomplete and is inadequately furnished with means to support it. The Scotch Education Department is the central authority meantime responsible for the education of the country. That Department, and not various bodies as at present, should be the dispenser of the funds to colleges and schools alike, and all educational institutions should be responsible to the Department. Thus agricultural education would be systematically organized, and a sure foundation for a revival of agriculture would be laid.

Along with education there must also be included the great question of agricultural research. Nothing can be more vitally important in the interests of agriculture and of agricultural education than the investigation of the numerous problems and difficulties with which our farmers are constantly confronted. Further light is needed on plant growth and plant nutrition, on the best methods of treating the diseases of plants and animals; on the most effective employment of manures and feeding stuffs; on the improvement of our breed of live stock, and on the supremely important basal and practical problem of how to increase the returns from all branches of farming without at the same time increasing either costs or risks. The need is great, but little can be done till larger funds are available for defraying the necessary costs and for the employment of larger staffs of experts. The results of such investigations could be rapidly communicated to farmers through the agricultural press, and through the agricultural colleges, where lecturers could be largely employed in explaining to farmers all discoveries of practical value made in the course of such research. Such work could not fail in the course

of the years to help farmers to make the most of the soil and to add to the wealth of the country.

Education and research should not be confined to agriculture proper. The education of farmers necessarily includes a certain study of animal hygiene, and animal diseases; and veterinary instruction and veterinary research would naturally be embraced in developments which would cover all branches of agricultural and dairy science.

2. Forestry

Nor must the interests be overlooked of that great branch which possesses such a vital interest for the owners of those extensive tracts of poor land in the mountainous regions of Scotland, which, infertile as they are and comparatively useless for ordinary agricultural purposes, nevertheless contain a great potential value as the subjects of afforestation. In nothing is education more pressingly required than in modern systems of forestry management, and thorough instruction in the most approved methods of forest treatment could not fail to have far-reaching effects on the general wealth and prosperity of the country.

3. Statistics and Intelligence

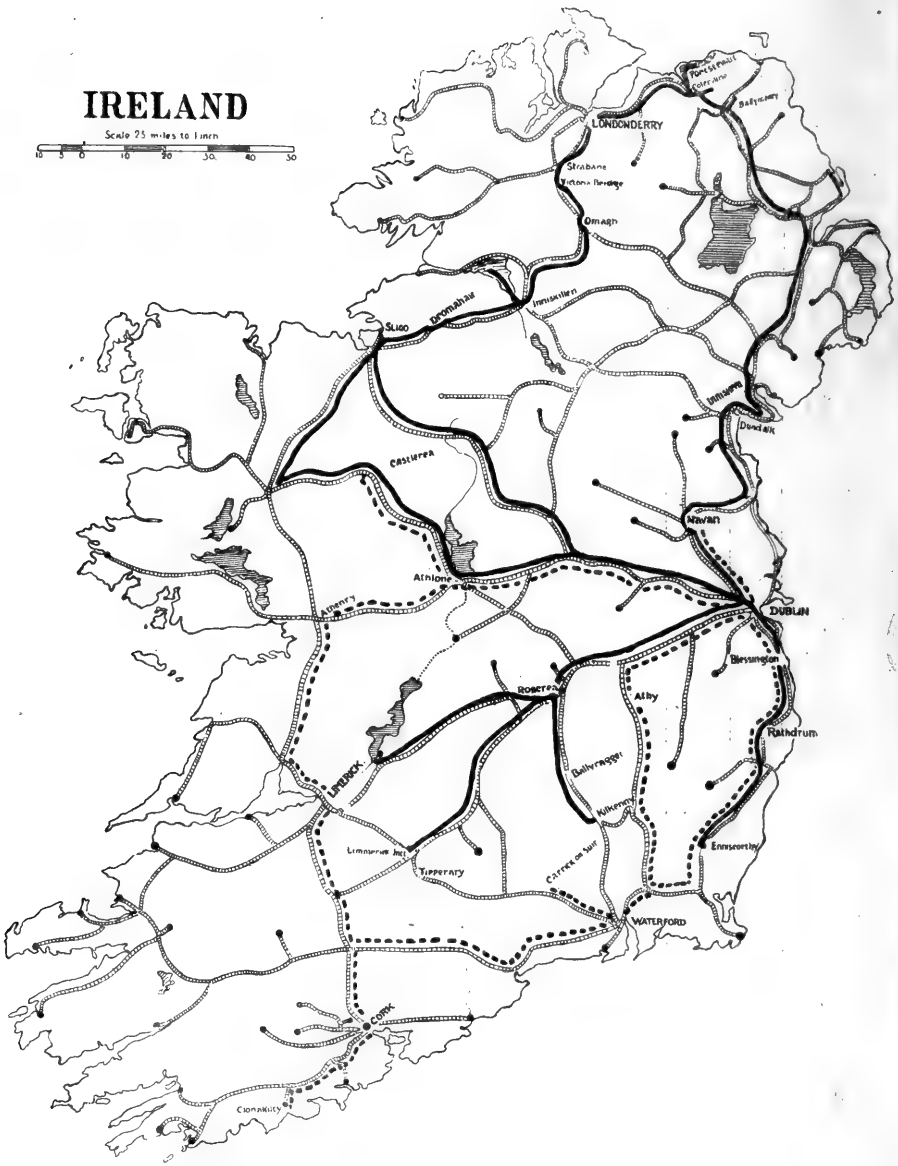
A Statistics and Intelligence branch would naturally follow. It would collect, collate, and publish statistics relating to agriculture in Scotland and in other countries. It would collect information at home and abroad in connection with agricultural investigations, as well as information in connection with the production, reaping, and marketing of crops. This information would be embodied in Returns and Leaflets, and scattered throughout the country. The Scotch farmer would thus be able to keep well abreast of the times.

4. Transit

Farmers in these days would give much to have a Government Department at their back to extract from the railway companies concessions in regard to service and rates, and to appear before the Railway and Canal Commissioners on their behalf. The Department of Agriculture should stand by the farmers and see that they obtain such terms from the railway companies as are necessary for the development of their trade.

Horses, Cattle and Sheep in Ireland for each Year since 1896

Year.	Number of Horses.			Number of Cattle.			Number of Sheep.	
	Two years old and upwards.	One year old and under two.	Under one year.	Two years old and upwards.	One year old and under two.	Under one year.	One year old and upwards.	Under one year.
1896	464,262	91,385	73,450	2,430,180	957,866	1,020,087	2,432,368	1,648,343
1897	461,558	83,816	64,841	2,448,169	964,934	1,051,771	2,466,593	1,691,313
1898	458,651	75,367	56,750	2,458,784	982,284	1,045,881	2,518,027	1,769,524
1899	457,375	66,759	56,152	2,455,390	993,384	1,058,683	2,554,913	1,809,594
1900	445,507	64,448	57,023	2,489,083	1,033,941	1,085,526	2,586,046	1,800,830
1901	428,236	73,691	62,989	2,523,989	1,046,203	1,103,131	2,586,451	1,792,299
1902	428,795	81,897	69,073	2,588,362	1,067,705	1,126,154	2,499,109	1,716,756
1903	436,563	89,327	69,856	2,527,357	1,036,253	1,100,502	2,305,680	1,638,924
1904	442,820	93,132	68,978	2,524,256	1,035,435	1,117,027	2,247,387	1,580,532
1905	447,303	94,566	67,125	2,528,370	1,024,638	1,092,207	2,194,651	1,554,701
1906	443,106	99,477	61,830	2,549,965	1,000,343	1,083,616	2,160,598	1,554,234


IRELAND
Scale 25 miles to 1 inch
10 5 0 10 20 30 40 50
LONDONDERRY
Omagh
Sligo
Enniskillen
Cavan
Dundalk
Castlerea
Athlone
DUBLIN
Athenry
Ballinrobe
Athy
Baltinglass
Kilkenny
Limerick Jnct
Tipperary
Carrick on Suir
WATERFORD
CORK

REPORT OF THE SCOTTISH COMMISSION ON AGRICULTURE TO CANADA

1908

Topley, Photo

MEMBERS OF THE COMMISSION AT OTTAWA

REPORT

OF THE

SCOTTISH COMMISSION ON AGRICULTURE

TO

CANADA

1908

WITH NUMEROUS ILLUSTRATIONS

EDINBURGH AND LONDON
WILLIAM BLACKWOOD & SONS
1909

DOMINION PARLIAMENT BUILDINGS, OTTAWA

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THE COMMISSION AT WORK, OTTAWA EXPERIMENTAL FARM

TABLE OF CONTENTS

NIAGARA FALLS

INTRODUCTION

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

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

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

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

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

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

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

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

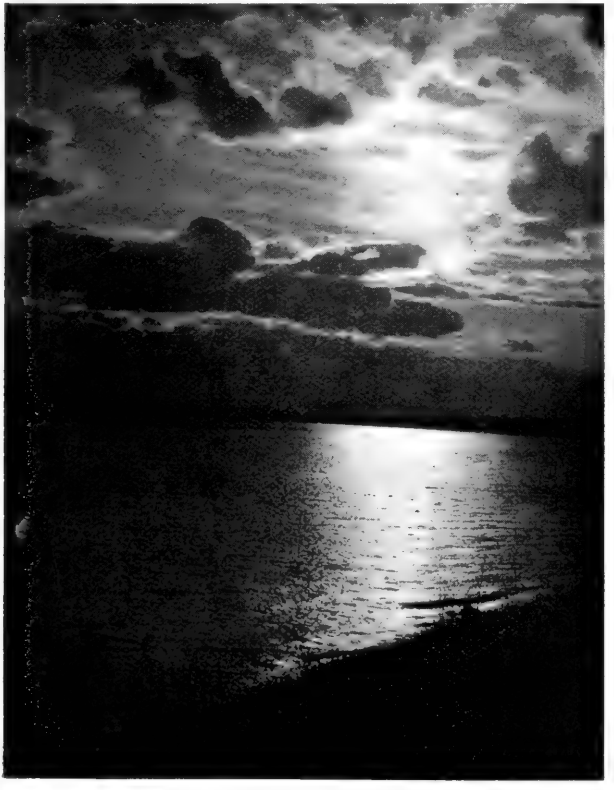
To Dr Saunders, and the superintendents of the various Experimental Farms, our indebtedness is great; at Ottawa, Brandon, Indian Head, Lacombe and Agassiz we had interesting days. To the Principals of the Agricultural Colleges which so notably distinguish Canada—to Principal Creelman at Guelph, to Principal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

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

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

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

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



SUNSET ON LAKE SUPERIOR

CANADA

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

1. Maritime Provinces

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

2. Quebec and Ontario

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

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

3. North-west Provinces

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

4. British Columbia

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

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

THE HON. FRANK OLIVER (MINISTER OF THE INTERIOR)

THE WANDERINGS OF THE COMMISSION

Rapid Jottings en Route

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

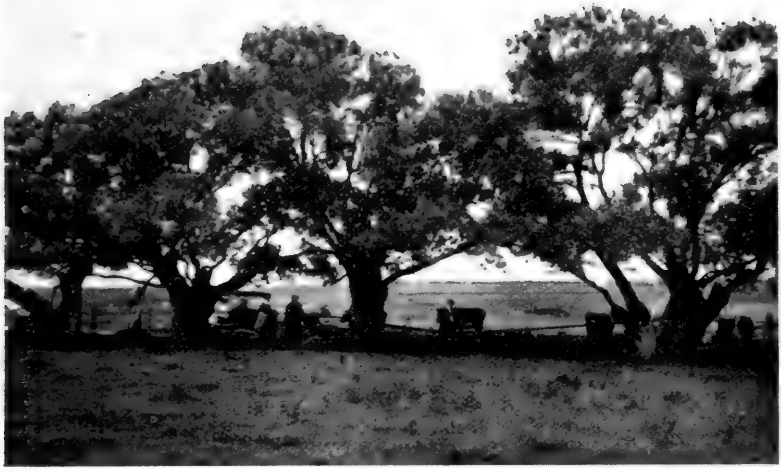
Prince Edward Island

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

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

AL FRESCO LUNCH, PRINCE EDWARD ISLAND

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



WILLOW TREES AT GRAND PRÉ

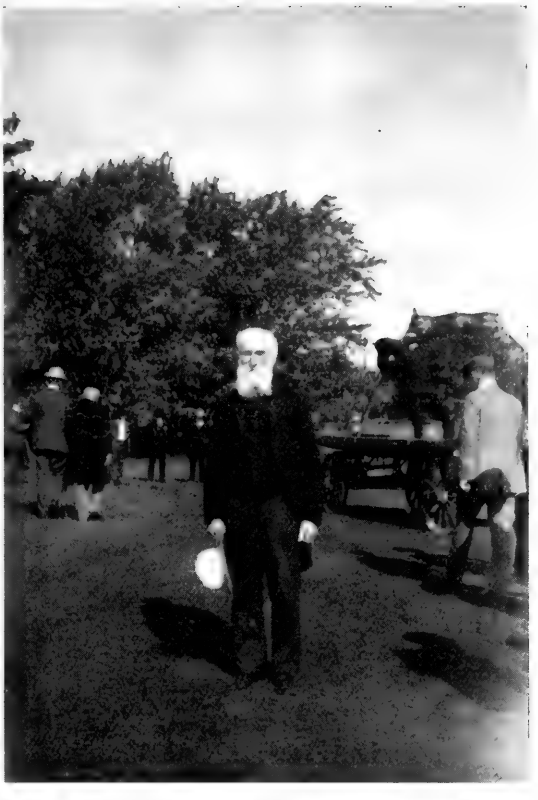
EVANGELINE'S WELL

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

Nova Scotia

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

SIR FREDERICK W. BORDEN, MINISTER OF MILITIA



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

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

New Brunswick

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

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

STEAMER ON ST JOHN RIVER

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

Quebec

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

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

THE HON. SYDNEY FISHER'S COUNTRY RESIDENCE, KNOWLTON

view of the country, a well-wooded country, with Brome Lake in the hollow. Descending the hill the creamery at Knowlton was inspected. It is, if we may put it in that way, like the Prince Edward Island Creamery, already described, a cross between a private and a co-operative creamery. The owner charges the farmers 2½ cents per lb. of butter made. The profits are divided among the farmers according to the quantity and quality of the milk supplied. After a passing visit to the library at Knowlton we proceeded to Alva Farm, the country residence of Mr Fisher. A few hours were spent in congenial company. Mr Fisher had brought to meet us, Judge Lynch, Sir Melbourne Tait, Chief Justice of Quebec, Mr George Foster, Lawyer, Montreal, Dr Fletcher, Botanist, Ottawa (since deceased), Dr Robertson, Principal of Macdonald's College, St Anne de Bellevue,

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

It was intended that the forenoon of next day should be spent in Montreal. This, however, was not possible, for some of the Commissioners. At 9 o'clock, seven of them, along with Mr Fisher, proceeded to a farm, four miles from Montreal. One feature of this farm, which extends to 60 acres, and is rented at 800 dollars, was the melon patch, measuring $1\frac{1}{3}$ acres. On this patch the farmer grew 32,000 melons, which yielded a gross return of something like £2000. A visit was also paid to Messrs Trenholme's dairy in the same district. The byres, which housed 150 cows, were floored with concrete and had an air space of 800 cubic feet per cow. The rest of the Commissioners remained in town, only to be convinced that a forenoon is much too short to explore even the most outstanding features of Canada's greatest city. At 12.15 they left for Macdonald College. Mr Fisher and his party joined them at Montreal Junction. Reaching St Anne de Bellevue, the Commission was met by Dr Robertson and driven to the College. At the outset, the doctor gathered the Commissioners together in a classroom and explained the design of the buildings and the general policy of the College. The different rooms were afterwards inspected and at one o'clock we sat down to lunch as the guests of Dr Robertson. During lunch, we had ample opportunity of obtaining information on all points of interest. Subsequently, we visited the different sections of the farm—the poultry section, the horticultural section, and the live-stock section, and then it was time to go. Accompanied to the station by Dr Robertson and quite a host of professors, we left for Ottawa.

Ontario

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

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

FARMHOUSE AT GRIMSBY

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

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

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

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

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

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

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

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

SNAKE FENCE, INGERSOLL

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

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

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

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

NIAGARA RAPIDS

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

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

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

Manitoba

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

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

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

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

Saskatchewan

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

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

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

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

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

Alberta

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

British Columbia

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

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

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

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

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

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

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

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

BLOWING UP STUMPS AT AGASSIZ

FIELD OF STRAWBERRIES, BRITISH COLUMBIA

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

Back to the Atlantic

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

Delta Lands

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

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

Homesteading

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

THE HOMESTEADING PARTY

"RIGS" WAITING FOR THE COMMISSION

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

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

Park Lands

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

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

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

FARM IN THE PARKLANDS, EDMONTON

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

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

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

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

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

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

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

SIWASH INDIANS PICKING HOPS AT AGASSIZ, BRITISH COLUMBIA

LAND SETTLEMENT

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

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

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

1. Residence

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

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

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

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

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

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

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

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

2. Cultivation

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

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

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

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

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

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

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

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

Pre-emptions

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

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

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

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

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

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

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

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

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

OLD AND NEW HOMESTEADS

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

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

DEPARTMENT OF AGRICULTURE

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

THE HON. SYDNEY FISHER, MINISTER OF AGRICULTURE

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

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

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

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

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

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

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

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

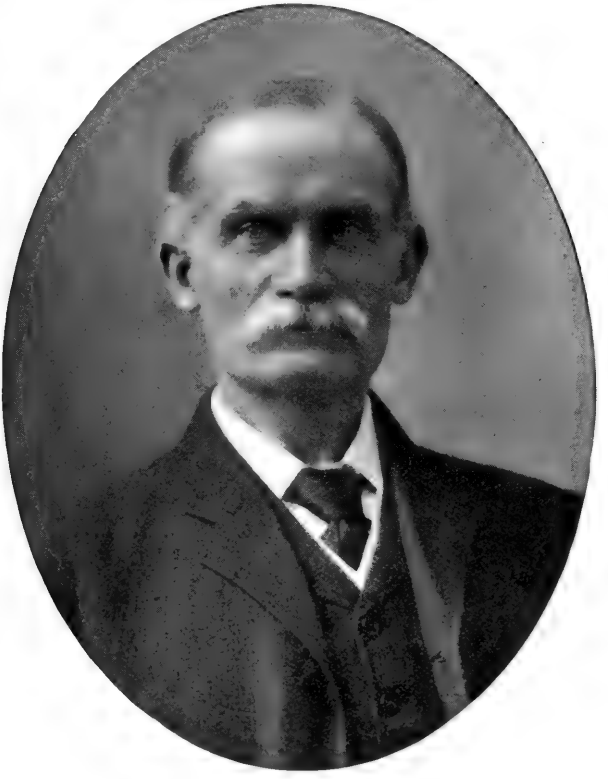
I. DAIRY AND COLD STORAGE COMMISSIONER'S BRANCH

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

1. Dairying

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

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



PRINCIPAL ROBERTSON, MACDONALD COLLEGE,
ST ANNE DE BELLEVUE

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

2. Fruit

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

3. Cold Storage

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

4. Extension of Markets

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

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

II. SEED COMMISSIONER'S BRANCH

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

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

III. LIVE STOCK BRANCH

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

IV. HEALTH OF ANIMALS BRANCH

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

1. Quarantine

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

2. Field Work

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

3. Pathological Work

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

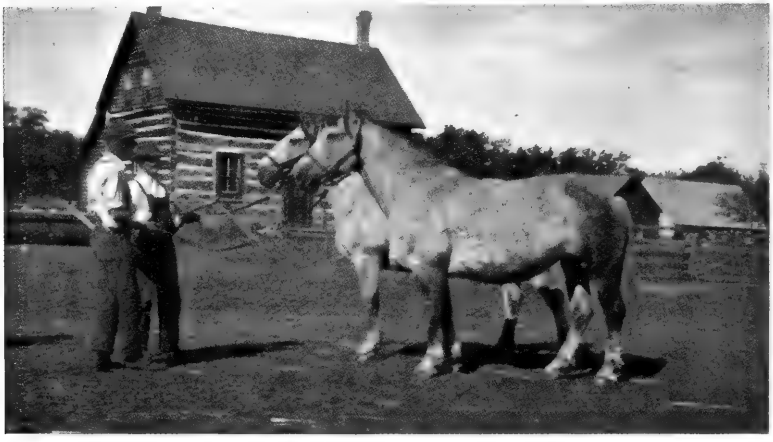
4. Meat Inspection

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

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

V. CENSUS AND STATISTICS OFFICE

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



PERCHERONS

GRANTS IN AID OF AGRICULTURE

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

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

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

Table I.—Federal Grants

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

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

[*Continued on p.* 62.

Table II.—Appropriations in Aid of Agriculture by the

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

* Includes proportion expended

various Provincial Governments for the Year 1908-9

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

Total Grant for all purposes, $31,980

Grand total, $1,614,081.

on the Poultry Industry.

Table I.—*continued from page 59.*

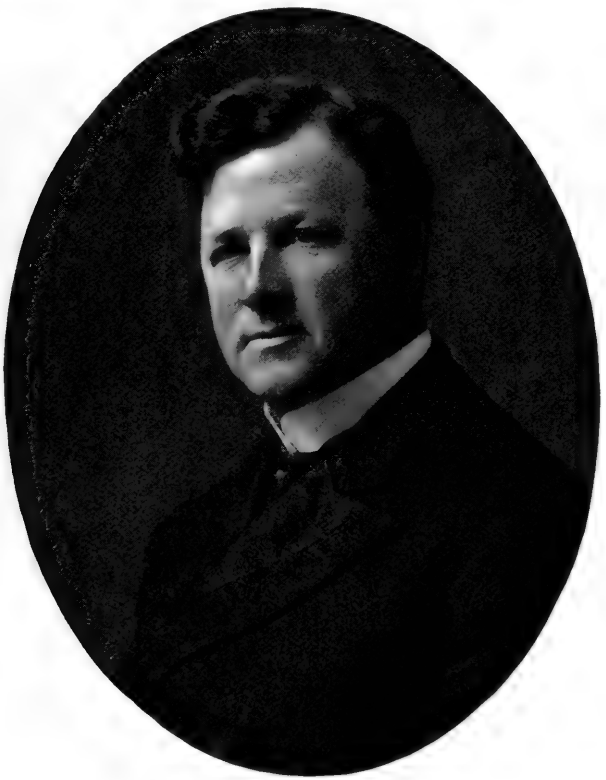
No. of Vote	Service	Grant
49	For the development of the live stock industry (payments made from this sum not to be subject to the Civil Service Act) . .	$45,000
50	Health of animals	300,000
51	Experimental farms — towards establishment and maintenance of additional branch stations	40,000
52	Grant to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

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

A CRITICAL MOMENT

AGRICULTURAL EDUCATION AND RESEARCH

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



PRINCIPAL CREELMAN,
ONTARIO AGRICULTURAL COLLEGE, GUELPH

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

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

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

Rural Schools

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

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

MAIN COLLEGE DRIVE, GUELPH

LADIES' RESIDENCE, MACDONALD HALL, GUELPH

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

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

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

Consolidation of Rural Schools

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

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

Macdonald Institutes

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

The following are the departments of the Institute :—

1. *Department of Home Economics*

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

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

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

2. *Department of Manual Training*

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

3. *Department of Nature Study*

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

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

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

Agricultural Colleges

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

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

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

Ontario Agricultural College, Guelph

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

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

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

MASSEY HALL AND LIBRARY, GUELPH

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

Courses of Study

The College offers five courses of study :—

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

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

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

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

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

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

Short Courses

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

Experimental and Research Work

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

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

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

PROFESSOR ZAVITZ DEMONSTRATING AT GUELPH
(MIDDLE OF PICTURE)

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

The Experimental Union

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

MAKING BUTTER, GUELPH

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

County Instructors

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

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

Nova Scotia College of Agriculture, Truro

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

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

Manitoba College of Agriculture, Winnipeg

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

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

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

Agricultural Education in other Provinces

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

Macdonald College at St Anne de Bellevue

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

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

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

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

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

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

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

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

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

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

Farmers' Institutes

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

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

Women's Institutes

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

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

STUMP FENCE AND CORN FIELD

EXPERIMENTAL FARMS

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

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

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

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

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

THE COMMISSION AT EXPERIMENTAL FARM, MACDONALD COLLEGE

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

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

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

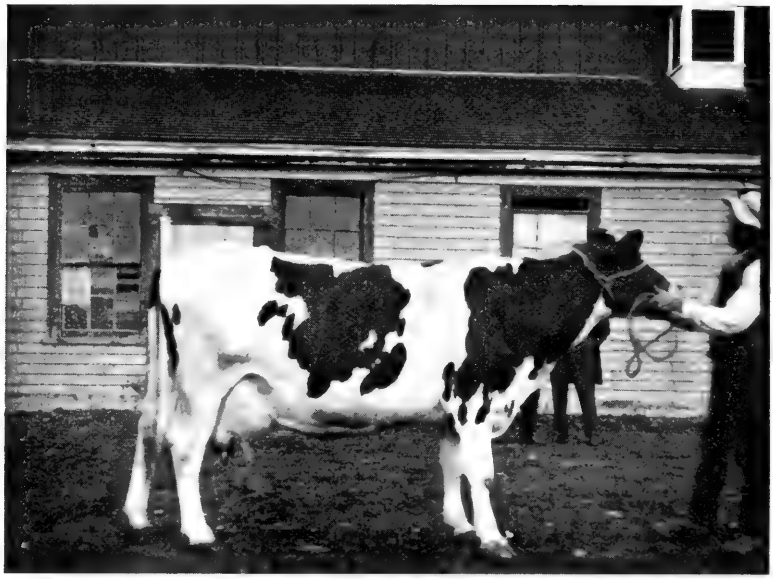
Dominion. The year after the farms were organised the number of letters received was about 8000. Within five years they increased to over 25,000, and during the past ten years, 1898 to 1907, the average number received annually was 72,619. In addition to this correspondence over 300,000 copies of reports,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

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

Agriculturists' Department

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

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



HOLSTEIN COW AT TRURO AGRICULTURAL COLLEGE

HOLSTEIN BULL AT TRURO AGRICULTURAL COLLEGE

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

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

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

Beef Production

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

1. *Breeding*

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

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

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

3. *Testing Values of Rations*

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

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

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

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

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

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

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

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

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

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

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

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

6. *Baby Beef*

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

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

7. *Length of Feeding Period*

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

HOW THEY LEAD CATTLE OUT WEST

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

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

9. *Methods of Feeding*

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

TOWN OF INDIAN HEAD, SASKATCHEWAN, SHOWING ELEVEN ELEVATORS

Dairy Cattle

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

1. *Breeding*

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

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

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

2. *Economy of Production of Milk*

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

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

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

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

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

5. *Individual Records*

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

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

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

7. *Cost of Feeding*

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

Sheep and Pigs

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

The Horticultural Division

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

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

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

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

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

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

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

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

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

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

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

Cereal Division

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

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

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

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

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

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

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

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

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

The Chemical Division

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

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

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

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

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

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

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

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

Division of Entomology and Botany

The work of this division consists of making collections of plants and insects particularly of an injurious character, investigating their life histories, and helping farmers to combat them. A great deal of useful and original investigation which cannot be noticed here has been carried on. One novel feature more or less connected with this department is worthy of notice. It had its origin in the unsatisfactory condition of the crop of 1905 when it came under inspection in Winnipeg on its way to the lake front for shipment. It was known that smut was causing considerable loss among the grain crops of the prairie provinces. In 1903 the percentage of dockage and rejection was only 3 per cent. ; in 1904 this had run up to 5½ per cent. ; but in the crop of 1905 a far worse state of affairs was manifested. It seemed probable that upwards of 20 per cent. of the enormous crop for the year, of nearly 90 million bushels of wheat, would be graded as "rejected" by the official inspectors. It was thought that something should be done at once to improve this state of affairs. The railway companies and the Dominion Department of Agriculture consulted together with the result that a special train manned by experts set out on a campaign, the aim of which was to remind farmers before the spring work began that more care was necesssary than had evidently been shown in preparing their seed grain and caring for the resulting crop. The campaign which was organized largely by the seed branch of the Department of

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

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

The Poultry Division

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

Branch Experimental Farms

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

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

DUNG DISTRIBUTOR AT WORK

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

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

LIVE STOCK

Cattle

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

Number of Cattle Kept

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

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

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

Number of Live Cattle and Quantities of Beef Exported

1. *To Britain*

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

2. *To United States*

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

[2] For nine months only.

3. *To Other Countries*

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

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

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

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

[1] For nine months only.

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

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

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

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

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

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

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

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

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

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

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

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

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

Cattle Feeding

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

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

Cattle Embargo

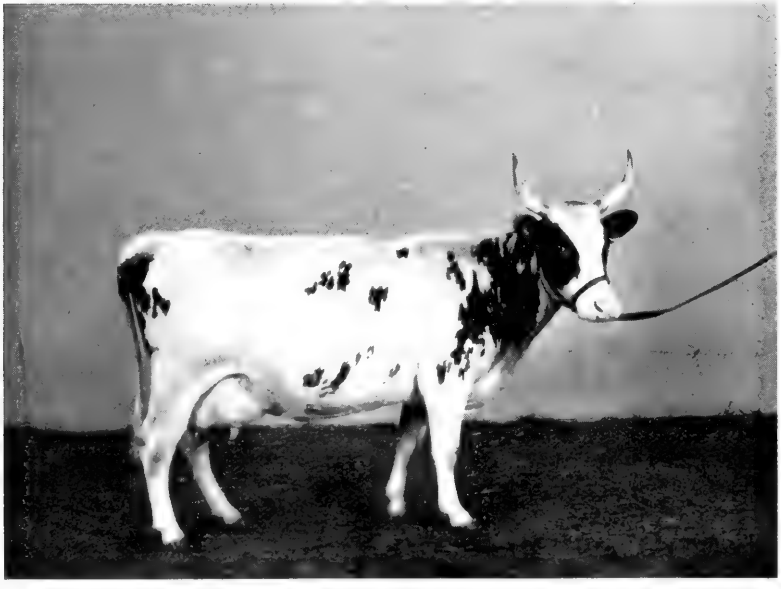
A report on the Canadian cattle industry would be incomplete which did not touch on the question of the removal of the restrictions against the importation of Canadian cattle into this country. As it is a subject, however, of much controversy, we shall content ourselves with an impartial statement of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

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

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

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

GUERNSEY COWS, HON. SYDNEY FISHER'S FARM



AYRSHIRE RECORD, 18 LBS. BUTTER PER WEEK

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

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

Horses

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

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

1. *Riding and Driving Horses*

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

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

2. *Draught Horses*

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

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

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

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

HORSE AT TRURO COLLEGE

GROUP OF CANADIAN-BRED CLYDESDALES AT REGINA

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

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

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

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

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

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

The export trade since 1900 is both interesting and instructive—

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

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

Sheep

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

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

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

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

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

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

SHEEP RANCHING

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

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

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

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

Quite recently a market for lambs has been opened by the

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

Pigs

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

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

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

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

PIG HOUSE AT GUELPH

PIG AT GUELPH

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

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

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

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

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

Poultry

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

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

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

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

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

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

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

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

POULTRY HOUSE AT MACDONALD COLLEGE

POULTRY FEEDING APPLIANCE AT GUELPH

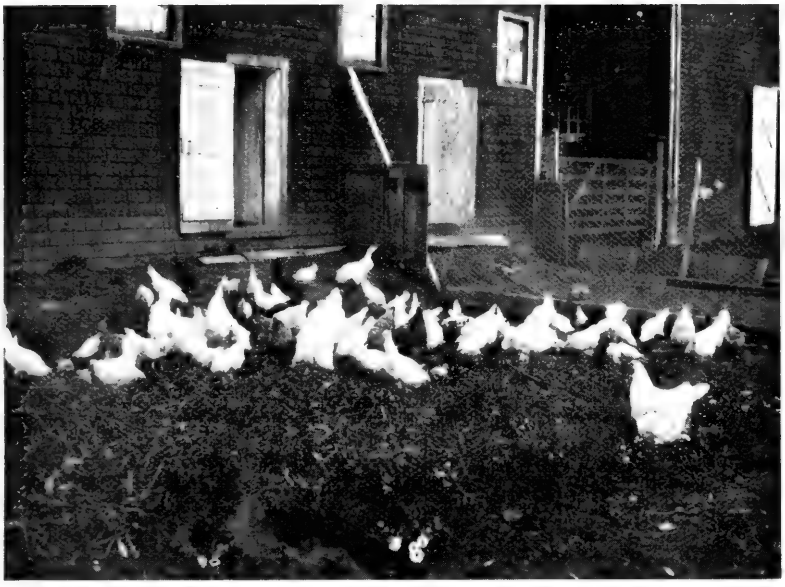
provided for in the front of the houses. No cooked food, hot mash or condiment of any kind was used. One feed a day, on a mixture of dry grain consisting of wheat, oats, barley, buckwheat, and Indian corn, was thrown on the floor, which was littered to a depth of 3 to 4 inches with cut straw and roughage.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

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

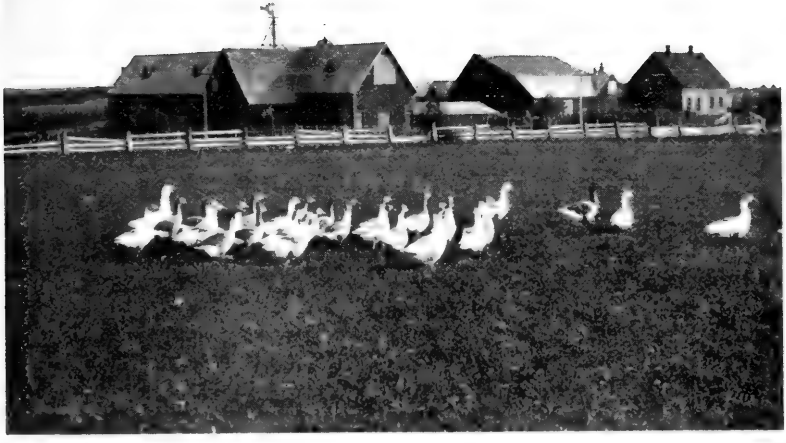
At the Ontario Agricultural College and Experimental Farm, Guelph, the poultry department is equipped with capital buildings and yards, constructed according to the most approved plans. The stock of fowls consists of twenty-five varieties representing fifteen breeds, the principal of which are Barred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

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

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



POULTRY



GEESE

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

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

Housing

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

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

Feeding

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

Incubation

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

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

Breeds

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

Poultry Institutes

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

WHEAT-FARMING

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

Wheat Production

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

Export Trade

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

The Wheat Belt

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

[1] Nine months.

BINDERS AT WORK

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

Fall Wheat

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

BANNER OATS

Spring Wheat

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

Seed-time and Harvest

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

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

Field operations then cease till the following spring. During winter, the hard frost pulverises the soil and its deep penetration 5 or 6 feet opens up the subsoil, keeping it in good condition for capillary action. In the spring, a matter of supreme importance is to get in the seed as soon as the weather conditions permit. It is sown from 10th April to 1st June, at the rate of from $1\frac{1}{4}$ to 2 bushels per acre. During the growing season statements of condition and

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

TEN-FURROW PLOUGH

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

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

THRESHING OUTFIT

OIL ENGINE THRESHING

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

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

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

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

Freight

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

GRAIN ELEVATOR, PORT ARTHUR, ONTARIO

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

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

Grades of Wheat

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

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

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

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

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

Transportation

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

What of the Future

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

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

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

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

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

BRINGING IN HAY. HORSE RANCH, MEDICINE HAT

DAIRYING

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

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

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

Breeds

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

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

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

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

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

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

Milk Yields

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

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

Milk Records

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

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

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

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

Cheese Factories and Creameries

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

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

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

INTERIOR OF BLACK CREEK CHEESE FACTORY, STRATFORD, ONTARIO

INTERIOR OF BLACK CREEK CHEESE FACTORY, STRATFORD, ONTARIO

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

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

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

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

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

BLACK CREEK CHEESE FACTORY, STRATFORD, ONTARIO

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

Cold Storage

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

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

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

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

Price of Milk

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

Condensed Milk Factories

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

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

The Cows' Feed

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

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

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

OTTAWA CORNFIELD

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

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

Pastures

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

Farm Buildings

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

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

FARMER'S HOUSE, NEAR BRANDON

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

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

Sanitation

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

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

RANCHING

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

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

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

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

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

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

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

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

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

HORSE RANCH, MEDICINE HAT

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

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

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

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

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

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

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

FRUIT-GROWING

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

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

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

Annapolis Valley

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

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

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

ANNAPOLIS VALLEY

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

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

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

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

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

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

CULTIVATION OF APPLE ORCHARD, GRIMSBY

COLDSTREAM RANCH, VERNON, B.C.

Niagara Peninsula, Ontario

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

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

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

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

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

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

British Columbia

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

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

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

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

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

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

YOUNG ORCHARD, KOOTENAY LAKE

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

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

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

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

SPRING CULTIVATION, NEAR KENTVILLE

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

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

Packing Fruit

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

Preserving Fruit

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

IRRIGATED VEGETABLE GARDEN

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

Co-operation

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

APPLE PICKING, WATERVILLE

FARM HOUSE, BARN AND ORCHARD, NOVA SCOTIA

IRRIGATION

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

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

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

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

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

HEADGATE OF IRRIGATION SYSTEM, NEAR CALGARY

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

WHEAT FIELD

COST OF LIVING

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

Food and Clothing

The following are the retail prices of some of the principal articles of food as paid at Ottawa in June 1907; Bread of ordinary quality, 12 cents per 3-lb. loaf; flour, $3\frac{1}{2}$ cents per lb.; beef—sirloin, 18 cents per lb.; roast, 10-15 cents; boiling, 8 cents; veal, 8-15

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

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

Rents, Rates, Taxes, &c.

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

Rent is usually payable by the month, and tenancies run for a

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

Locomotion, Light, and Fuel

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

CAR ATTENDANTS

cheap in price. In most Canadian towns, electric cars (or trams) and telephones are everywhere in use. The former provide practically the only popular means of conveyance from point to point within urban and suburban areas, and usually there is a uniform charge of 5 cents for all distances with reductions for tickets supplied in quantities and for workmen travelling during specified hours, morning and evening. Telephones—a Canadian invention—are more largely used in domestic life than they are in Great Britain. The charge at Ottawa for telephones installed in private houses, is $25 per annum. The electric light is also practically universal, and at Ottawa the charge is 8 cents per 1000 watt hours less a cash

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

SHOOTING PARTY AT AGASSIZ

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

Wages

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

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

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

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

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

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

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

THE CARS AND SOME OF THE COMMISSIONERS

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

1. *Halifax, Nova Scotia*, 1906

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

2. *Ottawa, Ontario,* 1906

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

3. *Winnipeg, Manitoba,* 1905

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

4. *British Columbia,* 1906

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

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

MONTREAL MELON FIELD

COLONISATION

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

A Word of Warning

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

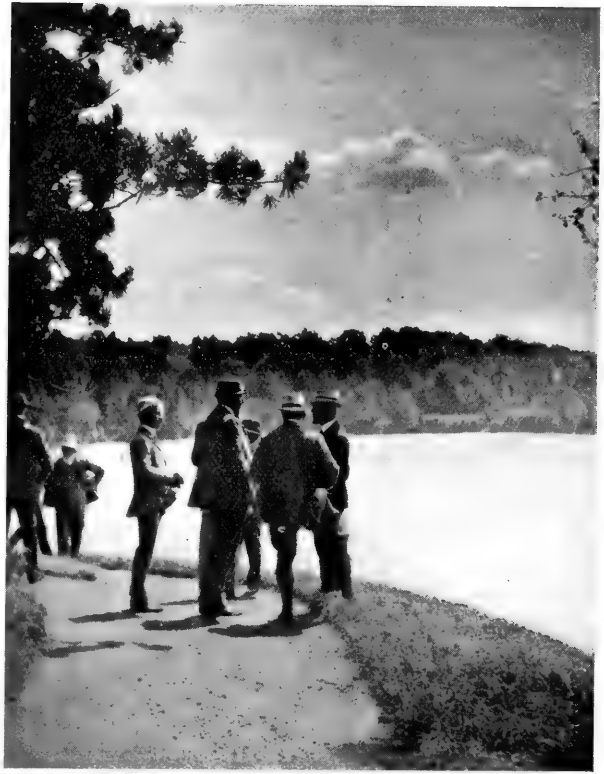
Farmers Wanted

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

The Eastern Provinces

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

INDIAN SCHOOL, BRANTFORD



ON THE BANKS OF LAKE BROME, QUEBEC

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

The Call of the West

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

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

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

C.P.R. HOTEL AT VICTORIA

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

Homestead

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

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

Purchase

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

A Scotch Colony

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

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

The Dairyman's and the Market Gardener's Chance

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

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

British Columbia

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

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

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

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

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

LOGAN BERRIES, BRITISH COLUMBIA

POSTSCRIPT

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

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