

DOMINION EXPERIMENTAL FARMS SYSTEM

by

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CHAPTER I

The idea, which Justus von Liebig^x expressed, that the prosperity of any nation depends much on the condition of its agriculture, has been well considered in Canada. The Canadian Government, more than most Governments, tried to foster the prosperity of its agricultural population. But the attempts were rather disorganized and not very efficient until the last two decades of the nineteenth century. From that time very much has been done and more has been attempted.

We must not wonder at the generosity of the Canadian Governments, both Federal and Provincial: Agriculture is the basic industry of Canada; Canadian Industry and Commerce are more or less dependent on Agriculture; Canada's cultivatable land is her most valuable asset and, though her other natural resources are immense, the prosperity of this country is largely due to the possibilities of its agriculture. Of the possible farm land of 385,000,000 acres only 40% is occupied at the present time.

The Dominion Experimental Farms System is one of the main instruments by which the Federal Government has been assisting the development and rationalization of Canadian Agriculture.

x Justus von Liebig German chemist and professor at Giessen from 1825 to 1850, and at Heidelberg from 1850.

From the very beginning the purpose of the Dominion Experimental Farms System was to find out, and advocate better methods of production on land and management of farms. They worked in close cooperation with purely educational establishments and did not give much attention to the problems of marketing.

The Ontario Agricultural College established in 1873 and located about one mile from the city of Guelph was the first institution in Canada which carried on agricultural education and experimental work. 24 acres of its farm of 550 acres was used for experimental work. In 1884 the College with its two years course did not accomplish much, but it was something to start with. In addition experimental work was carried on in Quebec on three private farms which were subsidized by the Provincial Government to the amount of \$2000.00 annually. These farms accomplished very little indeed. According to Mr. J. L. Inches, Secretary of Agriculture for New Brunswick in 1881 the Government imported cattle, sheep and swine and used 30 cattle, 40 sheep and 6 swine to form the nucleus of a stock farm. In several instances the Dominion Government issued regulations dealing with particular branches of agriculture as "Cattle Inspection", "Cattle Quarantine", "Exhibitions", and so on. All this shows that the Dominion and Provincial Governments already were trying to do for agriculture what they could. Although working

without any definite plan, they were beginning to realize the importance of these activities.

In 1884 the House of Commons appointed a Select Committee with Mr. Gigault as the chairman. The duty of the committee was to enquire into the best means of encouraging and developing the agricultural interests of Canada. The committee, logically enough, started its work by trying to establish the causes of the then prevailing agricultural depression. Only as their next step they undertook to decide what measures were advisable to adopt in order to foster the prosperity of agriculture in Canada. The committee found that the prevailing ignorance of good farming methods, leading to soil impoverishment and poor crop returns, was the principal cause of the agricultural depression and the resulting abandonment of lands. Consequently the committee recommended the establishment of experimental farms which would undertake the double duty of discovering improved methods of agriculture and of passing newly acquired knowledge to the farmers.

In order to get certain preliminary information, the Minister of Agriculture employed Professor William Saunders and instructed him to visit as many of the most important Agricultural Colleges and Experimental Stations in the United States and Canada as he might think desirable. The purpose of these travels was to find out the kind of

work that was carried on and the benefits of such work for practical agriculture. Professor William Saunders was also instructed to take note of the areas of land occupied by the existing experimental farms, the character of the soil, the capital cost and the expense of maintenance. Professor Saunders in compliance with the demand of the Minister of Agriculture visited many Agricultural Colleges and Agricultural Experimental Farms in the United States, enquired into the methods by which they were conducted and ascertained what benefits, direct or indirect, they were realizing. The scope of his investigation embraced horticulture, forestry, animal husbandry, dairying, and crop raising. He paid particular attention to the cost of maintenance and the capital investments necessary. He also gathered all the information he could from European Agricultural Institutions. Having summarized all this material he presented to the Minister of Agriculture the result of his work in the "Report on Agricultural Colleges and Experimental Farm Stations with suggestions relating to experimental agriculture in Canada".

By Professor William Saunders, F.R.S.C.

Printed by MacLean, Roger & Co., Ottawa, 1886.

"It has been shown that agricultural experimental stations have been of very great service in supplying much needed information, and stimulating progress in agriculture

wherever they have been established, and that these good results have been and are being brought about at comparatively small cost. In Canada agriculture may be said to lie at the foundation of the nation's prosperity, and involves interests of such magnitude and importance that any reasonable expenditure might well be incurred, provided the results were likely either to add directly to the profits of the tiller of the soil, by enabling him to increase the products of his land, or to save him from some of the losses incident to want of knowledge or experience. The consideration of so important a subject should be no longer delayed, but since any very large outlay at the commencement might be injudicious, it would perhaps be better to consider first the most pressing needs, and provide for them as soon as practicable, leaving the important subject of agricultural education in colleges for future consideration", wrote Professor Saunders in his Report. Accordingly, in order to meet the most pressing needs, he suggested:

I. The establishment of one central experimental station near Ottawa for the provinces of Ontario and Quebec, jointly, with not less than 400 acres of land.

II. The establishment of sub-stations :

(a). One for the provinces of Nova Scotia, New Brunswick and Prince Edward Island, jointly, with not less than 200 acres of land.

- (b). One for Manitoba with not less than 640 acres of land.
 - (c). One for the North-West Territories with not less than 640 acres of land.
 - (d). One for British Columbia with not less than 200 acres of land.
- III. The reservation at suitable points in the North-West Territories, from the available unoccupied Dominion lands, of blocks of one, two or more sections each, for future experimental work in tree planting.
- IV. The establishment of a Botanic Garden, near to the central station, where all the native trees, shrubs and flowers of the Dominion could be brought together as far as conditions of climate would permit, and new and useful species introduced and propagated.
- V. The establishment of a chemical station in connection with the central experimental farm in order to provide the means of testing the value of Canadian fertilizers.
- VI. The establishment of a general museum in connection with the central station, where examples of all varieties of produce raised from year to year should be kept for reference and comparison, as well as for

the instruction of visiting farmers. Specimens of injurious insects and their work, of injurious and beneficial birds and other subjects of interest should be represented here.

VII. The control of all this System should be in the hands of the director, whose residence should be at the central station.

The report was submitted to the Minister of Agriculture on the 20th of February, 1886, and in the same year the Minister introduced into Parliament "An Act respecting Experimental Farm Stations". This Act, which was founded upon the recommendations of Professor Saunders, passed without opposition. It provided for the establishment of an experimental farm for the Provinces of Ontario and Quebec jointly, one for the Provinces of Nova Scotia, New Brunswick and Prince Edward Island jointly, one for the Province of Manitoba, one for the North-West Territories and one for the Province of British Columbia. The Experimental Farm of the Provinces of Ontario and Quebec was indicated as a Central Farm of which the director had the power of control over the whole system. The Act made provision for the reservation of several sections of land in the North-Western Territories, in Manitoba and British Columbia for the experimental work of tree planting and timber growing.

Paragraph IV of the Act respecting Experimental Farm Stations stated: " The Governor in Council may for the purpose of establishing such farm stations, acquire by purchase an extent of land, not exceeding five hundred acres, in the vicinity of the seat of Government, for the central farm stations, and an extent of land, not exceeding three hundred acres, in either of the Provinces of Nova Scotia, New Brunswick or Prince Edward Island, and a like extent of land in the Province of British Columbia, for the farm stations secondly and fifthly mentioned in the next preceding section; and the Governor in Council may, for the like purpose, set apart in Manitoba and in the North-West Territories of Canada such tracts of unoccupied available public lands, which are the property of Canada, as are necessary for the farm stations, thirdly and fourthly mentioned in the next preceding section; but the tract of public land so set apart shall not, in each case, exceed one section; The Governor in Council may also set apart in the Province of Manitoba and in that portion of the Province of British Columbia known as the Railway Belt, in each a tract or tracts of land not exceeding ten sections, and in each of the four provisional districts of the North-West Territories defined by order of the Governor in Council, and known as Assiniboia, Alberta, Saskatchewan and Athabasca, a tract or tracts not exceeding ten sections for the purpose of tree planting and timber growing"

Paragraph V of the Act dealt with the Management of Farm Stations: "The said farm stations shall be under the control and direction of the Minister, subject to such regulations as are, from time to time, made by the Governor in Council, and the Governor in Council may appoint a director and such officers and employees as are necessary for each farm station".

Paragraph VI stated that all expenses incurred in the process of organizing and maintaining the experimental farms and tree-growing tracts were to be paid out of the money provided for that purpose by Parliament.

Paragraph VII set forth the work that was to be undertaken at the stations by their officers. The duties of the officers were formulated as follows:

- (a) To conduct researches and verify experiments designed to test the relative value, for all purposes, of different breeds of stock, and their adaptability to the varying climatic or other conditions which prevail in the central Provinces and in the North-West Territories,
- (b) To examine into the economic questions involved in the production of butter and cheese.
- (c) To test the merits, hardiness and adaptability of of new or untried varieties of wheat or other cereals,

and of field crops, grasses and forage plants, fruits, vegetables, plants and trees, and to disseminate among persons engaged in farming, gardening or fruit growing under such conditions as are prescribed by the Minister, samples of the surplus of such products as are considered to be specially worthy of introduction.

- (d) To analyze fertilizers, whether natural or artificial, and conduct experiments with such fertilizers, in order to test their comparative value as applied to crops of different kinds.
- (e) To examine into the composition and digestibility of foods for domestic animals.
- (f) To conduct experiments in the planting of trees for timber and for shelter.
- (g) To examine into the diseases to which cultivated plants and trees are subject, and also into the ravages of destructive insects, and ascertain and test the most useful preventatives and remedies to be used in each case.
- (h) To investigate the diseases to which domestic animals are subject.
- (i) To ascertain the vitality and purity of agricultural

seeds.

- (j) To conduct any other experiments and researches bearing upon the agricultural industry of Canada which are approved by the Minister.

Paragraph VIII dealt with the necessity of periodical reports by the officers in charge of the farms. Such reports were to be prepared at least once in every three months and sent to the Minister for publication.

Paragraph X provided for annual detailed reports of the work accomplished at the farms. Such reports were to be delivered to the Houses of Parliament within the first twenty-one days of each session.

In this way ended the work started by the Select Committee; the recommendations were the logical issue of the Committee's opinion that the cause of the agricultural depression was the prevailing ignorance of good farming methods. "The Act respecting Experimental Farm Stations" was designed to help Canadian Agriculture by providing the means of finding out, and advocating better methods of crop and livestock production and of farm management. Marketing was intentionally or unintentionally ignored, though Section (j) of Paragraph VII provided for the possibility of enlargement of the activities in practically every direction. As we shall see later the experimental farms continued to limit themselves to the work of getting

a more and better product for a unit of production be it land, labour, or capital and refused to enter into the business side of the problem. Very likely this policy contributed to the success of the organization as it made possible better specialization. With the passing of the Act the time of groping in the dark passed and the organized systematic work of experimenting, propagating new varieties, and improving the methods of rational farming began.

CHAPTER II

In selecting the sites for the experimental farms very much attention was paid to the variations in climate in different parts of Canada. The sites were selected in such a way as to render the most efficient help to the farmers in the most thickly settled districts and to cover the most varied conditions which influence agriculture in Canada.

The land for the Central Experimental Farm was selected near Ottawa not far from the Parliament Buildings. It contained many kinds of soil, a condition necessary for the experimental work that was to be carried on. The site provided varied topography as well, and contributed to the possibility of making experiments under different conditions. Professor Saunders recommended providing for the central station which should serve as an experimental station for the Provinces of Ontario and Quebec jointly, not less than 400 acres of land. "The Act respecting the Experimental Farm Stations" confirmed this recommendation, and 465 acres were secured accordingly. As the possession of the land took place late in Autumn not much could be accomplished before the next Spring. The work done mostly consisted of clearing the land from loose stones and of rearrangement of fences. Only about 20 acres of land were ploughed.

In the winter months the clearing of land was continued with the result that about 60 acres were freed from undergrowth. At the same time a large supply of stable manure was obtained, an office and store room were built and a glass structure for the purpose of testing the vitality and germinating power of seeds was erected. In this way the farm was prepared for the spring work, not on a large scale as yet but with a sufficient amount of land for the first share of grain, grass seed, trees and vines. In 1928 about 358 acres were added so that now the farm comprises 825 acres.

The Central Experimental Farm is the headquarters of the System and therefore the preliminary work of research and experiments originates there. The more complex problems of research and laboratory investigations are conducted and performed there. The work that has been begun is extended in its more practical aspects to the branch stations. Different stations have different problems to solve. All the work and experiments performed on all the stations are coordinated at the central farm which summarizes the information, interprets it and passes it over to the farming public.

Branch stations receive certain directions to perform certain phases of work which originated on the central farm. They have to comply with the suggestions given to them by the officers of the central farm, as these officers have the responsibility of having various experiments coordinated and complimentary to one another. But, besides

these experiments, advised from the central farm, each branch station carries on its own independent work; tries to solve its own problems, peculiar to its own district. Certain problems arise and can be solved only by experimenting under the specific conditions of each locality. Such experiments are conducted by the branch stations independently from the central farm in Ottawa.

EXPERIMENTAL FARM, INDIAN HEAD, SASKATCHEWAN.

The Experimental Farm for the North-West Territories was purchased from the Bell Farming Company in 1887 at Indian Head, Saskatchewan. It consisted of 680 acres lying directly east of the town of Indian Head, which is about 45 miles east of Regina. At the time of the purchase, this was all bare prairie land with very fertile soil, which could produce excellent crops of grain. The strong winds created the specific problem of sheltering the growing crop. At the time of the establishment of the farm, the prairies round about Indian Head were unsettled. Not much was expected of agriculture in that region beyond the possibility of growing the best grades of wheat. The farm was purchased in 1887 and the experimental work was started in 1888. In 1928 640 acres were added, so that now the farm comprises 1320 acres.

EXPERIMENTAL FARM, BRANDON, MANITOBA.

The Experimental Farm for Manitoba was established in 1888, about $2\frac{1}{2}$ miles from Brandon, Manitoba. It comprises 652 acres, of which only about 350 acres are available for cultivation. The remaining 302 acres consist of woods, ponds, a small lake and a rough steep portion forming the bank of the Assiniboia Valley. The soil is mostly heavy and rich, though there are about 50 arable acres of very light soil which is frequently blown. The topography is uneven and varied. It provides two typical soils of Manitoba : valley land being typical of the soil of the eastern part of the province, and light sandy loam of the higher level being typical of the Western part of the province. The sloping sides of the valley are suitable for experiments in fruit and tree growing, or for a permanent pasture.

EXPERIMENTAL FARM, NAPPAN, NOVA SCOTIA

The Experimental Farm for the Maritime Provinces was established in 1888 at Nappan, in the County of Cumberland, Nova Scotia, about 8 miles from the border of New Brunswick. It is situated one half mile from the Railway Station and 5 miles from the town of Amherst. The farm consisted of 300 acres, 45 acres being dyke land and marsh land, formed by the overflow of the tides from the Bay of Fundy. This soil yields heavy crops of hay, especially

when dyked. The upland consists of a great variety of soils; chiefly it is clay loam, with some parts gravelly. In 1919 the 165 acres adjoining the south farm was purchased. The newly acquired land was mostly marsh-land. After the establishment of the stations at Charlottetown, Prince Edward Island, Kentville, Nova Scotia, and Fredericton, New Brunswick, the Experimental Farm for the Maritime Provinces at Nappan has been called the Experimental Farm for Nova Scotia. The farm is mostly suited for livestock breeding.

EXPERIMENTAL FARM, AGASSIZ, BRITISH COLUMBIA.

The Experimental Farm for British Columbia was established in 1889 at Agassiz, 70 miles east of Vancouver and about two miles from the Fraser River. It consists of 1400 acres, of which only about 300 acres of bottom land are arable. The remainder is the slope of the mountain which is covered by timber. The Agassiz farm was mostly an orchard and forestry farm, though work along all the main lines of agriculture was carried on. After 1911 the dairy farming branch of the experimental farm was stressed more than other branches. This was due to the fact that with the development of agriculture in other parts of the province, it became evident that Agassiz was not representing the district of British Columbia which was best suited for fruit growing.

EXPERIMENTAL STATION, LETHBRIDGE, ALBERTA.

The Experimental Station for Southern Alberta is situated one mile east of Lethbridge. Its 400 acres were presented to the Dominion Government in 1906 by the Alberta Railway and Irrigation Company. The Lethbridge Experimental Farm started its experimental work in 1908. The soil is sandy clay loam typical for Southern Alberta and uniform all over the 400 acres. About 200 acres are irrigated and serve for experimenting and studying the problems of irrigation farming, which is practiced in one part of Southern Alberta; remaining 200 acres are not irrigated and they are used for studying the problems of dry farming, which is typical for another part of Southern Alberta. These two types have distinctly different problems to solve and this necessitates having two separate reports on Field Husbandry from the same farm. In 1928 100 acres of land were added. Now the farm has 500 acres.

EXPERIMENTAL STATION, LACOMBE, ALBERTA.

The Experimental Station for Central Alberta is situated at Lacombe, about 115 miles north of Calgary. It was established in 1907, and the place was chosen as the one which well represents the district. The farm has 490 acres of loam varying in quality. Central Alberta is the district of livestock farming and mixed farming. This is

a rather elevated plato with plenty of sunshine and much less wind than prevails in other parts of the prairies. These factors make the Lacombe Station very interesting. They provide the possibility of having different types of experiments which aim to investigate problems of highly intensive farming. A certain part of the farm was under cultivation previous to its acquisition by the Dominion Government, and it was found that the soil had been greatly exhausted.

EXPERIMENTAL STATION, ROSTHERN, SASKATCHEWAN.

The Experimental Station for Central Saskatchewan was started in 1908, when 160 acres of land near the town of Rosthern were purchased. In 1913 more land was bought, so that now the farm has 649 acres of a uniform black loam, slightly sandy and elevated. The uniformity of the soil and of the topography provides the possibility of carrying the uniform variety tests, the object being to establish the comparative advantage of one variety of crop over another. The land bought for the experimental station was previously cultivated for ten years without any rotation of crops. As the result of such exploitation of the soil, the problems of fighting the weeds, preventing blowing and generally bringing the farm back to the condition of fertility presented itself in the very beginning. The problem of soil drifting was the most important. The elevated

position of the farm having somewhat sandy soil, together with its being grain cropped for many years in succession, made such drifting a problem of expediency.

EXPERIMENTAL SUB-STATION, FORT VERMILION, ALBERTA.

In 1908 five acres of land were rented from Mr. Robert Jones, a farmer of a district of Fort Vermilion, Alberta, which is on the Peace River, 350 miles north of Edmonton. This remote district, though extremely interesting, did not warrant the establishment of a regular experimental station. Mr. Robert Jones undertook to conduct the experimental work on his own land for a certain remuneration. The number of acres rented increased with time, and the experiments were carried on not only with the grain crop, as in the beginning, but with vegetables, small fruit, and tree-fruit as well. The chief purpose of this experimental sub-station was to discover the varieties of vegetables, fruits, and trees best suited to resist frost killing, and to test the early maturing varieties of cereals. Also grasses and forage crops were tested.

EXPERIMENTAL STATION, CHARLOTTETOWN, PRINCE EDWARD ISLAND.

The Experimental Station for Prince Edward Island was established in 1909 near Charlottetown having an original area of 29 acres of a sandy loam of different qual-

ities. Now the farm comprises 170 acres, because from time to time more land was added through lease or purchase. In spite of the fact that the topography is sloping and that the slope is rather a steep one, especially on the west, the farm had to be drained in most of its parts. The subsoil is exceptionally impervious to water. The land areas of the farm have many different types of soil including sand, clay and even peat. The farm undertakes the experiments and the research work covering practically all the problems of the agriculture of Prince Edward Island. These include field husbandry, horticulture, livestock breeding, forage crops, poultry etc.

EXPERIMENTAL STATION, HARROW, ONTARIO.

The Experimental Station for Southern Ontario was established in 1909 about a mile from Harrow. Until April 1923 this farm had only 50 acres of leased land but at this date the Federal Department of Agriculture purchased those fifty acres and the adjoining 150 acres. Now the Harrow Experimental Station comprises about 200 acres of various kinds of soil. This allows the experimentation in growing all kinds of garden and field crops cultivated in Southern Ontario. The land is level and stony in some places. Until 1923, experiments at the Harrow Station were practically limited to tobacco growing and the problems which it involved. It was even called at that time the Harrow Tobacco

Station. Now, though remaining chiefly a tobacco experimental station, the Harrow Farm experiments in horticulture, field husbandry, and forage crops. Much attention is paid to the experiments with corn and soy beans.

EXPERIMENTAL STATION, STE. ANNE DE LA POCATIERE,
QUEBEC.

The Experimental Station for Eastern Quebec was established in 1910 at Ste. Anne de la Pocatiere, Karamouska County. Originally about 106 acres of land were bought but later 145 acres were added. These 251 acres can be divided into two parts: the lower level part with a heavy clay soil, and the upper uneven part with a poor, gravelly soil. Much attention is given to livestock raising, especially to sheep breeding, as a very large area of the province of Quebec is rough land suitable for pasture only. The farm undertakes much interesting work in field husbandry, horticulture, forage crops, poultry and bee culture. In certain districts Quebec seems to be able to produce an exceptionally good quality of flax. The experimental farm did not overlook this possibility and accordingly it carries on the experiments with the flax production.

EXPERIMENTAL STATION, SCOTT, SASKATCHEWAN.

The Experimental Station for North Western Saskatchewan was established at Scott, in 1910, 100 miles from

Saskatoon, It has about 520 acres of bare prairie land of which 120 acres are not suitable for cultivation, but which can be used for pasture. The farm has a uniform chocolate clay loam which is typical of the district. As the rainfall is rather too light, the chief problem of the station is the experiments with the methods of dry farming in the Northern part of the agricultural district. This problem is not an easy one, as crops and methods of cultivation must be adapted to a dry climate having cold dawns and^a short period of possible vegetation. The district is best adapted for grain growing, but the possibility of livestock raising is not overlooked. The experimental station carries on experiments with forage crops, animal husbandry, horticulture to a certain extent, but pays most attention to field husbandry.

EXPERIMENTAL STATION, INVERMERE, BRITISH COLUMBIA.

The Invermere Experimental Station was established in 1910 in the centre of the Columbia Kootenay Valley near Windermere Lake, British Columbia. It is located on the first bench adjacent to the bottom land of the Columbia River Valley. At the beginning only 70 acres of light soil were acquired, but in 1923, 240 acres were added. Those 240 acres are situated some distance nearer to Windermere. The station was primarily started to carry on the experiments with tree growing and fruit growing but, there was enough evidence since that time to show that the district

was not well suited for fruit growing. Work in forage crop culture, irrigation experiments, livestock raising, field husbandry, poultry and bee culture is carried on nowadays. Till 1928 the two parts of this experimental station had 370 acres. In 1928 more land was added so that now the farm comprises 475 acres. The original area nearer Invermere is practically abandoned as it does not allow the expansion of the work: the water supply is limited and the area too small.

EXPERIMENTAL STATION, CAP ROUGE, QUEBEC.

The Experimental Station for Central Quebec was established in Cap Rouge Village, about 9 miles from Quebec City, in the very beginning of 1911. It consists of 346 acres of gently sloping and even land. Near the Southern boundary, the slope becomes more marked. The soil typical for the province cannot be called fertile. It varies very much and thus the scope of the possible experiments is very large. Much of the land is drained, but a great deal still needs to be drained. The experiments are carried on with field husbandry, foragecrops, cereals, animal husbandry, poultry and horticulture. Under the management of the Cap Rouge superintendent is the Horse Breeding Station of St. Joachim, 25 miles east of the city of Quebec.

EXPERIMENTAL STATION, KENTVILLE, NOVA SCOTIA.

The Experimental Station for the Annapolis and

Cornwallis Valley was established at Kentville, Kings County, Nova Scotia. Its original 25 acres were bought by the Provincial Department of Agriculture in 1910, and were taken over by the Dominion Department of Agriculture in 1911. The land was almost entirely under growth, and the first thing to be done was the clearing of the land. Only in 1912 was the actual work begun, when 12 acres of orchard were planted. Since 1910 much land was added, being acquired from different owners and in different acreages. At the present time the farm consists of 453 acres of which only 100 acres were cleared at the time of the purchase. Most of the clearing was done after the purchase. The topography of the land is uneven, A ravine occupies about 100 acres of unarable wood land. The soil is mostly sandy loam together with varying subsoils. This necessitates the drainage of some parts of the farm. Kings County is mostly a fruit growing district and naturally the experimental station was chiefly concerned with orchards. The information obtained, helps the fruit growers very much indeed. Horticulture, animal husbandry, poultry, forage crops and bee culture experiments are carried on at the Kentville Experimental Station.

EXPERIMENTAL STATION, SIDNEY, BRITISH COLUMBIA.

The Experimental Station for Vancouver and the adjacent islands was established in 1912 near Sidney, in the North Saanich district, about 15 miles from the city

of Victoria. The 130 acres of land bought were covered with brush or timber. Now all the land is cleared except the Park area, and much of it is tile drained. The task of clearing the land, and leveling it after the huge stumps and stones had been removed, required several years of hard work. The problem of clearing land and draining it is an important one for the islands, as most farms there have to pass this stage of development. The soils on the experimental station are typical for the district, that is to say, they vary greatly in quality, and are interdispersed. Such an arrangement of the soils is a problem by itself and it confronts the entire district which the station represents. Much of the land of the station is tile drained. Most attention is given to horticulture, poultry and bee culture, though almost all other branches of farming are more or less represented. The general tendency is to experiment and develop the ways of the most intensive small scale farming.

EXPERIMENTAL STATION, FARNHAM, QUEBEC.

The Experimental Station at Farnham, Quebec, was established in 1912 in the Jamaska Valley. This is largely a tobacco station which undertakes numerous experiments with many different varieties of tobacco. The farm has an area of 95 acres, part of which is occupied by a ravine with small stream of water. A dam with a gate has been built for regulating the discharge of the water. This provides for the

irrigation of the land above the dam. In some places the surface drainage work has been done as well.

EXPERIMENTAL STATION, FREDERICTON, NEW BRUNSWICK.

The Experimental Station for New Brunswick was established toward the end of 1912 in the city of Fredericton. 525 acres of land were partly cleared and the clearing has been going on since that time. The soil is mostly a clay loam with clay subsoil, though in some places it is sandy. The station undertakes experiments in practically all branches of agriculture, though animal and field husbandry are most prominent. Horticulture, poultry, forage crops, bee culture, cereals -- all are well represented. In 1923 at this experimental station the Provincial Department of Agriculture built a school of agriculture.

EXPERIMENTAL STATION, LENNOXVILLE, QUEBEC.

The Experimental Station for the Eastern Townships and Southern Quebec was established in April, 1914. It is situated one hundred miles east of Montreal at Lennoxville. Its original acreage was 440 acres, but 160 acres were added in 1920. Now all the area comprises 600 acres, more than one third of which is drained and one third is under permanent pasture and wood. There are two distinctly different types of soil. Near the river the soil is a heavy

loam with clay subsoil, further away from the river the land is more elevated, there a sand or gravel subsoil lies beneath a light loam. On this farm careful attention is given to the increase of soil fertility. To procure an adequate quantity of manure and to be able to utilise leguminous crops to the best advantage, a large amount of livestock is kept. Much of the stock is purchased in the fall and sold in the spring. This farm carries on experiments dealing with livestock feeding, dairying, horticulture, poultry, bee culture, forage crops and field husbandry. Flax and hemp are given considerable attention.

EXPERIMENTAL STATION, SUMMERLAND, BRITISH COLUMBIA.

The Summerland Experimental Station for Okanagan Valley and the dry belt of British Columbia was established in 1914, six miles north of Penticton. The station has 545 acres of a typical Okanagan Valley soil. This means that the soil varies greatly both in quality and kind. About one half of the land is under irrigation, and the remainder is a poor pasture. The cultivated part of the farm presents a number of benches situated on the south eastern slope. The benches are unequal in size, and, of course, of different levels. All this is typical for the district, and provides for extensive study of the problems of irrigation under different conditions, and with different

soils. For irrigation purposes the water must be pumped and lifted to an appreciable height, amounting to 400 feet in some places. Several pumps are used, and, moreover, the water is supplied by the Municipality of Summerland. Horticulture is emphasised -- particularly tree-fruit growing. Field husbandry, forage crops, the growing of hemp for seed, poultry and animal husbandry have their proportioned places in this station.

EXPERIMENTAL STATION, MORDEN, MANITOBA.

The Experimental Station for Southern Manitoba was established in 1914 at Morden. This place is the centre of the apple growing district of Manitoba. In 1914 302 acres were bought from a private owner, who with his predecessors worked the farm for two generations. Consequently the land was full of weeds, and caused much trouble before it was finally cleaned up. The soil is typical for the district, being mostly a sandy loam with a clay subsoil. The Morden Station concentrates on growing fruit trees. More than one third of the acreage is used for this purpose. Field husbandry, animal husbandry, forage crops, poultry, bee-keeping, tobacco and grain seed production are the activities in which the station engages. However the whole question of horticulture as applied to prairie conditions is given the most careful study.

EXPERIMENTAL STATION, KAPUSKASING, ONTARIO.

The Experimental Station for Northern Ontario was established at the close of 1914 near the town of Kapuskasing, Ontario, in the District of Cochrane. The farm is located as far north as any farm of the district and, moreover, it is 720 feet above sea level. This is a farm experimenting in the possibilities of agriculture being carried on further north than it is customary. It is the Northern Outpost of Eastern Canada. The farm has 1270 acres of a rich, heavy clay soil, rather uniform, though here and there sandy loam appears. When first acquired the land was under timber, and the interned aliens were used for clearing it. Actually the farm was used as a prison camp for interned aliens, the first of whom arrived there in December, 1914. The prisoners cleared only about 300 acres; about 200 acres have since been cleared; 300 acres were timbered and burned over. Altogether there are about 520 acres of arable land; 300 acres of roughly cleared land, which was seeded with clover and timothy and served as a pasture, and 450 acres of uncleared land. Most of the experimental work has to do with forage crops. The district is best suited for livestock raising and the climate is favourable for forage crops. The experiments in field husbandry, animal husbandry, horticulture, poultry and bee culture are engaged

in by the management of the Kapuskasing Experimental Station.

EXPERIMENTAL SUB-STATION, BEAVERLODGE, ALBERTA.

In 1914 Mr. W. D. Albright volunteered to undertake without compensation some experimental work. His farm at Beaverlodge is about 25 miles east of the British Columbia Boundary. Mr. Albright's farm is 2500 feet above sea level and the climate is rather dry and cold. The peculiarity of the situation prompted the Dominion Experimental Farms System to accept the proposition. The experimental work started in 1914. In time the scope of the work enlarged until Mr. Albright was giving full time service. Particular notice was given to the problems of forage crops; field husbandry is next in importance. This is followed by small fruit farming, animal husbandry and bee culture.

EXPERIMENTAL STATION, LA FERME, QUEBEC.

The Experimental Station for Northern Quebec was established in 1916, one mile from La Ferme. It consists of 2200 acres of level land, half of which is of very little value, as it is too stony and covered with ponds. The remaining half was under forest of which only about 250 acres are cleared. Originally the station used the labour of the prisoners of war, but the progress of their work was slow. The soil of the station is a clay of different qualities --

heavy clay predominating. This type of soil is typical for Northern Quebec and allows the undertaking of the most needed experiments. Much of the land has surface drainage; only about 50 acres being underdrained. Mixed farming prevails in Northern Quebec. Therefore it is natural that the experimental station for Northern Quebec should concentrate on the work of improving the methods of mixed farming. Various rotations are tested. Different ways of preserving or increasing the soil fertility are compared. Forage crops, animal husbandry, horticulture and poultry are dealt with and experiments with the different systems of drainage are extensively carried on.

EXPERIMENTAL STATION, SWIFT CURRENT, SASKATCHEWAN.

The Experimental Station for South Western Saskatchewan at Swift Current was established in 1920. The work began, however in 1922. This station had 640 acres of typical prairie land. Such land is easily broken and is used mostly for growing grain crops. The farm undertakes experiments in horticulture, poultry, animal husbandry, forage crops and field husbandry. Of these items field husbandry is the most developed as at the present time the improvement in the methods of the cultivation of lands and of the crop rotations is most needed by the nearby farmers. This station was the first to experiment with the combine. In 1928 160 acres were secured so that now the farm com-

prises 800 acres.

EXPERIMENTAL FOX RANCH, SUMMERSIDE,

PRINCE EDWARD ISLAND.

The Experimental Fox Ranch at Summerside, Prince Edward Island was established in 1925 in compliance with the petition of the Canadian Silver Fox Breeders' Association. They generously contributed in land, animals and equipment of the ranch. In December 1925 the ranch was ready to accept the animals as its buildings and laboratories were completed by this time. The ranch has about five acres of land which is sufficient for carrying on the numerous experiments undertaken on the ranch and also in its laboratories. Previous to the setting up of the Summerside Ranch, the experimental work connected with the raising of silver foxes had been done at the Experimental Fox Ranch at Mountain Road, Hull. The last ranch was closed when the location proved to be unsuitable.

EXPERIMENTAL STATION, L'ASSOMPTION, QUEBEC.

The Experimental Station at L'Assomption was established in April, 1928. The farm of the station has an area of 150 acres, all of which at the time of the purchase were in a very poor state. The work of the past two years has been, for the mostpart, that of improvement. Some of the area was tile drained. This farm is a tobacco and dairy station, and in 1929, 312 plots for experimental

work on tobacco were started.

The five original farms established around 1886 are known as "Experimental Farms"; those added subsequently are known as "Experimental Stations". No other distinction is expressed by the title.

E.S. ARCHIBALD, B.A., B.S.A., LL.D., DIRECTOR.

Central Experimental Farm, Ottawa, Ontario.,

Superintendent, D. D. Gray.

Experimental Station, Charlottetown, Prince Edward

Island, Superintendent, J. A. Clark.

Experimental Fox Ranch, Summerisde, Prince Edward

Island, Superintendent, G. E. Smith.

Experimental Station, Kentville, Nova Scotia,

Superintendent, W. S. Blair.

Experimental Farm, Nappan, Nova Scotia,

Superintendent, W. W. Baird.

Experimental Station, Fredericton, New Brunswick,

Superintendent, C. F. Bailey.

Experimental Station, Ste. Anne de la Pocatiere,

Quebec, Superintendent, J. A. Ste. Marie.

Experimental Station, Cap Rouge, Quebec,

Superintendent, G. Langelier.

Experimental Station, Lennoxville, Quebec,

Superintendent, J. A. McClary.

Experimental Station, Farnham, Quebec,

Superintendent, R. Bordelean.

Experimental Station, L'Assomption, Quebec,

Superintendent, J. E. Montreuil.

Experimental Station, La Ferme, Quebec,

Superintendent, P. Fortier.

Experimental Station, Kapuskasing, Ontario,

Superintendent, S. Ballantyne.

Experimental Station, Harrow, Ontario,

Superintendent, H. F. Murwin.

Experimental Station, Morden, Manitoba,

Superintendent, W. R. Leslie.

Experimental Farm, Brandon, Manitoba,

Superintendent, M. J. Tinline.

Experimental Farm, Indian Head, Saskatchewan,

Superintendent, W. H. Gibson.

Experimental Station, Rosthern, Saskatchewan,

Superintendent, W. A. Munro.

Experimental Station, Scott, Saskatchewan,

Superintendent, G. D. Matthews.

Experimental Station, Swift Current, Saskatchewan,

Superintendent, J. G. Taggart.

Experimental Station, Lethbridge, Alberta,

Superintendent, W. H. Fairfield.

Experimental Station, Lacombe, Alberta,

Superintendent, F. H. Reed.

Experimental Sub-Station, Fort Vermilion, Alberta,

Superintendent, R. Jones.

Experimental Sub-Station, Beaverlodge, Alberta,

Superintendent, W. D. Albright.

Experimental Station, Summerland, British Columbia,

Superintendent, W. T. Hunter.

Experimental Station, Invermere, British Columbia,

Superintendent, R. G. Newton.

Experimental Farm, Agassiz, British Columbia,

Superintendent, W. H. Hicks,

Experimental Station, Sidney, British Columbia,

Superintendent, E. M. Straight.

CHAPTER III

We have enumerated all the existing station and sub-stations of the Dominion Experimental Farms System. Their number increased rapidly before 1915 as new districts were being developed and new sections were being settled. Only four more stations, one of which is a Fox Ranch, have been established since then. This slackening of the pace does not imply that the Dominion Government had lost its interest for the undertaking. It remained willing to provide more financial support if such was urgently needed. The number of experimental stations no longer increases rapidly because almost all the different agricultural districts of Canada are provided. We must remember that the Dominion Experimental Farm System has "competitors" in the Provincial Experimental Farms and Agricultural Colleges. The Manitoba Agricultural College, for example, carries on very important and successful work, experimenting under conditions peculiar to the Red River Valley. All "competitors" are working in close co-operation, of course, and this mutual help is very beneficial. A number of short-lived sub-stations have been omitted from this thesis. For example Kamloops, British Columbia, a sub-station which was discontinued because its work became redundant, and the Fox Ranch at Mountain Road, Hull, which had been badly placed and was therefore closed.

There are, of course, a few districts with their own peculiarities of climatic and soil conditions which have no experimental stations near them, but they are not settled thickly enough to justify the immediate expenditure. We must not forget that at the present time the Dominion Experimental Farms System has in different districts 199 Illustration Stations carried on by private farmers, who do the illustration work as advised by the specialists from the actual experimental station. Though this division was established to illustrate methods which had been determined on the experimental stations, the varied conditions of the actual applications often gave rise to new problems and necessitated modifications in the methods. Such problems were looked into by an expert from the experimental station. At the present time alterations to and experiments of the Dominion Experimental Farms System consists largely in increasing the scope of work done by the existing farms, in increasing their tilled acreage, and in adjusting their work more accurately to the peculiar needs and conditions of the locality served. In 1928 the acreage of the Central Experimental Station in Ottawa was increased from 468 to 825.5 acres; that of the Experimental Station at Indian Head, Saskatchewan from 680 to 1320 acres; that of the Experimental Station at Swift Current, Saskatchewan from 640 to 800 acres and that of Lethbridge, Alberta, from 400 to 500 acres.

At the same time the number of illustration stations increases very rapidly; in 1928 35 more illustrations stations were established.

The chronological order of the establishment of the existing experimental stations was shown above. Let us see now how the stations cover the territory of Canada.

British Columbia has the following stations:

For the Okanagan Valley and the dry belt of British Columbia we have Summerland Station and for the South Western corner of British Columbia we have Agassiz Experimental Station. For the Upper Columbia Valley we have the Invermere Experimental Station and for Vancouver Island we have Sidney Experimental Station, Vancouver Island. There are also 16 illustration stations in British Columbia and their number is increasing.

Alberta is served by the following stations:

Lethbridge for the Southern Section and Lacombe for the Central; and by two sub-stations, one at Beaverlodge for the Rockies and one at Fort Vermilion. There are also 19 illustration stations.

Saskatchewan has four experimental stations:

One for South Western Saskatchewan at Swift Current, one for North Western Saskatchewan at Scott, one for Central Saskatchewan at Rosthern and one for South Eastern Saskatchewan at Indian Head. Moreover there are 27 illustration stations and their number is steadily increasing.

Manitoba has two experimental stations, one at Brandon and one at Morden and 13 illustration stations. As was mentioned before, the Manitoba Agricultural College shares in the work undertaken by the Dominion Experimental Farms System, by covering the area of the Red River Valley.

Ontario is served by three experimental stations, one in Northern Ontario at Kapuskasing, one in South Western Ontario at Harrow and one at Ottawa which performs the duty of the Central Experimental Farm. In Ontario there are 15 illustration stations.

Quebec has six experimental stations, one for Northern Quebec at La Ferme, one for Central Quebec at Cap Rouge and one for Eastern Quebec at Ste. Anne de la Pocatiere. One for the Eastern Townships at Lennoxville, one tobacco station at Farnham and one at L'Assomption, P.Q., Quebec. There are 63 illustration stations.

New Brunswick has one Dominion Experimental Station at Fredericton, with 18 illustration stations.

Nova Scotia has two experimental stations, one at Nappan and one at Kentville Annapolis and Cornwallis Valley, with 16 illustration stations.

Prince Edward Island has a Dominion Experimental Station at Charlottetown and one Fox Ranch at Summerside. It has 12 illustration stations.

Altogether in Canada we have at the present time 21 Dominion Experimental Stations, 5 Experimental Farms, 2 Experimental Sub-Stations and 199 Illustration Stations.

CHAPTER IV

The administrative structure of the Dominion Experimental Farms System is comprehensive enough and elastic enough to make possible the effective use of the employees knowledge and effort without burdening them with unduly heavy responsibility.

The Central Farm at Ottawa is the headquarters of the System. Its Director is the guiding spirit of the whole, having control over the work carried on in all the experimental stations, including that done at the central farm. He directs all the experiments and determines the policy that must be pursued throughout the system. He is the Director over the Superintendents of all the experimental stations and sub-stations of the Dominion Experimental Farms System. This post demands an individual with exceptional managerial ability and extraordinary capacity to grasp the problems of agriculture on the Dominion scale. Canada has been extremely lucky to obtain the services of such persons from the very start.

Different kinds of work are carried on throughout the Dominion Experimental Farms System. Each line has its particular technical superintendent, who controls and directs all the experiments associated with that particular line of work. These chief technical officers have their headquarters at the Central Experimental Farm at Ottawa

where they have a double duty. They are in charge of a particular line of work throughout the entire system and in addition superintend any experiments in that line being performed at the central farm.

The research and experimental work carried on on the Dominion Experimental Stations falls into fourteen divisions. Each of these divisions has its own superintendent who lives in Ottawa and performs his double duties as above explained. Each superintendent is directly responsible to the Director for the efficiency of the work of his particular division. The divisional superintendents have their own staffs of assistants, clerks and workmen as required. Until 1910 the divisional superintendents had under their authority and direction special lines of work on the central farm only. The Director, himself, until 1910 had supervised and directed all the work on the branch stations.

The fourteen divisions existing at the present time are as follows:

1. Extension and Publicity
2. Illustration Stations.
3. Field Husbandry
4. Animal Husbandry
5. Horticulture
6. Botany
7. Cereals
8. Chemistry

9. Forage Plants
10. Tobacco
11. Fibre
12. Poultry
13. Bees
14. Bacteriology

The Director and the Divisional Superintendents from time to time, visit the Branch Stations in order to be able to see personally the progress and the degree of success of the work carried on according to their respective suggestions.

Each Experimental Station of the system, including the Central Farm in Ottawa, is in charge of a superintendent, whose duties are to direct the staff, to supervise the care of the livestock and to ensure the efficient use of the resources of his farm. He must also supervise the accounting and see that his farm accomplishes the tasks it is given to do. The Branch Experimental Farms do not carry on only the work and experiments in accordance with the instructions from the Director or the chief technical officers. This general work planned in the Head Office at Ottawa is supplemented and complimented by experiments of local character. Each locality has its own peculiarities and its own specific problems to solve; the climate, the soil, and the topography vary, while different types of settlers stress different lines of production. The Branch Farms are ex-

pected to conduct and do conduct experiments of local importance, which must be coordinated with the various lines of work planned at Ottawa. The coordination of these two types of work adds to the responsibility of the farm superintendent. The superintendent has under him an assistant or assistants, one or more technical specialists, a clerical staff, a foreman and skilled and unskilled labour as required. He is responsible, directly, to the Director of the System.

All farms are obliged to send to Ottawa, copies of the records of experiments, which were conducted on them. These records are studied and compared by one of the chief technical specialists in the Centre, who is at the head of the corresponding divisions. These chief specialists report to the Director upon the condition and the development of their work on each of the branch farms.

All officers in charge of the farms themselves, or in charge of the special lines of work, are in close and direct co-operation. The work on the branch farms is decided and planned at Ottawa by agreement between the Director, the chief technical officers and the superintendent of the branch farm where the work is to be conducted. From time to time the Director or the chief technical officer would come to the branch farm and contribute to the work by making suggestions or by giving information obtained from the other experimental farms.

All plans of work on any of the experimental farms and all expenditures connected with them must be approved by the Director before their execution is commenced. The Director is responsible for his action before the Minister of Agriculture.



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CHAPTER V

The experimental farms were established for finding out and advocating the better methods of production, and the management of farms. The information obtained was to be passed over to the farmers actually engaged in production. Two distinctly different stages of work are required from the Experimental Farms System. First the knowledge of farm methods must be acquired, and then, secondly, this knowledge must be "sold" to the farming public. The goal of the system has been to assist in the development and rationalization of Canadian Agriculture. All the knowledge, all the information, gathered by the experimental farms would not contribute to that end, unless it is utilized by the farmers themselves. The system would not advance much if it had kept the results of its work for itself. The first stage of the work alone would not be worth the trouble and the expenditure; the second phase could be done only after the first had been accomplished.

The achievements of the system manifest themselves in the growing prosperity of the farmers or, at least, in the increased average production. Forty years ago it was difficult to deal with farmers as "customers", they mistrusted and criticised a learned instructor more than was

justified. And yet the farmer had to be made familiar with the art of experimenting; with the advantages of the learned instructors methods. The farmers succumbed to the attack, lessened their mistrust and adopted some of the methods that were advised by the experimental stations.

The farmers in the neighbourhood of the experimental farms saw the promise of profits there, due to the scientific improvements of cultivation. Many of the farmers took advantage of the demonstration, and imitated the methods of cultivation. The farmers further removed from the stations did not fare so well. The hardship which came to them through their geographical position had to be overcome in some way. First of all the method of correspondence was tried. The staff encouraged such correspondence from the very beginning. They endeavoured to make the farmers feel free to seek such advice as would help them in carrying on their work. The endeavour met with gratifying success, and a large number of letters was received and carefully answered. In those letters all kinds of questions were asked, some of which were hard to answer; but even where considerable time was needed to find out the desired information, the enquiry was made and the answer was sent to its destination. Letters started pouring in and thus the first real contact between the farmer and the Experimental Farms System was made.

The second way of disseminating the knowledge obtained from experimental work was by organizing meetings of farmers which were addressed by the technical officers and the farm superintendents. ^{Sometimes} a series of such meetings would be held in connection with some of the local Agricultural Societies, and the lectures given would amount to Short Courses in one or two subjects of Agriculture. The staff came into personal contact with the farmers and this resulted in much benefit to both parties.

From the very first year of their existence, all the experimental farms published the results of their work in the annual reports. In addition to this, bulletins, and pamphlets on various subjects of practical interest have been issued from time to time. Their number has been steadily increasing each year; the subjects covered by such publications were also enlarged. All the pamphlets, bulletins and reports are mailed free to any one who applies for them. Judging by the number of applications, the interest in this printed information is very great indeed. As the results of the experimental and research work were rapidly increasing, the task of passing over the information gained, became more and more complicated, and required more time for its proper carrying out. The time came when it was realized that a special division and a special staff had to be organized. Their specific duty was the linking together of the system and the people for whose benefit it

was created.

Early in the Spring of 1915, the Division of Extension and Publicity was established for the purpose of disseminating the knowledge obtained on all experimental farms. To be more correct, we must say, that the Division of Extension and Publicity was established to continue and develop the publicity work begun in 1914 under the supervision of Dr. Grisdale, the Director of the Dominion Experimental Farms System.

Concretely the work of this division consists of:

1. Planning and preparing educational exhibits and placing them at Exhibitions, Fall Fairs, Seed Fairs, Corn Shows, Poultry Shows, Etc.
2. Editing reports, bulletins, pamphlets, circulars and other publications for the experimental farms.
3. Distribution of bulletins and descriptive literature at the Exhibitions and Fairs.
4. Securing additional names for the mailing list.
5. Preparation of lecture charts for the officers of the central experimental farms and branch farms.
6. Securing and editing of press articles which are distributed to newspapers and periodicals throughout Canada.

7. Preparation of educational material for schools, lecture halls, libraries etc.
8. Preparation of new sets of lantern slides and loaning and distributing of lantern slides already existing.
9. ~~The~~ Assembling and preparing for printing of material for "Seasonal Hints".
10. Securing the needed reprints and revisions of experimental farm publications.
11. Organizing and delivering addresses and lectures pertaining to the knowledge acquired at experimental farms.
12. Preparation of educational collections of seeds or plants and photos, and supplying with those photos various periodicals in Canada and elsewhere.
13. Editing divisional and branch farm reports and other publications .
14. Sending out information and literature in response to requests received by mail.

These are the activities of the Division of Extension and Publicity. They can be extended as the opp-

portunity to make the results of the work of the experimental farms available to farmers would allow.

It is hard to say which is the most important activity of the Division. Maybe the editing of the publications of the experimental farms is, as practically all other activities are more or less dependent on this one. Even the lantern slides must be provided with explanatory manuscripts, which are edited by the Division.

All publications edited by the Division of Extension and Publicity can be classified under five general types.

1. Reports
2. Exhibition Circulars
3. Seasonable Hints
4. Press Articles
5. Pamphlets and Bulletins.

"Reports" are the most detailed accounts of the work performed on the farm and the results obtained from the experiments conducted there. Reports are mirrors of the Experimental Farms -- they reflect all that happened on the farm, they reflect everything about everything and therefore enable the public to become the judge and the critic of farm activity. Primarily reports are issued for the Director, the chief technical officers and the Minister of Agriculture; but anyone can get them free on application. They are issued:

- (a) By the Director (Reports of the Director)
- (b) By the Chief Technical Officers (Report of the Dominion Horticulturist; Report of the Dominion Poultry Husbandman; Report of the Dominion Chemist, etc.)
- (c) By the Superintendents of the Experimental Farms and Sub-Stations (Report of the Supervisor of the Experimental Farm, Brandon, Manitoba; Report of the Superintendent of the Experimental Station, Rosthern, Saskatchewan, etc.)

"Exhibition Circulars" are entirely different kind of publication. They are prepared primarily for distribution at the Fairs, where Dominion Experimental Farm exhibits are displayed. In practice, however, they are largely sent in answer to the requests of those who desired information about a particular problem. The circulars deal with vital problems of the Canadian farmer. They are written in popular comprehensive language, and give concise information on a particular and narrow subject such as "Clean Milk", "Growing Grapes For Home Use", or "Trap Nests. Most of them have from four to six pages.

"Seasonable Hints" are issued three times during the year, namely in March, July and November. They may be defined as short pamphlets, 16 pages as a rule, dealing in

in a concise form and in a practicable manner with the seasonable problems of a farmer. They attract attention to the problems which need the consideration at the time when the pamphlet reaches the farmer. They are timely advisers and a handy source of information, and therefore became very popular from the beginning. As the agricultural conditions in the Prairie Provinces differ from those in the East and in British Columbia, two different editions of "Seasonable Hints" are issued: -- one, "The Prairie Edition", adapted for agricultural conditions in the Prairies, and another, the "Eastern and British Columbia Edition", adapted for agricultural conditions in the Eastern Provinces and British Columbia.

Publication of "Seasonable Hints" was started in 1915 and the number of copies necessary to meet the requirements continue to increase. At the present time they have a circulation of about 500,000. The "Publication Branch" now has the sole charge of the distribution of this pamphlet. The Division of Extension and Publicity is responsible for the collecting, preparation and editing of each issue. The "Publication Branch" sends one copy of "Seasonable Hints" to every regular farmer in Canada. Moreover, all Canadian Banks help in the task of distribution of those "Hints" among the farmers of their districts. A number of copies of "Seasonable Hints" is sent by the Publication Branch to many Dominion and Provincial Government

Officials and Agricultural Specialists, who distribute the pamphlets among various organizations with which their work brings them into contact. More copies are sent to trading and elevator companies for the same purpose. It maybe that "Seasonable Hints" did most of the work directed to link farmers with the experimental farms. An example of the subjects with which "Seasonable Hints" deals, is as follows:

Number 19. Eastern and British Columbia Edition, March 1921

"The Time to Seed in Eastern Quebec"

"Choosing a Variety Suited in Your District"

"Field of Clover Hay After Different Kinds of
Nurse Crops"

"The Harvesting of Alfalfa"

"Root Seed Growing"

"Preparing Corn Land in the Maritime Provinces", etc.

Number 17. Prairie Edition, July 1920.

"Late Summer Treatment of Summer Fallow Land"

"Rye as a Pasture"

"How to Ensure Largest Yields from Alfalfa"

"Growing Western Rye Grass for Seed"

"Durum Wheat"

"Value of Elevator Screening in the Ration", etc.

"Press Articles" is a column of short practical and prompt information given to the general public through

most of the Canadian Newspapers and Agricultural Journals. The whole of the Dominion of Canada is reached by means of this press article service, which endeavours to pass to the farmers, quickly, the helpful information urgently needed at the time. So in times of outbreaks of insect pests, the prompt information regarding means of controlling those pests is given through the newspapers of the district affected. When the new information is secured through the experimental work, it is passed to the farmers first of all by means of the "Press Articles". This is the quickest possible way of reaching them. Besides, much timely information is given each month, as most of the newspapers are willing to use such articles freely. They are printed at the proper season and by the newspapers of the region where the information is likely to be of use. The language of the articles is easy to read and is written in a brief clear cut fashion.

In 1916 only 12 articles were sent to be printed

In 1917 -- 80

In 1918 -- 150

In 1923 -- 240

This last figure remained fairly uniform for all the following years. More than 800 daily and weekly Newspapers and Agricultural Journals participated in the work. Usually the articles appear under the heading of "Experimental Farms Note", though this is not a rigid rule.

We are acquainted now, with "Reports", "Exhibition Circulars", "Seasonable Hints", and "Press Articles" of the "Division of Extension and Publicity". In addition, practically every phase of agricultural effort in Canada is covered by special Bulletins, Pamphlets and other Publications of the Experimental Farms. Such Publications are issued by the Dominion Department of Agriculture as research or a certain line of experiments provides enough information to justify the publication. There is not uniformity in the last publications, and they are not issued periodically or systematically. As an example of such type of publication I can mention the following:

Bulletin Number 42 Dominion of Canada, Department of Agriculture.

"Experiments with Wheat at the Dominion Experimental Farm, Brandon, Manitoba.

A summary 1889-1923 by W. C. McWillican, B.S.A., Superintendent at Brandon".

The style of these publications varies with the class of readers for which they are written.

The "Division of Extension and Publicity" prepares lantern slides for lending to Agricultural and Horticultural Societies, to Agricultural Classes in High Schools, and to other organizations. Special sets of slides are prepared for the use of the Branch Farm Superintendents, who may need them from time to time in connection with their lecture work.

Illustrated by lantern slides lectures are much superior to ordinary lectures, and this is understood and given some care. Each set has between 20 to 50 slides, and is provided with an explanatory manuscript. As no rental charge is made for the slides and the only expenses incurred amount to the one way express charge, -- the return charges are paid by the Division -- the lantern slides became very popular and are often required. Different subjects are dealt with by the sets, e.g.;

"Profitable Poultry Keeping"

"Planting and Care of the Farm Home Grounds"

"Production and Distribution of Improved Varieties of Cereals by the Dominion Experimental Farms", etc.

The Division prepares photographs, small collections of educational material, such as seeds, fibre, models of various kinds of farm buildings, charts and legends for the use of Branch Farms or divisional chief officers. Sets of plans and sketches and complete working drawings are prepared as well. Blueprints are given free on request, and they are given in large numbers as the farmers do not lack interest in such opportunities. The blueprints deal with different buildings, such as chicken pens, granary, silo etc.

All that is prepared is exhibited by the Division itself, or loaned for exhibition. The purpose of the Division is to be a connecting link between the Experimental Farms and the farmers, making the results of the Farm work

known as widely as possible. To accomplish this end, the display of the prepared exhibits is a very effective factor indeed. By looking at the educational collections, by seeing photos and slides and charts and blueprints, the farmers receive valuable information in an attractive form. Many of the farmers have real difficulty in acquiring knowledge that is given in book form. In some cases samples have value beyond printed information.

In the year 1925 -26 the Dominion Experimental Farms System exhibits were shown in 146 Winter Fairs, Poultry Shows and Seed Fairs, and hundreds of thousands of Canadian farmers saw the exhibits, asked questions about them, and got the answers from the trained attendants. It is hard to estimate the value of such Exhibitions. Farmers come into contact with actual accomplishments of the Experimental Farms, and they actually associate with the Workers of the System. The number of Fairs in which the Dominion Experimental Farms participate varies. In 1917 it amounted to 146, in 1919 it was only 72 and in 1926 146 again. The Exhibits are placed every year in all the most important Fairs. The number of the small Fairs in which Exhibits are placed varies. Not all Fairs to which the Exhibits are sent get the same kind or quantity of material. Exhibits of every kind are made each year at the Fair in Ottawa and in Toronto. These Fairs have all Divisions of the Experimental Farms System fairly well

represented. Smaller Fairs in different parts of the Dominion get the kind of Exhibits most representative of the district. The Division of Animal Husbandry is best represented when the district is largely one of livestock farmers. The hardy varieties of spring wheat are shown in the Northern parts of the Prairie Provinces.

So the Exhibits directly teach the farmers about the activities performed for their sake on the experimental farms. But they do the same indirectly by distributing the literature and by increasing the list of addresses to which Experimental Farms Publications are to be sent. Thousands of useful and helpful booklets and circulars are distributed among the patrons of the Fairs. The attendants at the Exhibition Stalls invite farmers to take the Publications and to leave their addresses on prepared cards in order to receive "Seasonable Hints" and with them catalogues of the new Publications. From those "Lists of Publications" they can choose any, and as many Pamphlets as they like, and get them free from the Publications Branch, Department of Agriculture, Ottawa. Free postage service is offered to those who wish to communicate with the Publication Branch, Department of Agriculture, Ottawa.

So much for the Exhibits of the temporary Fairs and Shows. In addition the Exhibits are placed and can be seen at any time at most of the Experimental Farms themselves, and in some of the College and Municipality Museums.

An exceptionally attractive Exhibit was placed in the Commercial and Industrial Museum of Montreal in 1918. Near such exhibitions as well as at the Fairs, special address cards are placed for the visitors. The address of each visitor who signs, is filed for the purpose of sending "Seasonable Hints" and "Lists of New Publications".

The principal activities of the "Division of Extension and Publicity" have been dealt with. We may repeat again, that the same Division, which caused certain literature and collections to be issued takes care of their re-issue if needed. This has been needed; numerous editions were revised and re-edited. Many of the Publications are edited in French as well as in English.

The bulk of the correspondence is carried on by special officers in the Division of Extension and Publicity -- the bulk of it, but not all of it. A large volume of correspondence is carried on by the various officers of the several experimental farms. The original policy of endeavouring to persuade the farmer that his questions are welcome, has been continued. If the farmer puts his questions to the chief horticulturist, he would answer them. Questions addressed directly to E. S. Archibald are answered by the Director himself. This extraordinary politeness and consideration toward any person in Canada makes one even think, that, the practice is rather too extravagant.

Correspondence, literature, distribution of

collections and samples, educational lectures, and addresses delivered, prompt hurried information sent to newspapers, slides and exhibits lent to schools and clubs -- those are the means by which the Division of Extension and Publicity fights the distance between the farmers and the system.

Really, the endeavour to convey to the farmers the benefits of the vast amount of information gathered over a period of 43 years of systematic work is extremely important. All the information available would not amount to much if it were not actually used by the farming community.

The Division does its best but only farmers can justify its continuance. They are invited to come, and some of them do come. Organized groups of farmers come to the experimental farms and are conducted through them, are shown about and the work is explained to them. Excursions and individual visits gain in popularity; picnics with short lectures and demonstrations are well attended and arranged oftener than before. Farmers or the leaders of their organizations express their own initiative here and the Dominion Experimental Farms Officers rejoice.

CHAPTER VI

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The farmers are willing to contribute their share to the success of the experimental farms by making experimental farming and public farming one cause, and their acknowledgement of the benefits rendered is inestimable. Such co-operation must be and has been encouraged in every reasonable way. Theoretically speaking it is possible to bring the information obtained on the experimental farms straight to the farmer, but it is impossible to compel him to use that information. He must be able and willing to benefit by the entire scheme. The Exhibits are of no use when the farmer looks at them but does not see them; the lectures are of no use if the farmer hears them but does not listen to them.

Many farmers became personal friends of the Experimental Farm Employees. More wish to become personal friends and all must act as friends.

The best example of the co-operation of private farmers and the Experimental Farm Officers, perhaps, is the existence of the numerous Illustration Stations. There are about 200 of them now, and all of them are taken care of by individual farmers and practically without remuneration.

The first Illustration Stations were established in 1915 in Saskatchewan and Alberta as follows:

In Saskatchewan -- Assiniboia, Cabri, Herbert, Kindersley, Maple Creek, Pambrum, Prelate and Shannavon.

In Alberta -- Bow-Island, Carmangay, Empress,
Foremost, Grassy Lake, Jenner, MacLeod, Magrath,
Manyberries, Medicine Hat, Milk River, Pincher
Creek and Whitla.

The benefits of such stations were so self-evident
that the stations rapidly increased in number and now exist
in every Province of Canada. At the present time we have

- 27 Illustration Stations in Saskatchewan
- 13 Illustration Stations in Manitoba
- 15 Illustration Stations in Ontario
- 63 Illustration Station in Quebec
- 18 Illustration Stations in New Brunswick
- 16 Illustration Stations in Nova Scotia
- 12 Illustration Stations in Prince Edward Island
- 19 Illustration Station in Alberta
- 16 Illustration Stations in British Columbia

In 1915 we had only	21 Illustration Stations
In 1916	37 Illustration Stations
In 1918	40 Illustration Stations
In 1919	51 Illustration Stations
In 1920	64 Illustration Stations
In 1921	84 Illustration Stations
In 1922	88 Illustration Stations
In 1923	88 Illustration Stations
In 1924	125 Illustration Stations
In 1925	144 Illustration Stations

In 1926	148 Illustration Stations
In 1927	164 Illustration Stations
In 1928	164 Illustration Stations
In 1929	199 Illustration Stations

The number has been increasing all the time and there is reason to believe that it will increase in the future. Generally speaking the object of the Illustration Stations is to interest the farmer in the work of the Experimental Farms. This is achieved by demonstration of the practical well-proven and ascertained crop production methods. The demonstration is staged on the rented area of land which is cultivated by the farmer who rented the land, and exactly as he is instructed by the experimental farm officer. Concrete objects of the work carried on at the Illustration Stations are

1. To put into operation under the supervision of the Dominion Experimental Farms System Officers, on farms owned and operated by farmers, methods of cultivation and crop rotation which have been found by the experimental farm to give the best results;
2. To grow the crops and grasses most suited for each particular locality and soil;
3. To grow the crops and grasses at a minimum cost,

Roughly, we may say that the purpose of the work carried on at the Illustration Station is to show how to

produce the heaviest crop at a minimum cost.

The easiest way to win an overcautious farmer is by demonstrating the immediate increase in pecuniary return. Everyone agrees that a crop which can be sold for more money is superior to the crop sold for less money. No farmer can deny the usefulness of the methods which increase the value of crops. This last is exactly what happens at the Illustration Stations. Farmers are persuaded that the theoretical agriculturists are worth while getting into contact with. Consequently some of them go to the Experimental Farm, or write there, or simply imitate the methods practised on the Illustration Stations.

Illustration Stations help to make the valuable results of the experimental and research work of the System widely known by giving to a great number of remote farmers the opportunity to see how the "Theory" works on practice. The importance of the dissemination of the various bits of information gained through work performed on the Experimental Farms cannot be overemphasized. Illustration Stations are successful in performing this task.

In establishing an Illustration Station it is necessary, first of all, to find the farmer, who lives in the district decided upon, and who is willing to rent some land and to undertake the job of cultivation. The area rented is between 5 and 50 acres. For the first Illustration Station the area of 45 acres was rented. The farmer who

rents the land undertakes the cultivation of it, under the direction of the Division in charge. He endeavours to adopt the best methods of cultivation as determined by the experiments previously conducted on the Farm. Divisional officers and the nearest Experimental Farm superintendents visit the Illustration Stations and help the operator by giving needed suggestions. The operator does not get any remuneration for his work other than the rent for the land.

Originally the Illustration Stations were supposed to deal exclusively with the crops, grasses and crop rotations, but by and by the scope of their activity enlarged. So at the present day some work dealing with livestock and poultry is being conducted on a number of the Illustration Stations. Certified seed growing is encouraged. The erection of the improved types of farm buildings is advised wherever possible. The tile drainage is recommended and demonstrated, and other improvements brought about by information obtained from the Experimental Farms System are attempted to be set up. Actually some of the Illustration Stations at the present day do not vary greatly from the smallest Experimental Sub-Station. This similarity becomes even greater in the case of the Illustration Station which was located in a new sparsely settled district. Such Illustration Stations provide the information regarding the future possibilities of the locality, and really are a small scale experimental sub-station.

From the very beginning, that is to say from 1915, all Illustration Stations were under the supervision of the specially formed "Division of Illustration Stations". The Division has its own Superintendent and a staff of travelling supervisors, whose duty it is

1. To see that the operators of the Illustration Stations actually grow crops in the ways that are deemed best by the Division to stimulate greater and more economical production.
2. To organize and address field and public meetings.
3. To assist at short courses.

The establishment of the Division of Illustration Stations furnished another connecting link between the Experimental Farms and the farmer.

There is one way more in which the Illustration Stations are used as the means of bringing together the staff of the Experimental Farms and the farmer. I refer to "Field Meetings". Those are organized during the growing season and provide the opportunity for the Divisional and Farm Superintendents to come into contact with actual workers of the land. They have a talk dealing with the production of crops, preparation of the soil, rates of seeding, varieties of grain etc. All are cordially invited to such "Field Meetings" and they are as much a social affair as anything else. But, after all, a social affair is the best

way to make the people acquainted with one another. The Field Meetings are held at the Illustration Stations.

Let us recollect now all the means by which the numerous results of the work conducted on the Experimental Farms are brought to the attention of the public. They are as follows:

- A. Actual demonstration of the results obtained from the improved methods of cultivation, seed selection, scientific stock breeding etc. This is done through the medium of
 - 1. Experimental Stations themselves
 - 2. Illustration Stations
 - 3. Exhibits at Fairs and Museums

- B. Different kinds of Publications sent to the farmer and public in general.
There are five kinds of Literature
 - 1. Reports
 - 2. Brochures and Booklets
 - 3. Seasonable Hints
 - 4. Press Articles
 - 5. Exhibition Circulars

- C. Teaching farmers directly through
 - 1. Organized Short Courses
 - 2. Lectures
 - 3. Field Meetings

D. Personal Correspondence.

This is the way in which information is passed to the public.



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CHAPTER VII

We have now to say what information is passed, what work and experiments are carried on at the Experimental Stations, and how much did the Experimental Stations succeed in making their work beneficial to the farming public. Sometimes one hears the opinion voiced that Experimental Farms are wasting energy and capital, which might better be used for other purposes, -- that the Experimental Farms do not pay. The Experimental Farms are just what the name implies, and cannot be expected to provide returns on the basis on which ordinary farms are operated. Experimental Farms are striving to obtain valuable information and the unsuccessful experiments which add to the expenses incurred during the year, make a real contribution to the entire project. In a sense unsuccessful experiments do not exist. It is important to know what one must do, but the knowledge of what one must not do, is valuable as well. Of course in order to keep up the argument, some may contend that the benefits derived from the Experimental Farms are not justified by the expenditures that have been made over a large period of years. I do not think that there are many farmers at the present time who would suggest such a notion. The expenses of the Experimental Farms System are about \$2,000,000 annually. It is impossible, of course, to estimate with any degree of accuracy the benefits derived from the System. It is difficult to evaluate any one piece

of research work. Can we gauge the extent of Dr. Sadler's contribution by his discovery whereby ~~Kingstone~~ Cheese ripens quickly?

The benefits due to the activities of the Experimental Farms System are not self evident, but it would not be an exaggeration to say that they amount to more than \$2,000,000 annually.

The results obtained by the Dominion Experimental Farms System show themselves in the gradual improvement of the methods practiced in agriculture for crop and livestock production; and in the accumulation of information which could improve these methods still further. From the very beginning the purpose of the Dominion Experimental Farms was to find out and advocate the better methods of production and management of farms. The work was carried on in order to render practical assistance to the farmer. Dominion Experimental Farms exist solely for the practical benefit of the farmer. Of course, one must not forget that the facilities of the Experimental Farms are limited.

At the time of the establishment of the Experimental Farms the methods of agricultural production were primitive, the live stock was of poor quality and clumsily handled. Indeed, the establishment of the Experimental Farms was caused by the desire to improve the agricultural conditions of that time. The Select Committee pointed out that the principal cause of the agricultural depression

was the prevailing ignorance of good farming methods, leading to soil impoverishment and poor crop returns. The applications of scientific agriculture were few at that time. Systematic rotations were rarely adopted; the importance of the best quality of seed was not generally understood. The land was cultivated in a primitive fashion, and fertilizers were used excessively or not at all. Methods of dry-farming were unknown. Irrigation and drainage were in their crude forms. The benefits of leguminous plants for soil fertility were never heard of. The raising of livestock was not intelligently handled. Scientific feeding, breeding, housing and management were not considered. In short, the soil was used wastefully, the seed indiscriminately, the livestock without sufficient care.

The first twenty years of their existence the Dominion Experimental Farms spent on the experiments and research work dealing with the basic problems of agriculture. New knowledge was not vast. Implements, cleared land, laboratories and other facilities were only developing. After this time the Experimental Farms found themselves dealing with more and more complex investigations. Knowledge had steadily increased and possibilities widened. Experiments became more intricate, research work more complicated needing more precise results. All this necessitated greater specialization and increase of the number of technical experts. The possibility of enlarging the scope of work was

provided in this way and also by the increased number of Branch Farms. New Experimental Farms were established in new localities. Each locality controls the scope of experimental work by the agricultural possibilities of the district, where the Farm is located. The opening of new localities widened the possibilities.

CHAPTER VIII

As was mentioned before, at the present time the Dominion Experimental Farms System comprises 14 Divisions, as follows:

1. Field Husbandry
2. Animal Husbandry
3. Horticulture
4. Botany
5. Cereals
6. Chemistry
7. Forage Plants
8. Tobacco
9. Fibre
10. Poultry
11. Bees
12. Bacteriology
13. Illustration Stations
14. Extension and Publicity

Not all of these Divisions existed from the very beginning of the establishment of the System. The necessity of increased specialization dictated the increase of the number of Divisions.

At the time of establishment the Central Farm had only four Divisions as follows:

1. Entomology and Botany

2. Chemistry
3. Horticulture
4. Agriculture (Field, Livestock Work and Cereals)

In 1887 a Poultry Division was formed.

In 1903 the "Cereal Division" was put in charge of a separate superintendent.

In 1909 the "Division of Entomology and Botany" was divided into two Divisions; "Division of Entomology" and "Division of Botany".

In 1911 "the Division of Agriculture" was split into "Division of Animal Husbandry" and "Division of Field Husbandry".

In 1911 the "Division of Forage Plants" was formed.

In 1912 the "Tobacco Division" was joined to the System.^x

In 1915 four more Divisions were created, as follows:

1. Bee Division
2. Fibre Division
3. Division of Extension and Publicity.
4. Division of Illustration Stations

In 1923 the "Division of Bacteriology" was formed.

So there would have been in 1923 15 Divisions if in 1914 the "Division of Entomology" had not been sep-

x Previous to 1912 the Tobacco Division existed as a separate branch of the Department of Agriculture, and only in 1912 was made a part of the Dominion Experimental Farms System.

arated from the System and become an independent branch of the Department of Agriculture. This last arrangement suits this Division better, as its work must be conducted wherever outbreaks of insect pest might occur. Experimental Farms have a handicap in this respect when compared with the Department of Agriculture. Since 1923 the Dominion Experimental Farms System has had 14 Divisions.

We have dealt with two Divisions, namely, with that of "Extension and Publicity" and with that of "Illustration Stations". Let us now see what the remaining twelve are doing.

We shall start with the "Division of Field Husbandry". This Division deals with

- (a) Methods of land cultivation
- (b) Improving or preserving the fertility of the soil.
- (c) Obtaining information regarding the best methods of growing crops.

The Division is interested in clearing, breaking, draining and irrigating the land; controlling weeds and fertilizing the soil as well as preserving the moisture in it. The Division is interested in the methods of seeding and in the kinds of seed which should be used. It deals with rotation of crops in order to discover the arrangements of crops which give the most remunerative results, and with mixtures of seed-grass, hay crops and crops for ensilages. It invest-

igates the relative merits of farm implements and it tries to find out the cost of producing the crops. This last point is of the utmost importance, because after all, it is relatively high or low cost of production that assures the farmer of success or failure.

All Experimental Stations and Farms deal more or less with the problems of Field Husbandry. However some Stations stress so much the special lines of Agriculture, that "Field Husbandry" is carried on only as a necessary part of the work, without which the specific experiments could not be performed. The Stations which have the Division of Field Husbandry little developed, are as follows:

Summerland, British Columbia (Tree-Fruit Growing)

Agassiz, British Columbia (Horticulture, Dairy
Cattle)

Fort Vermillion, Alberta (Horticulture)

Kentville, Nova Scotia, (Fruit Growing District)

Summerside, Prince Edward Island (Fox Ranch)

"The Animal Husbandry Division" deals with :

- A. Breeding of livestock and finding the information as to which breeds are best suited to the locality, for the purpose they are acquired, and for the economy of production. The Division endeavours to make pure bred sires at comparatively low prices available to any farmer.

B. Feeding of livestock:

Various methods of feeding are tried, and the results carefully compared. The nourishing values of different ensilages, hay crops, vegetables, grains, roughages, and various by-products are discovered. The effect of different feeds on milk production or on fattening, or on power production are investigated.

C. Health of the livestock:

This maybe divided into two parts:

1. Disease prevention

- (a) Hygiene and Prophylactics
- (b) Proper Housing
- (c) Wholesome Feeding

2. Treatment of animals already ill.

D. Housing of the livestock under various conditions and in various seasons of the year. The purpose is to find out the best and the most economical types of buildings for different kinds of livestock and for different climates.

E. Dairying:

This includes milk production, handling of milk, butter and cheese production, experiments with different types of dairy equipment.

- F. Preparation and handling of meat, meat production; dressing of fowl, bacon etc.
- G. Organizing the record system in order to enable the buyer who wants to provide his herd with pure-bred cattle, to know exactly what breed he is buying. This is a system of registration and accounting. Records of test performances and the parents of each animal are carefully made.
- H. Hybridizing and cross-breeding, with the purpose of developing a hardy or fertile type.
- I. Gathering the cost of production data.

As in the case of the Division of Field Husbandry the Division of Animal Husbandry is more or less represented at most Experimental Stations. Different Stations specialize in different breeds of stock or even in different types of livestock.

The Dairy Cattle Branch is stressed at

Nappan, Nova Scotia

Fredericton, New Brunswick

Ste. Anne de la Pocatiere, Quebec

Cap Rouge, Quebec

Lennoxville, Quebec

La Ferme, Quebec

Kapuskasing, Ontario

Morden, Manitoba

Rosthern, Saskatchewan

Lacombe, Alberta

Agassiz, British Columbia

Hog and swine production is emphasized at

Kentville, Nova Scotia

Ste Anne de la Pocatiere, Quebec

Lennoxville, Quebec

La Ferme, Quebec

Kapuskasing, Ontario

Brandon, Manitoba

Indian Head, Saskatchewan

Rosthern, Saskatchewan

Lacombe, Alberta.

Beef cattle breeding is an important item at

Nappan, Nova Scotia

Kapuskasing, Ontario

Brandon, Manitoba

Indian Head, Saskatchewan

Rosthern, Saskatchewan

Scott, Saskatchewan

Swift Current, Saskatchewan

Lethbridge, Alberta

Lacombe, Alberta

Sheep raising is carried on at

Nappan, Nova Scotia

Ste Anne de la Pocatiere, Quebec

Kapuskasing, Ontario

Lennoxville, Quebec

La Ferme, Quebec

Brandon, Manitoba

Morden, Manitoba

Indian Head, Saskatchewan

Rosthern, Saskatchewan

Scott, Saskatchewan

Lethbridge, Alberta

Lacombe, Alberta

Pure bred horses are bred by the Experimental
Stations at Ste Anne de la Pocatiere, Quebec.

Cap Rouge, Quebec

Morden, Manitoba

Indian Head, Saskatchewan

Lacombe, Alberta

Agassiz, British Columbia

Poultry is well represented at

Cap Rouge, Quebec

Lennoxville, Quebec

Indian Head, Saskatchewan

Brandon, Manitoba

Lacombe, Alberta

Summerland, British Columbia

Agassiz, British Columbia

Invermere, British Columbia

Sidney, British Columbia

The Division of Animal Husbandry is little represented at the Stations at

Charlottetown, Prince Edward Island

Harrow, Ontario (Tobacco Mostly)

Summerland, British Columbia (Tree Fruit Growing)

Sidney, British Columbia (Some Dairying)

Fort Vermilion, Alberta (Horticulture)

Kentville, Nova Scotia (Fruit Growing District)

All Branches of the Animal Husbandry Division are represented at the Central Station at Ottawa.

A special horse breeding farm is maintained at St. Joachim, 25 miles east of Quebec City. This farm is under the management of the Cap Rouge Experimental Station Superintendent.

A special Fox Ranch is maintained at Summerside, Prince Edward Island.

The "Division of Horticulture" can be divided roughly into three parts :

1. Tree-Fruits
2. Small fruits and Vegetables

3. Landscape Gardening, Ornamental trees, shrubs and flowers.

The Tree-Fruits Branch concerns itself with:

- A. Discovering of the best methods of caring for orchards as follows:
 - 1. Their cultivation
 - 2. Control of pests and fungus diseases
 - 3. Fertilizing the soil for orchards
 - 4. Alleviating the risk from frosts
 - 5. Sheltering from winds
- B. Discovering the best suited types of fruit and of the best suited variety of the given fruit.
- C.- Investigations attempting to find out the comparative superiority of one variety of fruit over the other. Some facts considered are: Time of ripening, yield, quality of fruit, hardihood etc.
- D. Creation of cross-breeds, especially those which can stand severe frosts.
- E. Individualism of the trees. The exceptionally fertile tree or the tree with the fruit of high quality is selected and an attempt is made to perpetuate its individuality.

The Small Fruits and Vegetables Branch deals

with :

1. Discovering of the best methods of cultivation of small fruits and vegetables
2. Prevention and controlling of the fungus diseases and pest infections.
3. Fertilization
4. Testing of different varieties for their suitability to locality.
5. Comparing different varieties with respect to time needed for ripening, yield, flavour, shape, hardiness against frosts, demand for irrigation, hardiness against droughts, ability to grow in the same place without exhausting the bed.
6. Creation of new varieties characterized by specially valuable qualities
7. Growing vegetables for seed

" " Landscape Gardening deals with ornamental trees, shrubs and flowers.

1. Methods of cultivation and caring for them are investigated.
2. Many varieties are grown and minutely described.
3. Different varieties are tested and their seasons of bloom, hardiness, demands for

- soil, climate, and care needed are compared.
4. New and better varieties are originated.
 5. Best combinations of ornamental trees, shrubs, grasses, annual and perennial flowers are studies.
 6. Methods of laying-out grounds are taught.

Besides the work described above the Division of Horticulture carries on experiments under glass frames or in hot houses. It studies plant nutrition of strawberries and apples in pure sand cultures. It records the new varieties of fruits in water paintings. It carries on the work concerned with canning and dehydration of fruits and vegetables. It prepares and sends to different Horticultural Exhibitions and Fairs the collections of dried specimens, water colour specimens and samples of fresh and canned fruits and vegetables.

The Division of Horticulture performs extremely useful work and the scope of this work is large. All Experimental Farms and Stations give much attention to Horticulture, but it plays the predominant part on the Experimental Stations at :

Experimental Station, Summerland, British Columbia

Experimental Sub-Station, Fort Vermilion, Alberta

Experimental Farm, Agassiz, British Columbia

(Especially until 1911)

Experimental Station, Kentville, Nova Scotia

Experimental Station, Harrow, Ontario

Experimental Station, Invermere, British Columbia

Experimental Station, Sidney, British Columbia

Experimental Station, Farnham, Quebec (Tobacco)

Experimental Station, Morden, Manitoba.

"The Division of Botany" may be shortly defined as plant pathology investigations; -- this really covers most of its research work and most of its numerous experiments. The plant pathologist isolates the organisms which produce the disease, studies their life history, learns the conditions under which they become harmful, and advises the measures for their destruction. This is mostly laboratory research work with artificial cultures of microscopic organism and fungi. Some experiments are performed in hot houses or even in open fields. This Division deals with potatoe diseases e.g. Late Blight Wart Disease, with grain rust and diseases of timber, shrubs, orchard trees, herbaceous plants, cereals, bulbs of different varieties and roots. As a logical consequence of this work, the Division undertakes to analyze any seeds and samples of trees sent there and to certify the samples free of disease. This service is free. The Division studies the weeds, the history of their lives and the methods of their eradication or control. The effect of different plants on livestock is carefully investigated. The methods of the eradication of the

the poisonous ones are determined

Besides the work described the Division possesses at the Central Experimental Farm an extensive Arboretum and Botanical Garden. Numerous valuable collections of trees, shrubs and herbaceous plants are gathered from many countries. This Garden is open for the general public and has a very great educational value, besides being a wonderful place to rest. We may add that the farmers are perfectly welcome to send to the Division of Botany, any plant, whether it be diseased or not, and to ask for its identification. If one is doubtful about certain mushrooms it is well to send them for identification. The Division has the herbaceous room with scientific collections of seeds and plants. Specimens of botanic interest are preserved as well.

The chief work of the Division of Botany is performed at the Central Experimental Farm in Ottawa. That Farm has the largest and the best equipped laboratories. The Dominion Botanist himself, is there. Some of the Branch Experimental Stations have their own botanical laboratories. There are pathological laboratories at the Central Station in Ottawa and at:

Charlottetown, Prince Edward Island

Kentville, Nova Scotia

Fredericton, New Brunswick

Ste Anne de la Pocatiere, Quebec

Morden, Manitoba

Brandon, Manitoba

Rosthern, Saskatchewan

Indian Head, Saskatchewan

Scott, Saskatchewan

Summerland, British Columbia

"The Division of Cereals" endeavours to have the general farming public use the best varieties of seeds. In order to do this the Division undertakes

1. To find out which variety among the existing ones is the best for the locality as to hardiness, yield and disease resistance.
2. To find out which variety can be ground into the best quality flour; milling and baking tests are undertaken.
3. To originate better and new varieties by:
 - (a) Selection
 - (b) Isolating pure lines in existing varieties.
 - (c) Cross-breeding
4. To propagate the best existing, improved or new varieties of seeds.
5. To produce the commercial quantity of the recommended variety of seeds, or to see that it is produced.
6. To stimulate the use of superior seed cleaning machinery.
7. To distribute the samples of seeds among farmers, who agree to sow them according to instruction from the

Division, and to report about the results obtained.

8. To produce registered pedigreed seeds. In order to be registered the seeds undergo tests as to variety, quality, vitality and freedom from weeds. The tests are performed by an official seed inspector, who supervises the work of putting those seeds into sacks, sewing them up, sealing and tagging them. Some of the stations undertake to assist in the installation of seed-cleaning plants and rent their seed-cleaning machinery to farmers, who want their seeds graded. The rent is not high.

Every Experimental Farm and Station, except the Fox Ranch, carries on the work of the Cereal Division with some of the seeds. All Experimental Farms together deal with wheat, rye, oats, barley, buckwheat, peas, beans, flax and hemp. The Division of Cereals works in close co-operation with the Division of Botany and Chemistry.

"The Division of Chemistry" first of all is a necessary assistant to other Divisions. It undertakes for them the analytical work, when such work is needed. It is needed only too often. The Division serves as an information bureau to the farmer. The farmer is given the privilege of asking for an analysis of practically anything he would care to send. He can send soil, water, feeds, fertilizers and animal products. The Division does the

work free, and sends back the information needed. Besides being an expert adviser and investigator, the Division of Chemistry undertakes certain research work and experiments on its own account.

1. It finds out the constitution of soils and their deficiencies.
2. It finds out the requirements of different crops and animals.
3. It finds out the composition of crop and animal products at different stages of their ripening.
4. It discovers the nutritive value of different foods and roughages.
5. It investigates the fertilizing value of
 - (a) Various fertilizers
 - (b) Manures
 - (c) Leguminous plants
 - (d) Rain or snow
6. It investigates the physical structure of the soil and the methods by which physical structure can be improved.
7. It studies the influence of different rotations on the soil fertility.
8. It studies the methods of preserving the soil humidity and the nutrification of soil.
9. It studies the effect of irrigation on soil fertility.

10. It carries on research work in preserving meats, fruits and vegetables.
11. It studies the constitution and preparation of fungicides and insecticides; it performs chemical analysis and physical examinations of the insecticides and fungicides appearing on the Canadian market.
12. It examines the water from wells and advises the method of improving its quality (e.g. How to soften hard water).

The Chemistry Division does not limit itself to laboratory work. Numerous field-tests are carried on at many Experimental Farms and Stations.

"The Division of Forage Plants" as the name itself indicates, deals with leguminous plants, grasses, field roots and ensilage plants, which are used or can be used for forage. The Division:

1. Tests different varieties of plants and compares their relative advantages.
2. Breeds the improved strains of forage plants.
3. Originates the new varieties.
4. Tries to find out the best methods of cultivating the recommended varieties.
5. Teaches how to grow field roots for seed.
- 6.- Collects Canadian wild flora with the idea of

discovering the species likely to be of value as forage plants.

7. **Determines** what variety of forage plants is the best suited for different localities.
- 8.- **Determines** the best combinations of forage plants cultivated for hay or for pasture.
9. **Investigates** the possibilities of restoring the productivity of the exhausted pasture, lands and meadows.
10. **Experiments** with turf grass
11. **Propagates** superior varieties of forage plants.
12. **Undertakes** to supply and to distribute the seeds of recommended varieties not available commercially.

Among the forage plants which interest the Division are: corn, broom corn, sunflower, soybeans, mangels, sugar beets, carrots, swedes, turnips, alfalfa, clover, timothy, rye, western rye, Awnless Brome grass, barley, orchard grass, kentucky blue grass, millets, sorghums etc.

All Experimental Farms and Stations carry on experiments with forage crops.

"The Tobacco Division" was established as a separate branch of the Agricultural Department in 1905. In 1912 it was joined to the Dominion Experimental Farms System, and since then continued its work as the "Tobacco

Division^m of the Dominion Experimental Farms System. This Division undertakes to investigate all problems connected with tobacco growing, curing and preparation for market.

In order to do this the Division:

1. Studies chemical and physical structure of soils and the methods of fertilizing them, thus fitting them for tobacco growing;
2. Studies the best methods of cultivation of the soil. The beds are frequently sterilized before receiving the tobacco seeds.
3. Studies the rotations of crops and tobacco for maintaining soil productivity.
4. Studies the pests, their habits, history of their lives, and the measures by which those pests can be destroyed.
5. Originates new or improved varieties.
6. Maintains varieties approved by the market.
7. Studies the tobacco diseases and the methods of combating those diseases.
8. Finds out the best ways of harvesting tobacco.
9. Carries on the research work dealing with tobacco curing.
10. Studies the methods of grading and packing of tobacco.
11. Studies the ways of storing different types of tobacco.

12. The Division deals with problems pertaining to tobacco seed growing and to production of early tobacco seedlings.
13. Studies the methods of tobacco seed disinfection.

The experiments with tobacco are conducted at:

The Central Farm, Ottawa
Farnham, Quebec
Fredericton, New Brunswick
Harrow, Ontario
Morden, Manitoba
Summerland, British Columbia
Agassiz, British Columbia

The experiments were carried on but were discontinued at Swift Current, Saskatchewan and Invermere, British Columbia.

"The Fibre Division" deals only with two plants -- flax and hemp. As the increased production of these plants is desirable, the Fibre Division undertakes:

1. To find out which areas in Canada are best suited for the cultivation of flax and hemp.
2. To test different varieties of the plants and to find out which varieties are the best.
3. To study the methods of cultivation, harvesting, deseeding, ~~retting~~ and scutching of flax and hemp.

4. To supervise the grading of the fibre and seed.
5. To assist in marketing of both the fibre and seed.
6. To determine the type of soil, which is the most favourable for flax or hemp growing.
7. To discover the best methods of fertilizing the soil.
8. To determine the stage of ripening at which harvesting becomes most remunerative.
9. To test and to compare different types of implements and machinery, such as pullers, de-seeders and scutchers.
10. To distribute the recommended seed among farmers willing to take care of the demonstration plots.
11. To determine the cost of production under different methods.

The Fibre Division is mostly represented on the Central Experimental Farm where largest and best equipped flax mill operates. But small flax mills and other machinery have been acquired by several Branch Experimental Stations.

The experiments with fibre production are carried on by the Farms at:

Central Farm, Ottawa

Ste Anne de la Pocatiere, Quebec

Lennoxville, Quebec,

Cap Rouge, Quebec

Kentville, Nova Scotia

Charlottetown, Prince Edward Island

Fredericton, New Brunswick

Agassiz, British Columbia

Indian Head, Saskatchewan.

"The Poultry Division's" activity embraces all phases of the industry. It deals with everything that relates to fowl and eggs as follows:

1. Incubation -- natural and artificial
2. Brooding of chicks
3. Rearing
4. Breeding
5. Culling
6. Housing
7. Fattening
8. Dressing
9. Feeding poultry for production or table use
10. Diseases of poultry
11. Registration of poultry
12. Cost of production of different breeds
13. Comparative advantage of different incubators, brooders etc.
14. Testing and comparing various breeds of poultry
15. Nutritive values of different feeds and for different purposes

Cap Rouge, Quebec

Lennoxville, Quebec

Brandon, Manitoba

Indian Head, Saskatchewan

Lacombe, Alberta

Summerland, British Columbia

Agassiz, British Columbia

Invermere, British Columbia

Sidney, British Columbia

" The Division of Bees " is interested in honey production, and therefore deals with bees and with honey-producing flora.

The Division studies the problems of:

1. Breeding the bees
2. Feeding the bees
3. Raising queens
4. Controlling swarms
5. Treating and preventing the diseases of bees
6. Housing
7. Wintering
8. Testing the productivity of different races of bees and of egg-laying capacity of their queens
9. The Division receives the samples of dead brood and carefully examines them and determines the diseases which caused their death. This service is free.

10. The Division determines the localities best suited for bee raising.
11. The Division supplies free of charge any information dealing with bee raising and treatment of diseases.
12. The Division studies problems dealing with handling of honey, grading it and packing.

The Bee Division was established only in 1915, but the experiments with bees were carried on since 1891, when the first apiary was established at Brandon, Manitoba. Bees and their habits interest not only the people, who are concerned with honey production, but also horticulturists as well, because bees are important agents in the cross-pollination of fruit and flowers. In some cases bees and wasps are blamed for damaging the fruit by puncturing the skin and sucking the juice. All this made experimental and research work with bees very interesting and important. Consequently the number of Experimental Stations which have apiaries increased rapidly. In 1891 there was only one such Station. In 1893 an apiary was established at the Central Experimental Farm. By 1913, 11 Stations were engaged in bee-culture and at the present time most of the Stations have apiaries.

There is not an apiary at the following :

Experimental Fox Ranch, Summerside,

Prince Edward Island

Experimental Station, Farnham, Quebec

Experimental Station, Harrow, Ontario

Experimental Farm, Brandon, Manitoba (was before)

Experimental Farm, Indian Head, Saskatchewan

(was before)

Experimental Station, Swift Current, Saskatchewan

Experimental Station, Cap Rouge, Quebec

(was before)

"The Division of Bacteriology" was established in 1923 at a time when the other Divisions were working at full capacity. A special Division, which could undertake the research and investigation work of micro-organisms, was keenly needed. Therefore the chief purpose of the Division of Bacteriology is to assist other Divisions in solving problems which relate to the activities of micro-organisms. Some Divisions have to deal more with bacteriae than the others, -- the Division of Bacteriology gives assistance chiefly to the first of these two groups. The Divisions and their respective problems are as follows:

"Animal Husbandry"	-- Contamination
"Field Husbandry"	-- Soil Micro-organisms
"Fibre"	-- Retting
"Poultry"	
"Bee"	-- Bacteria which caused the disease of bee larvae and fermentation of honey.

"Horticulture"

"Cereals"

All the Divisions mentioned surrendered some of their work to the Division of Bacteriology. Of course it has work which is apart from that of the other Divisions also. This independent work is of a practical character, and consists mostly of supplying the nitro-culture for leg-^xuminous crops to any one who is willing to use it. The Division performs numerous analysis of samples of water from farm wells, dairy products, foods and feeds, soil and soil condiments, and fibre. These samples are sent by the general farming public, who later receive the results of the analysis. Information is sent on request about the preservation of foods, manufacture of ensilage, rules of sanitation etc. The Division pays much attention to the problem of sanitation and hygiene of dairy implements.

The Division of Bacteriology is represented by the laboratory at the Central Experimental Station and by its staff.

x It is used mostly for alfalfa inoculation.

CHAPTER IX

We have ennumerated the activities in which the Dominion Experimental Farms System is engaged. The various Divisions have their own problems, but they do not work separately. Overlapping among them does exist in the sense that certain phases of the work carried on by one Division are cared for by the investigations of another Division which is particularly well equipped to deal with them:

The Division of Chemistry, the Division of Bacteriology and the Division of Botany are primarily specialized laboratories, established for the benefit of the rest; the Poultry Division is a specialized branch of Animal Husbandry; the Tobacco Division is a specialized branch of the Division of Horticulture etc.. The Divisions exist for the benifit of the entire System, and the specialized knowledge resulting from the investigations of each Division is not segragated, but made available to all the other Divisions. The Dominion Experimental Farms System is an Entity and not a conglomeration of unrelated units.

In one of the early chapters it was stated that the Dominion Experimental Farms System did not give much attention to the problems of marketing. Now, we can be more specific. The Fibre, Tobacco, Animal Husbandry and Horticulture Divisions touch the problems of marketing only in their relation to the preparation for market. They deal

with processing, grading and packing of dairy and animal products, tobacco, fruit and fibre. But even here the work of the System is a research work, which improves the quality of the produce and increases its chances on the market by decreasing the cost of production and expense of handling, and storing. Surely all this is a necessary part of the marketing process but this is the part nearest to the process of production as against the process of "demand Creation" and "assembly". The System does not seem to be willing to undertake the business part of the farmer's interest, though there is one indication of such a venture. The System gets the information from the market as to which varieties of the product receive the most favourable welcome^{and passes it} to the farmer, together with the advice to produce the variety demanded. The System attempts to determine what grades of products the consumers are likely to demand. By doing this the System touches the problems of "Assembly". At any rate if it is at all possible to draw a clear line between marketing and production, it may be said that the bulk of the activity of the Dominion Experimental Farms System takes place on the production side of such a boundary.

We have seen now what the Dominion Experimental Farms System attempts to do, and how it endeavours to pass the information obtained to the general farming public. Let us say in a word what has been accomplished by the System up-to-date. There is seen in the farming communities

of Canada to-day, the application of principles that had their birth in the investigations of the Dominion Farms System. The Dominion Experimental Farms System did not monopolize the right to improve the methods of agriculture. The rest of the Department of Agriculture, the Educational Organizations, certain private Societies and numerous individual farmers contributed to the same end. The System and other organizations frequently faced the same problems. In some cases farmers adopted suggestions given by the System because they had heard them also from other sources. "The Canadian Seed Growers' Association", certain legislative measures such as "Seed Act", "The Destructive Insect and Pest Act", "The American Pomological Society", "The Dominion Rust Research Laboratory" at Winnipeg, Pathological Field Laboratories, Agricultural Colleges, research work at Refineries and many others, knowingly or unknowingly, work in co-operation with the System.

What is due solely to the System and what is not? We shall mention only the most important results of the activity of the Dominion Farms System. And we shall remember all the time that there are other organizations to whom Canadian Agriculture owes a certain share of its gratitude for its better practices and methods.

At the time of the establishment of the Experimental Farms, the value of good seed was not universally understood. Now it is understood widely. Seeds are graded,

cleaned and often disinfected and only varieties suitable for a particular location are sown. By selection, cross-breeding and in-breeding, new varieties were created, which possess very valuable qualities for certain localities. So "Marquis Wheat" was developed in 1904 by crossing "Red Fife" and "Hard Red Calcutta". Marquis has extended greatly the area where wheat can be grown, as it possesses the quality of maturing in a shorter time than "Red Fife". Besides this quality Marquis gives a high yield. Since 1909 Marquis became the leading spring wheat of North America. It is impossible to enter into a detailed account of the qualities of the different varieties of crops obtained. The most important new varieties of wheat are: Marquis, Garnet,^x Red Bobs, Major, Kitchener, Crown, Ruby, Reward, Prelude.^{xx} Intensive research is now being devoted to the development of a rust-resisting variety of wheat.

The new varieties of oats are: Victory, Banner, Liberty, Laurel, Columbian, Longfellow and Prolific.

The new varieties of barley are: Beaver, Chinese, Duckbill and Charlottetown.

The new varieties of flax are: Novelty and Longstem.

The new varieties of soy beans are: Beaty, Navy, and Norwegian.

x Since 1925 replaced Marquis, matures 10 days earlier.

xx Matures two weeks ahead of Marquis.

The new varieties of peas are: Chancellor, MacKay, Arthur and Cartier.

The developed and acclimatized varieties of tobacco are: For Ontario, grades of White Burley, which provide over 50% of the total tobacco yield; Broad Leaf, Marne, Hickory, Pryor, Broadleaf Resistant, Standup Resistant, Little Hill, Greenwood, Green River; For Quebec, where more than 50% of the tobacco grown is cigar tobacco, the new varieties tested and grown are: Cornstock, Spanist, Connecticut, Broad Leaf, General Grant, Canelle, Little Havana, Resistant, Havana, Zimmer, Spanish, Kendig and the Little Dutch Ragondorf.

When the Dominion Experimental Farms were established there were only 5 hardy varieties of apples known. Now more than 200 hardy varieties are known, tested and compared. The best known varieties of apples grown at Experimental Stations are: Melba, Joyce, Lobo, Patricia, Pedro, Ascot, Donal, Bingo, Elmer, Emilia, Laiver, Walbridge, Sparta, Wilgar, Famerse, Stonetosh, Macclaw, Spimil, Bethel, Anis, McIntosh, Norther Spy, Jonathan, Alexander, Charles Ross, Early Colton, Grimes Golden, King David, Rome Beauty, Newton, Pippin, Wagener, Winter Banana, Spitzerburg etc..

New varieties of plums are: Carleton, Ottawa, Carson, Rideau, Black Diamond, Bradshaw, Early Gold Green-

gage, Mallard, Pond Seedling etc..

New varieties of currants are: Saunders, Magnus, Climax, Topsy, Eagle, Boskoop and Giant Buddenburg.

New varieties of gooseberries are: Red Jacket, Charles, Mable and Silvia.

New varieties of raspberries are: Count, Brighton, and Sir John.

New varieties of strawberries are: Portia, Hermia, Cassandra, Lavinia, Mariana, Magoon, Glen Mary, Greenville, Bisel, etc..

There are great numbers of newly developed varieties of seeds for forage plants, vegetables, sugar beets etc.. Some of the developed varieties are cultivated by the farmers. The latest improved varieties are replacing the older ones.

In 1890 the nine years average yield per acre on Canadian farms was as follows:

Five years average in

1927 was:

Fall Wheat	19.4 bushels	26.8
Spring Wheat	15.2 "	18
Barley	25.8	26.7
Oats	34.4	32.6

Rye	16.2	16.6
Buckwheat	22.3	23.0
Potatoes	117.9	89.7 cwt.
Turnips	391.0	189 . cwt.
Hay & clover	1.4 ton	1.6 ton

The average yield per acre increased, in spite of the fact that the area of production gradually took in regions to the North and West which used to be considered unsuitable for agriculture. Of course, we must not forget that the increased yield resulted not only because of the better quality of seed used, but also because of the methods of cultivation and systematic rotation practised now. The soil is fertilized in certain localities, and summer-fallow in other localities. The fertility of the soil is increased by the use of leguminous plants, sometimes inoculated with nitro cultures of bacteria. Surface tillage preserves moisture in the soil, and by drainage excess moisture is taken away. Improved or newer implements are used. At the time of the establishment of the Dominion Experimental Farms the broadcasting sowing machine was generally used, and the drill was an innovation. The Experimental Farms compared these two by conducting the test for five year (1890 - 1895). They found that the average yield per acre obtained following the use of the drill was 33 bushels, and after the broadcasting machine had been used only 27 bushels.

In 1922 the Swift Current Experimental Station started experimenting with combines. A twelve-foot motor-driven Massey-Harris combine was the first to appear at the Experimental Station.^x The experiments were carried on for the purpose of determining whether or not the combines could be economically used in the drier districts of Western Canada. The combine and the Binder threshing machine combination were compared, first with respect to operating cost, and secondly with respect to loss of grain. It was found that the combine could compete favourably with the binder and threshing machine. It was found that a heavy crop flattened out by storm could be harvested more easily by the combine.

The average crop yield increased. The average production from livestock increased even more than the crop yield. At the time of the establishment of the Dominion Experimental Farms System Canada was importing for breeding purposes only very small groups of pure bred stock. More than 90% of the animals in Canada were not of pure bred stock, and had only one good quality, namely the ability to shift for themselves when necessary. The production per head was low and veterinary officers in England complained that Canadian cattle imported into England frequently carried contagious diseases. Poultry breeds which were being developed at that time interested the breeders

x The first combine in Canada was introduced by a private farmer at Spy Hill, Saskatchewan, in 1908.

from the exhibitional and not the economic point of view.

The Experimental Farms began the work of building up separate breeds, both in poultry and livestock. The breeds of poultry which received attention are as follows: Barred and White Plymouth Rocks, Silver Laced and White Wyandottes, Coloured Dorking, Light Brahmas, Langshans, Houdans, Buff Cochins, White Javas and crosses of the Plymouth Rocks and Coloured Dorking, and Indian Game and Langshan. These breeds were considered to be both egg layers and flesh formers. Breeds for egg production only, were: White Leghorns, Black and White Minorcas and Andalusians. With time some of the breeds have been dropped and some new breeds have been tried. Highly productive breeds have been developed and the average production of each hen for all Canada has been raised from about 45 eggs to about 70 eggs.^x Egg laying contests were first introduced at the Charlottetown Station, in 1918. Each Province annually conducts its own contest in at least one of the Experimental Stations. In addition, the Central Farm also holds an annual egg laying contest in which all the provinces participate. These egg laying contests greatly stimulate an interest in egg production. They provide for the farmer the means of knowing the most successful breeders in the country.

The Livestock work at the Experimental Farms was started with stock imported from England and the United

^x For British Columbia it is 111.

States. The first breeds of cattle were: Durham, Ayrshire, Holstein and Polled Angus. Later Guernsey, Shorthorn, Aberdeen Angus, Herefords and Jerseys were added.

With horses only two breeds were introduced; Clydesdale and Percheron.^x The Cap Rouge Experimental Station leads in maintaining the French Canadian general purpose breed.

With sheep the Shropshire received the most attention. Different districts raise different breeds. The System now has the following breeds: Shropshire, Oxford, Dorset, Cotswold, South Down, Lincoln, Suffolk, Leicester, Corriedale, Cheviots and Hampshire. All these breeds were brought from Europe mostly via the St. Lawrence.

With pigs the bacon type was favoured. Berkshire, Yorkshire and Tamworth are the three best liked; Poland and Duroc Jerseys represent the heavier breeds.

In the beginning the Experimental Farms had to do a pioneering work as far as pure bred stock was concerned. Pure breeds were brought from England and the United States, and the Canadian farmers first saw them at the Experimental Station. Now-a-days many hundreds of farmers sell pedigreed pure bred stock. Many thousands of farmers have cross bred and hope to develop pure bred stock. The superiority of pure bred stock over native stock is well known even by a backward peasant somewhere in Galicia or Hungary. The superiority of the earning power of pure bred stock over

^x Clydesdale became better liked.

common livestock is:^x

Dairy Cattle	47.8	per cent
Swine	38.3	" "
Sheep	37.8	" "
Beef Cattle	36.8	" "
Goats	36.8	" "
All Classes		
(Weighted Average)	40.4	" "

The average production of scrub cows is 172 lbs of fat and 3,660 lbs of milk annually. The average production of pure bred cows is 350 lbs of fat and 10,000 lbs of milk annually. The highest record for a Holstein cow was 1,218.58 lbs of fat and 37,381.4 lbs of milk in one year. An Ayrshire cow, Crocus, is reported to have given over 45 tons of milk during her 17 years of life. The weight of a pure bred beef cow is more than double the weight of an unimproved one. Pure bred beef cattle, pigs, sheep and poultry mature much quicker than native breeds; they produce more beef, mutton, pork or fat out of the same quantity of consumed feed; the quality of their product is superior.

The Canadian farmer is given the opportunity to improve his stock as the System maintains pure bred sires and sells pure bred stock at nominal prices. Now-a-days when there are many private breeders the System's work of

^x "Types and Market Classes of Livestock" by Vaughan

improving the Canadian livestock does not seem so important. All kinds of "Breeders' Associations" of the present time are in a position to improve the stock of an average farmer. But we must not forget, however, that the private breeders got their breeds largely from the System.

Though the research work in Animal Pathology has been carried on by a separate Branch of the Department of Agriculture, namely that of "Health of Animals", the Dominion Experimental Farms System participated in that work. Its herds have been used for experiments by the Health of Animals Branch and the problems which arise when dealing with pregnant cows, mares, ewes and swine were looked into independently from the Health of Animals Branch. Recommendations of the last Branch were adopted and ascertained by the System. Methods and practices of disease prevention were studied by the System also independently. The health of Canadian livestock is maintained to a greater degree than before the establishment of the System.

By introducing rotation of crops the System not only increased the average yield of the crops, but it also cleared the land of weeds and made better distribution of labour throughout the season. Complementary and supplementary crops provided the possibility of better utilization of animal power, implements and labour available.

Ignorance of good agricultural practices and methods of cultivation no longer prevails in Canada. Thanks to the System the prospects of Canadian Agriculture, as far as production is concerned, are very bright. And yet we may speak of agricultural depression in Canada. The Select Committee of 1884, which investigated the causes of agricultural depression and the tendency to abandon farms, arrived at conclusions, which would not be warranted in judging the conditions which prevail today.^x The Canadian farmer knows his business fairly well and produces much and yet he is not so well off today as in the beginning of this century. He must buy on a high priced market, and sell on a low priced market. The farmer is at a disadvantage compared with people x Though the methods of production in Agriculture during the nineteenth century needed improvement those methods were not entirely responsible for the agricultural depression between 1871 and 1900. The high prices on agricultural goods caused by the civil war in the United States and the Crimean war, together with the Treaty of Reciprocity which was favourable for Canada, made Canadian agriculture prosperous from 1854 to 1866. Canada lost part of its United States market after the abrogation of the Treaty of Reciprocity in 1866. From 1871 to 1896 the prices on agricultural products were falling. In 1896 a bushel of wheat in Canada cost 58 cents as compared with \$1.02 of 1871. From 1900 the prices on agricultural products were steadily rising.

of other industries.

The System exists for the purpose of increasing the farmer's prosperity. In what way is this being done? There are three possible ways of making farming more profitable. These three way are:

1. The increase of the price on agricultural commodities.
- 2.. The decrease of the cost of bringing the agricultural commodities from the farmer to the consumer.
3. The decrease of the cost of production.

The first way is a difficult one even when all the Governmental Machinery is made available for the enterprise. If the price can be raised at all, it is going to be a local or a national price. The System has not adopted this method.

The second way is being achieved by the united and organized activities of farmers themselves. Co-operative Associations help the farmer by reducing the cost of marketing. Farmers' Associations influence the Government and sometimes get legislative acts which help them to make marketing more orderly and therefore less wasteful. Co-operation and favourable legislation help the farmer in the second way. The System does very little.

We come now to consider the third way of increasing the farmer's prosperity. Modern methods of farming increase the productivity of units of production. By doing this they increase production and decrease the price on the commodity

produced. But, the price decreases less than does the cost of production of one unit of the commodity produced. The financial success of agriculture rests upon the relation of prices to costs. Technical improvements when practiced make the relation of prices to costs more favourable for the farmer. Some of the farmers who cannot take advantage of the technical improvements suffer. Others who adopt new scientific methods, decrease their cost of production and, therefore, prosper. Canadian agriculture which attempts to meet the export prices must remember that it has to compete with agriculture in other nations. The standard of living of the Canadian farmer is far above that of the European, Asiatic, and South American farmer. Therefore Canada produces under a handicap of extra cost.

The decrease of the cost of production by adoption of the new scientific methods of production, is of the utmost importance for Canada. The Dominion Experimental Farms System finds out such methods and tries to have them widely practiced. The System does its best to show the farmer how he can reduce the cost of production and there is every reason to believe that a wise choice has been made from among the possible ways of assisting him.

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