DOMINION OF CANADA
DEPARTMENT OF AGRICULTURE
DOMINION EXPERIMENTAL FARMS

DIVISION OF ILLUSTRATION STATIONS

PROGRESS REPORT

1934 to 1938

PART II

MANITOBA, SASKATCHEWAN, ALBERTA and BRITISH COLUMBIA

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PROGRESS REPORT ON ILLUSTRATION STATION ACTIVITIES 1934-1938

INTRODUCTION

The years, 1934 to 1938, may be summarized as a period of expansion and intensification in the nature and program of work undertaken through the organization provided by the Division of Illustration Stations. In 1938, there were 239 outpost station units linked with the Experimental Farms Service. Of this number, 192 were illustration stations and 47 district experiment sub-stations. There were 118 authorized projects under way associated with farm problems of production as well as other phases of practical agriculture as they occur in widely scattered communities.

From the standpoint of organization, these stations were divided into 17 supervisory districts. They serve as proving grounds and test points for new crops, varieties, and cultural practices. In this way the results of experimental findings may be disseminated to the advantage of neighbouring farmers through comparative trials and illustrations carried out on privately owned and operated farms. Further, the organization thus provided makes it possible for the different Divisions at the Central Experimental Farm, Ottawa, Ontario, and the branch experimental farms located in the different provinces to carry on verification tests under practical farm conditions, and in so doing to correlate such tests with experimental projects which are being investigated in a detailed way at the experimental farm. It is also possible to carry out experimental work at points distant from these central units relating to local problems which may be non-existent on the experimental farms or occur under different environmental conditions.

In 1935, under the provisions of the Prairie Farm Rehabilitation Act, the illustration stations operating in the southern portions of Manitoba, Saskatchewan and Alberta, coming within the drought areas, were reorganized on a strip farming basis, expanded to cope with soil drifting and renamed as, "District Experiment Sub-stations." All of these stations are operated on privately owned farms. The various projects are being developed in co-operation with the owners under the direction of a supervisor who works out from the branch experimental station most centrally located to the group of stations making up the supervisory district. The distribution of stations by provinces in 1938 was as follows: 14 in Prince Edward Island, 18 in Nova Scotia, 19 in New Brunswick, 58 in Quebec, 19 in Ontario, 18 in Manitoba, 51 in Saskatchewan, 24 in Alberta, and 18 in British Columbia.

The divisional progress report for purposes of publication has been assembled in two parts. Progress report Part "I" summarizes the results of the work for the crop years 1934-37, as it was carried out in the provinces of Prince Edward Island, Nova Scotia, New Brunswick, Quebec and Ontario. This, the part "II" progress report deals with the work in the four western provinces, namely, Manitoba, Saskatchewan, Alberta, and British Columbia.

Systematic Layout

The Basis of Illustration Station Farm Improvement

Illustration stations were started in the prairie provinces 23 years ago. For a number of years field crop projects were confined to a series of small fields having a frontage along a highway or well travelled road. The work on these

plots was planned with a view toward obtaining information on cropping practices which could be used in prairie farming to control weeds, maintain the fertility of the soil and, by diversifying the crops, make it possible to spread the risk of financial loss occasioned by lean grain years and sharply fluctuating prices for farm products.

After observing the results on the small fields for some years a number of station operators as well as other farmers were convinced that their entire field cropping practices could be reorganized to advantage. Consequently, since 1934 field projects, on Manitoba stations particularly, have been extended to incorporate all or at least a large part of the operator's farm. These farms were measured, suitable field boundaries struck and fences rearranged to meet the needs of the new plan. This was the type of organization adopted in 1935 for the newly instituted district experiment sub-stations. As a service to farmers other than station operators who request information relative to farm reorganization, plans are drafted and suggestions on farm layout are made.

From the commencement of this broader field of station activity, it has been recognized that conditions vary greatly between farms and between districts and that no single plan or system can be consistently employed. For instance, before definite cropping plans were chosen for the illustration station farms, the following factors were carefully studied:—

(*a*) The location and size of farm.
(*b*) Climate.
(*c*) Kind of soil.
(*d*) Prevalence of weeds.
(*e*) Numbers and kinds of live stock kept and whether an increase or decrease in numbers was anticipated.
(*f*) The amount of wild hay and pasture available.
(*g*) Adequacy of the water supply.
(*h*) Power available.

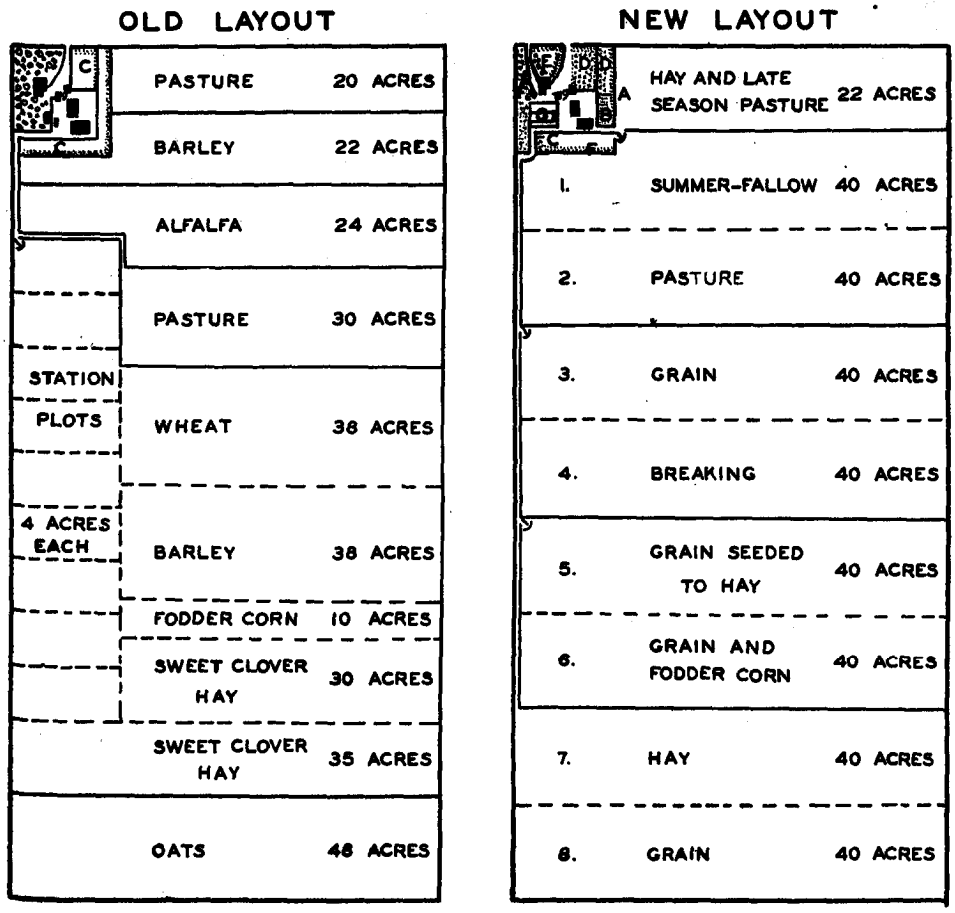
While, therefore, a crop rotation suitable in all respects to neighbouring farms cannot be followed on the stations, the main principles relative to efficient field crop planning can be demonstrated.

The two accompanying diagrams show how the farm of T. H. Roberts of Dugald, Man., has been rearranged. An illustration station was established on this farm in 1924. The new plan has been in operation for three years. On the diagram to the left the layout previous to the adoption of the revised plan will be noted. On the right is sketched the new layout which is under process of development.

Small fields have been made available near to the buildings on which to test grain varieties. Field "A" is not included in the systematic crop rotation. It has been seeded to a mixture of alfalfa and grass which provides a crop of hay after which the field is used as a supplementary pasture during August and September.

Fields 1 and 8 have been arranged to accommodate a crop rotation of eight years duration, having a sequence as follows:—

First year—Summer-fallow.
Second year—Grain.
Third year—Grain seeded to hay.
Fourth year—Hay.
Fifth year—Pasture.
Sixth year—Breaking.
Seventh year—Grain.
Eighth year—Grain.



LEGEND

FENCES
FIELD DIVISIONS
A. HAY AND NIGHT PASTURE
B. TEST PLOTS
C. SOILING CROP
D. TRIAL ORCHARD AND VEGETABLES
E. LAWN, SHRUBBERY, HEDGE, AND PERENNIAL BORDER.
F. NEW WINDBREAKS
G. POULTRY YARDS
1 TO 8. CROP ROTATION FIELDS

N

SCALE
1" = 880'

This rotation was chosen by the operator following a study of several alternatives. It was considered the best system to meet the needs of the type of farming in which he was engaged. On this farm a herd of 25 to 30 Holstein cattle is carried. Fifteen to 20 cows are in heavy milk at all times. Whole milk sold to the nearby Winnipeg market accounts for the larger share of the income made. Hay, pasture and generous supplies of good feed grain are essential. No wild hay or pasture land is available. It will be observed from

the diagram that prior to 1934 the operator had not been following a systematic plan for seeding hay and pasture fields. As each additional field of pasture was seeded a fence had necessarily to be built around this field. No fewer than five intersectional fences had been erected, but approximately half of the farm was still without facilities by which it could be brought regularly into pasture.

Dividing fields by fences on the large farms common to the Prairie Provinces incurs heavy expense and is frequently the reason why newer crop rotations and systematic cropping are not accepted as a practice. Certain types of four-, six- and eight-year rotations have, however, recently been devised whereby pairing of fields, or more properly pairing the years in the rotation, makes possible the full utilization of the farm for live stock by the erection of only a few intersectional fences. The eight-year rotation outlined above is so arranged that the first and fifth years, namely, fallow and pasture, are always together in a fenced area. Years two and six are likewise paired; three and seven; four and eight. By this method, live stock get the run of the fallow field together with the regular pasture field. As the 80 acres of fallow and pasture become bare during August, the hay aftermath on field "A" is available for pasture. Later when the grain, which is paired with hay, is removed, there is an aftermath on the hay field which provides valuable autumn grazing. Fifteen acres of fodder corn are grown each year. This occupies a strip on sod breaking alongside grain. Corn cannot be used as a summer-fallow substitute since the fallow is included in the pasture area. Cleaner and better crops of corn are, however, grown on the breaking. There may be some objection to taking a whole year to break the sod. A rotation formerly tried on this station provided for hay, or pasture and break the same year. To give time for the removal of the hay or to make the most out of the pasture, the breaking could not be accomplished until late in the summer. The heavy soil in this locality became too hard and dry for successful late ploughing and the crop the following year suffered accordingly. Under the new plan the breaking is done after seeding. This does not occasion an unnecessary waste of land on western farms because in a mixed farming rotation of this type the breaking replaces an area which in all likelihood would otherwise be bare summer-fallow.

The rotation outline does not specify what grain crops are grown. This will depend on the needs of the farm. At Dugald feed grain is a first consideration. Two or more fields are devoted to oats and barley and seldom more than one to wheat.

Comparative tests and fact-finding phases of illustration station work are linked up with this organized farm layout. These tests deal with local problems of production such as the suitability of grain varieties, hay crops and mixtures, the control of weeds and the cultural practices best suited to the breaking of sod land. Costs of producing crops are kept and data recorded comparing pasture crops with grain, hay and fodder corn.

Changes around the farmstead will be noted. "D" indicates where the new trial orchard of large fruits is located. "E" shows the improvements in front of the dwelling. These include a lawn, shrubbery and flower border along the drive backed by a trimmed caragana hedge. The old poplar bluff in which many trees had died was removed in 1936 and new windbreaks indicated by "F" have been set out.

Cereal Variety Testing, Introduction of New Varieties, and Sale of Seed

Cereal variety tests, including wheat, oats, barley and flax were conducted on some 68 illustration stations and district experiment sub-stations in 1938. This project was sponsored by and carried out in co-operation with the Dominion Cerealist and the cereal assistant on the branch experimental farms. It had

as its primary purpose ascertaining the adaptation of certain new varieties and strains in comparison with those being commonly used. Superior varieties are grown, multiplied and offered for sale by station operators to neighbouring farmers at nominal prices. During the five-year period, 1934-38, seed grain sales from this source amounted to 209,202 bushels. Grass and clover seed sales totalled 274,312 pounds, and potatoes for seed purposes to the number of 29,546 bushels were disposed of to farmers in the localities surrounding these stations. The number of farmers who procure seed in this way varies from year to year. In 1935 there were 1,308 as compared with 1938 when 1,147 farmers purchased seed from the station operators in the different provinces. In certain specialized crop districts, it frequently occurs that there is not sufficient local sale for the seed produced and substantial quantities are shipped to other areas.

Renown and Thatcher wheat in the rust-infested areas of the western provinces and Coronation in the east were extensively grown and distributed. The Vanguard oat, a variety resistant to stem rust, and Erban, which is highly resistant to leaf rust, have proved valuable and will be more generally grown in rust infested areas in the eastern provinces. In the cereal variety test, one of the numbered varieties of wheat, namely 975·1, has shown up particularly well over a period of years as a high quality rust-resistant strain. This spring it was named and released for sale as "Regent." It is being grown on a fixed scale this season by some 54 station operators in the rust-infested areas of the three Prairie Provinces.

Live Stock Improvement and Sales of Breeding Stock

On the stations in southern Manitoba, and southern and central Saskatchewan and Alberta, the trend has been for a reduction in the number of live stock kept because of the limited pasturage and forage crop supplies in recent years resulting from the drought conditions which have been experienced. On these farms where live stock is kept, to the extent of contributing in an appreciable way to the farm income, beef breeds predominate. In the northern sections of these three provinces, in British Columbia and in the five eastern provinces of Ontario, Quebec, New Brunswick, Nova Scotia and Prince Edward Island, dairy herd progress constitutes a necessary and important phase of the improvement program. The low producers are determined and disposed of on the basis of individual milk records. Greater attention to use of proven sires from high producing dams, general health and better feeding practices, are objects of illustration station operators. The tuberculin testing of herds and pullorum testing of poultry flocks are now active station projects. A number of the poultry flocks have qualified for hatchery approval, permitting the sale of eggs to commercial hatcheries.

The sales of breeding stock by operators during the past five years amounted to 1,354 head of cattle, representing the various breeds kept on the stations, 2,215 hogs of Yorkshire breeding, 474 sheep, 200 silver foxes, 4,421 cockerels, 3,727 pullets, 8,759 baby chicks and 29,973 settings of eggs.

Field Meetings and Dissemination of Information

Field meetings held on the stations each year during the period of growth are featured as a means of acquainting farmers in the surrounding community with the work being conducted on the experimental farms and illustration stations. In this way an opportunity is provided for neighbouring farmers to meet the representatives of the experimental farms and to review with them projects under way relating to field crop management, fertilizer, weed eradication, gardening and live stock activities and as well to discuss the problems that confront them in their daily operations. Those interested are taken over

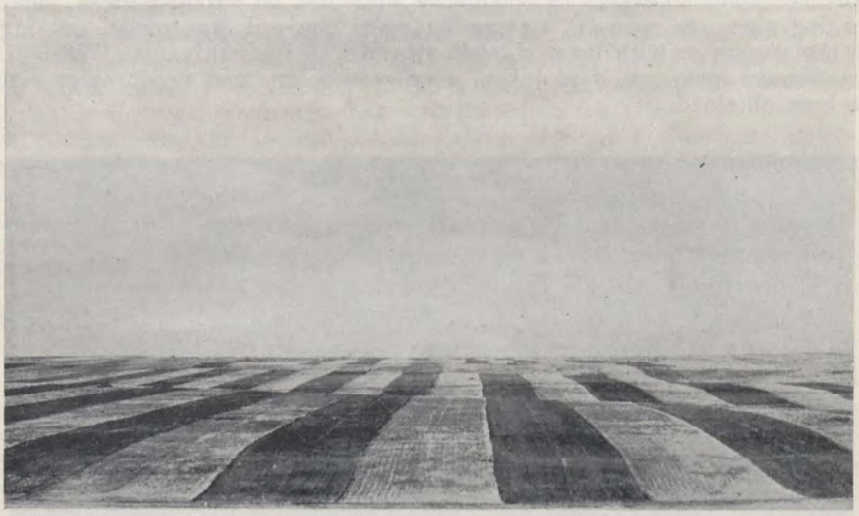
the fields and the result of the work is discussed in its relation to the whole organization. In addition, the Supervisors, working through the Superintendents of the branch experimental stations, have prepared press articles, reports and given radio talks. During the past year some 25,590 people attended 181 field days organized at station points. The average total yearly attendance for the past five-year period was 20,742. The number of meetings held totalled 783. The number present per meeting averaged 132.

A draft horse class at field day, Consort, Alta., 700 persons in attendance.

The ladies' group at field day, Hafford, Sask.

Strip Farming and Soil Drift Control

Strip farming has been a standard method of controlling soil drifting in the Monarch district of southern Alberta for a number of years. A study as to the efficiency of this practice in other areas on different soil types was undertaken in 1933 on three illustration stations, namely, at Loverna, Avonlea and Fox Valley, Sask. Upon the inauguration of the Prairie Farm Rehabilitation Act, the study of the problem of drought and soil drift control was extended and special work has been under way since 1935 on some 47 district experiment sub-stations. The work on five of these sub-stations has been developed from the Experimental Farm, Brandon, Man., ten from the Experimental Farm, Indian Head, fourteen from the Experimental Station, Swift Current, eight from the Experimental Station, Scott, Sask., and ten from the Experimental Station, Lethbridge, Alta.



Strip farming near Monarch, Alta.

Width of Strips.—In the spring of 1935 experimental studies in soil drift control were undertaken at 38 points and some 13,771 acres of land were laid out on the basis of a strip-farming program. These farms were located in districts where soil drifting had presented a problem. They were representative of the different soil types and regional conditions as they occurred in widely separated communities in southern Manitoba, southern and central Saskatchewan and Alberta, in what is referred to as the P.F.R.A. area. During the next three years additional land was put into strips as the number of sub-station units was increased up to 47. At the present, approximately 25,849 acres are given over to studying the practicability of this system of farming, including such hazards as grasshopper invasions and wheat stem sawfly, which have been found to do more damage to crops when grown in strips than when in larger fields with fewer borders. Different widths of strips have been laid down in an effort to correlate soil type and the most practical width of strip to control soil drifting. On the loam type soils the most generally used width of strip is 16 rods. Other widths are under test varying from 5, 8, 10, 13⅓, and up to 20-rod strips. On the lighter sandy loam soils the narrower strips are being used. The results so far show that 16-rod strips are well suited to the ordinary loam soils, but on some of the silt loams, it is found necessary to use narrower

strips. These strips in most cases have been arranged on the basis of a two-year rotation of fallow and wheat, or a three-year rotation of fallow, wheat, wheat.

Cultural Methods.—The results obtained from work carried out on the sub-stations indicate that strip farming alone does not control soil drifting. On the other hand, when combined with effective cultural practices, particularly those which bring about a lumpy condition of the soil and retain the stubble and trash on the surface, very satisfactory results have been obtained. During 1935 and 1936, there was little damage to crops from soil drifting on any of the sub-stations. Any such drifting came mainly from light sandy ridges and adjoining fields. In 1937 conditions were the most unfavourable since this project started. The season was one of extreme drought with persistent strong winds. Under these conditions soil drifting was controlled to such an extent that the damage from this cause was not serious. In certain cases, however, it was necessary to resort to emergency measures on exposed areas, such as spreading straw or manure, cultivating when the soil was moist, or ridging with the plough or with lister shovels attached to the cultivator. When these precautionary measures were taken, very satisfactory and encouraging results have been obtained.

Trash preserved at the surface in ploughless fallow.

Quite definite principles have been developed in summer-fallowing the land and in the handling of the trash cover. In this connection, however, it is obvious that no hard and fast rule can be applied. It is necessary to study the land to be worked and the implements available before deciding on a method. The machines which are in most common use for this purpose include the one-way disk, the duck-foot cultivator, rod weeder and such new machines as the Noble blade weeder and a new heavy spring-tooth cultivator. The objective is to develop a lumpy condition in the summer-fallow land and to retain the stubble and trash on the surface. At the conclusion of a five-year period following the 1939 crop year, it is planned to assemble for publication a summarized progress report, dealing in a detailed way with the various projects being carried out on the district experiment sub-stations relating to drought and soil-drifting problems in the P.F.R.A. area.

Sources of Farm Revenue

Farm management studies relating to sources of revenue were undertaken in 1937 on 98 farms in the eastern provinces which were being operated as illustration stations. This phase of work was extended in 1938 and returns were obtained from 124 station operators located in British Columbia and in the five eastern provinces and 88 farms in Manitoba, Saskatchewan, and Alberta. Such basic information is of very definite practical value to farmer operators as well as representatives of the Department in a long-period farm improvement program. In the Dominion there are some 728,623 farmers actively concerned in that they are located on soils of widely varying types within different climatic zones, infested with different weeds, overrun with many insects destructive to plant life, varying with respect to drainage, natural fertility and acreage under crop. Some of these farms are of irregular shape, some have a comparatively small and some a large tillable acreage. All of these factors, occurring as they do in varying relationships, make it necessary that each farmer study his organization individually when instituting an improvement program aiming at the greatest convenience, saving in labour, and economy in production.

By assembling the returns from sales of farm produce and classifying them under different commodity lines, it has been possible to ascertain the extent to which each enterprise has contributed to the gross annual revenue at each station. On the 14 stations in British Columbia supervised from the Experimental Farm, Agassiz, it has been found that the gross annual revenue amounted to $2,551.32. This does not include the produce used within the household, which contributed to maintenance of the different members of the family. Further, it was found that the five farms with the highest revenue had cash sales amounting to $4,129.13 and that the five lowest took in $1,434.98.

The following chart illustrates the diversified nature of the farming carried out on the properties operating as illustration stations in British Columbia:—

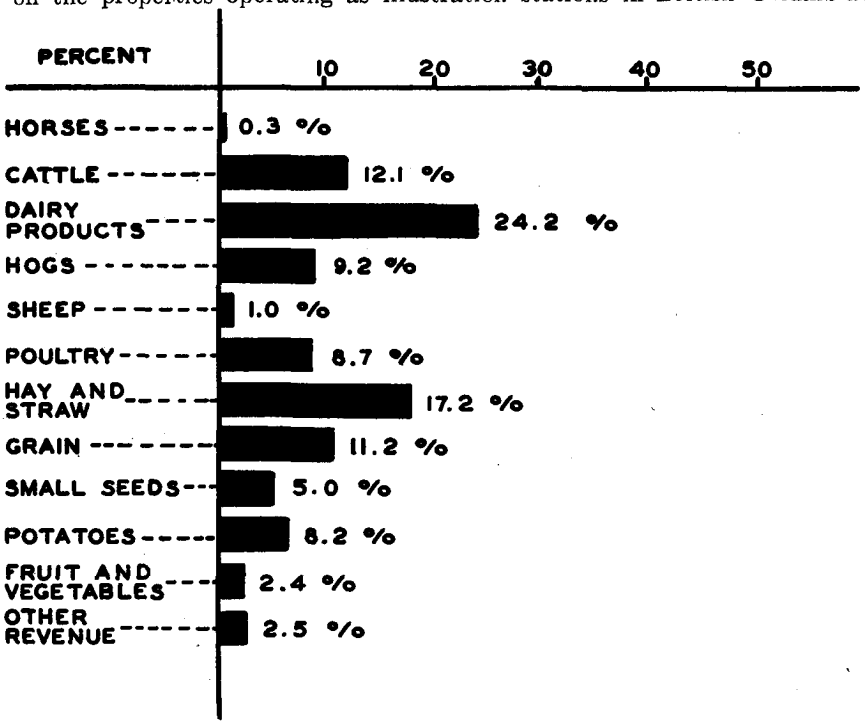


Chart showing proportion of revenue derived from various enterprises on farms operating as illustration stations in British Columbia.

It will be noted that dairy products rank first as a source of revenue, amounting to 24·2 per cent of the sales. The other revenue-producing lines in order of value were as follows: hay and straw, 17·2 per cent; cattle, 12·1 per cent; grain, 11·2 per cent; hogs, 9·2 per cent; poultry, 8·7 per cent; potatoes, 6·2 per cent; small seeds, 5·0 per cent; other revenue, 2·5 per cent; fruit and vegetables, 2·4 per cent, sheep 1·0 per cent; horses, 0·3 per cent.

In the provinces of Manitoba, Saskatchewan, Alberta, and in the Peace River Block in British Columbia, there are 90 illustration stations and district experiment sub-stations. In the farm management and farm revenue studies undertaken on these stations, an attempt has been made to classify the 54 in southern Manitoba, southern and central Saskatchewan and Alberta, or in what is frequently referred to as the P.F.R.A. district; these stations will be referred to as group "1." The 36 stations in central and northern Manitoba, also northern Saskatchewan and northern Alberta, and the Peace River Block in British Columbia, will be referred to as group "2." This latter general area is considered climatically better adapted to a more diversified type of agriculture. The following chart illustrates the relative financial importance of the different sources of revenue on the 54 farms in group "1," also the 36 in group "2."

On both the group "1" and group "2" farms, grain growing, it will be noted, was the principal source of revenue. There is, however, a variation of from 63·8 per cent in group "1" stations to 44·5 per cent for those in group "2." Other revenue-producing lines in these respective groups contributed in the following proportion: dairy products, 6·5 and 15·5 per cent; hogs, 3·2 and 13·0 per cent; cattle, 8·5 and 7·2 per cent; poultry, 5·2 and 4·6 per cent; small seeds, ·04 and 2·2 per cent; hay and straw, 0·6 and 1·9 per cent; horses, 0·5 and 1·0 per cent; fruit and vegetables, 0·1 and 0·7 per cent; potatoes, 0·1 and 0·2 per cent; bees and honey, 0·2 and 0·03 per cent; sheep, 0·01 and 0·02 per cent; and other miscellaneous sources of revenue, 10·9 and 9·2 per cent.

In addition to the produce used within the household, the average cash receipts taken in by the station operators in group "1" amounted to $2,094.68. The five stations having the highest revenue totalled $9,250 each. The five stations having the lowest revenue averaged $184.96. In group "2" the five stations yielding the highest revenue averaged $4,475.28, and the five having the lowest cash receipts averaged $464.87. The average gross annual revenue taken in by the 36 stations in this group was $2,050.91.

Taking the stations in the provinces of Manitoba, Saskatchewan and Alberta as a whole, there has been, in recent years, a greater variation in yields and cash receipts by operators than in the other provinces. In most cases the size of the farm unit or acreage under crop has not contributed in any definite way to increasing the labour income. Such factors as seasonal precipitation, frequency of rains during period of crop growth, freedom from grasshopper and other insect damage, have been the principal factors influencing wheat yields. The five stations in Saskatchewan having the highest revenue had 404 acres in comparison with the five lowest which had 603 acres under crop. The average revenue taken in the latter case amounted to $184.96. On the other hand, 22 farms in Alberta having an average of 434 crop acres returned the operators $3,369.59. It will have been noted that the northern sections of the three Prairie Provinces are adapted to greater diversification, including grain, cattle, dairy products and forage-crop seed. The station farms are smaller than in the less-humid southern sections. The volume of sales, although lower, have been steadier. For the 20 stations in Manitoba, where the crop average was 352·8 acres, the average cash return was $1,906.42.

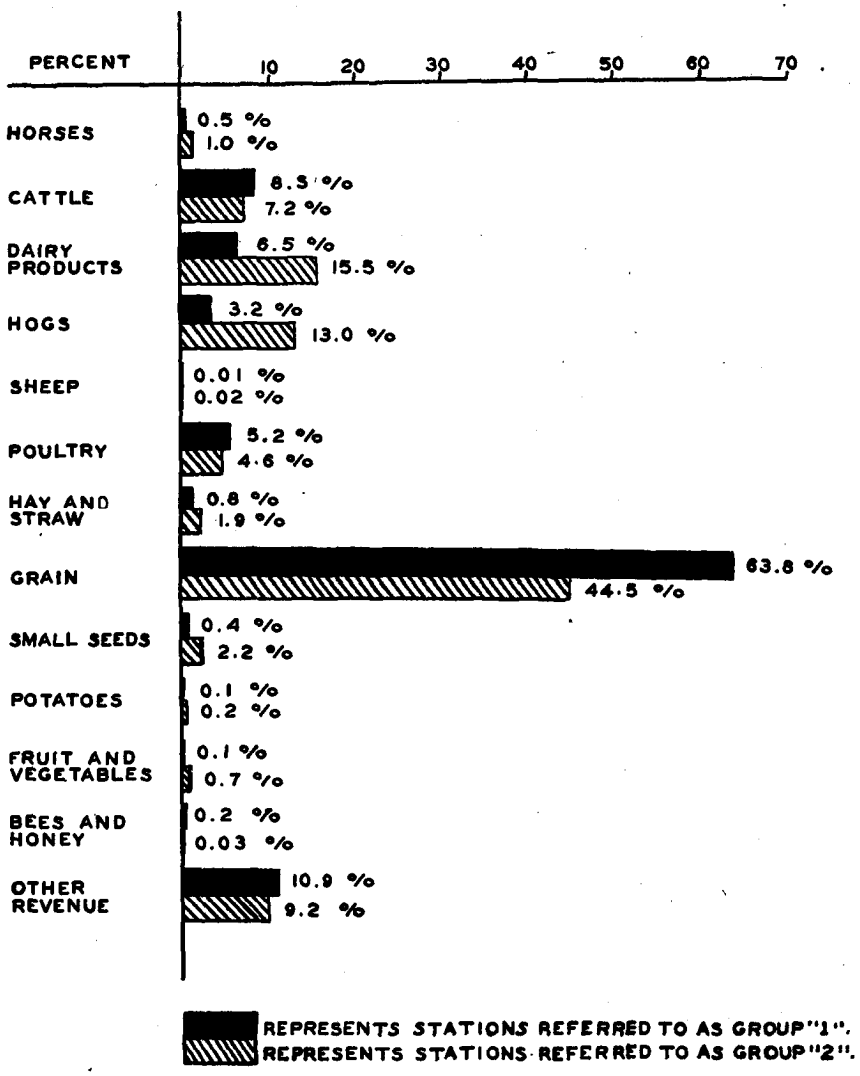


Chart showing the relative importance of different sources of revenue on illustration stations.

PROGRESS REPORT OF ILLUSTRATION STATIONS IN MANITOBA

Supervisors: D. A. Brown, B.S.A., A. W. Wilton, B.S.A.

Illustration stations were first established in Manitoba in 1924 with a Supervisor attached to the staff of the Experimental Farm, Brandon. Gradual expansion in the scope and nature of station activities developed prior to 1935. During that year, in accordance with the provisions embodied in the Prairie Farm Rehabilitation Act, three new stations were set up in southwestern Manitoba for the purpose of studying drought and soil erosion problems. These are designated as district experiment sub-stations of which five were in operation at the end of 1938. Since 1935 certain basic changes have taken place in the organization and method of assembling data on illustration stations. The work on thirteen illustration stations is reviewed in this report. These together with five district experiment sub-stations make a total of eighteen units in the province.

LOCATION OF STATIONS IN MANITOBA

District	Post office	Operator	Year Station Established
Eastern	Dugald	T. H. Roberts	1924
"	Gunton	Ellwood Fraser	1924
"	Petersfield	Wm. Michael	1924
Interlake	Arborg	M. Shebeski	1924
"	Eriksdale	R. G. Cowdery	1926
Central	Katrime	A. E. Walker	1928
"	Plumas	Fred Buschau	1924
"	Ste. Rose	Mrs. Louise Fitzmaurice	1926
Northwestern	Gilbert Plains	G. H. Best	1926
"	Kenville	A. A. Douglas	1931
"	Roblin	Robt. Arnott	1926
"	Silverton	J. J. Dunn	1935
"	Swan River	F. E. Smith	1929
Southwestern	Boissevain	C. C. Musgrove & Son	1938
"	Goodlands	C. M. Bell	1935
"	Lyleton	Edgar & Parsons	1935
"	Pipestone	Wm. Forder	1935
South-Central	Crystal City	J. B. & W. E. Ring	1937

Seasonal Conditions and Crop Growth

Stations are located in widely separated districts throughout the province. It may therefore be expected that records of precipitation will vary between stations in a given year. Crop growth varies likewise and it is not surprising that during the past decade only one year has occurred in which field crops made reasonably uniform growth throughout the province. That was in 1928.

Extremes of rainfall and temperatures, and, in the severity of attacks made by stem rust and grasshoppers, characterized the seasons from 1934 to 1938, the period dealt with in this report. Drouth was widespread in 1934 and grain crops were much below normal. Added to drouth, an invasion of grasshoppers in the south and west helped to destroy growth in most fields before the middle of July, and for the first time since land settlement began in this area, complete crop failures were experienced by many farmers. Weather conditions were reversed in 1935 as copious rains fell at frequent intervals throughout the summer, especially in southern districts. Vegetative growth was unusually heavy, but stem rust reduced the yield and quality of wheat to disappointing proportions. Drouth returned in 1936, being particularly severe in the south and west, but decreasing in intensity toward the north and east. Good crops were harvested in the Winnipeg, Portage la Prairie and Swan River districts,

but the larger part of the province reaped sparse yields and sustained a serious feed shortage. Localities which were dried out in 1936 welcomed abundant rainfall and good crops in 1937. However, the disastrous Saskatchewan drouth crept deeply into northwestern Manitoba, scorching crops in areas which seldom suffer from want of moisture. During this year stem rust once more attacked wheat crops in the south and accounted for reduced returns from susceptible varieties such as Ceres, Reward and Mindum. The crop season of 1938 opened cool and wet. Conditions were favourable for crops until the middle of June when dry weather again visited the southern part of the province and continued to the end of the year. Grasshoppers invaded several municipalities in the southwest. In general hay crops were good, grain crops light in the south, average in central districts and heavy in the north and east. Stem rust made its appearance on wheat early in July, but since the large proportion of the crop in Manitoba, in 1938, was composed, for the first time, of rust-resistant varieties, injury was largely confined to the districts in the south where Mindum durum is grown.

PRECIPITATION ON MANITOBA STATIONS, FOR THE CROP YEAR AUG. 1, 1937 TO JULY 31, 1938, AND AVERAGE FOR THE FIVE CALENDAR YEARS 1934 TO 1938 INCLUSIVE

District and Station	Autumn Aug. 1 to Oct. 31, 1937	Winter Nov. 1 to Mar. 31, 1937–38	Summer 1938				Total for summer months	Total for Crop year Aug. 1 1937 to July 31 1938	Average for five calendar years 1934–38 inclusive
			April	May	June	July			
	in.	in.	in.	in.	in.	in.	in.	in.	in.
ILLUSTRATION STATIONS									
Red River—									
Dugald	4·76	4·75	0·87	1·80	0·93	2·66	6·26	15·77	16·71
Gunton	9·08	5·35	0·46	0·84	3·27	2·54	7·11	21·54	17·14
Petersfield	7·12	3·72	0·43	0·60	3·08	3·41	7·52	18·36	16·20
Inter-lake—									
Arborg	5·87	4·71	0·75	1·50	2·19	2·97	7·41	17·99	15·43
Eriksdale	6·77	4·51	1·18	1·42	2·57	2·00	7·17	18·45	17·85
Central—									
Katrime	9·84	5·63	1·02	0·56	1·17	1·35	4·10	19·57	17·69
Plumas	4·43	6·35	0·60	0·04	1·19	1·08	2·91	13·69	15·57
Ste. Rose	7·80	2·90	0·99	0·93	2·39	0·77	5·08	15·78	15·73
North Western—									
Gilbert Plains	7·55	5·00	0·85	1·39	1·45	2·02	5·71	18·26	14·51
Roblin	5·25	7·60	0·50	1·89	2·68	1·07	6·14	18·99	15·01
Silverton	4·94	5·17	0·56	1·61	4·04	1·73	7·94	18·05	16·20*
Swan River	3·34	5·64	2·80	1·37	1·41	3·90	9·48	18·46	18·62
DISTRICT EXPERIMENT SUB-STATIONS									
S. W. Manitoba—									
Boissevain	—	—	0·76	1·60	0·98	2·26	5·60	—	—
Crystal City	3·25	3·77	1·00	1·31	1·00	1·54	4·85	11·87	—
Goodlands	3·31	3·83	0·59	1·17	1·20	3·26	6·22	13·36	16·69*
Lyleton	5·60	2·76	0·34	1·35	1·35	1·20	4·24	12·60	13·12*
Pipestone	5·00	3·50	0·33	1·01	0·63	4·86	6·83	15·33	16·01
Experimental Farm—									
Brandon	7·56	5·24	0·68	1·43	1·64	2·18	5·93	18·73	18·33

* Three year averages.

PRECIPITATION BY STATIONS DURING TEN CALENDAR YEARS 1929-1938 INCLUSIVE

	Red River			Interlake		Central			Northwestern				South-western	Exper-imental Farm
	Dugald	Gunton	Peters-field	Arborg	Eriks-dale	Katrime	Plumas	Ste. Rose	Gilbert Plains.	Roblin	Silver-ton	Swan River	Pipe-stone	Brandon
	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.
1929.....	12·99	11·53	13·35	11·81	15·18	15·74	13·10	.....	7·04	11·66	.....	17·40	12·95	15·08
1930.....	21·99	17·27	17·43	15·27	18·85	16·65	12·86	.....	13·23	16·58	.....	20·58	16·36	20·45
1931.....	16·56	14·35	15·80	17·00	26·20	20·09	15·26	.....	12·92	16·51	.....	15·26	13·06	14·82
1932.....	16·41	17·01	18·53	15·52	19·32	21·00	18·68	.....	13·83	17·45	.....	17·25	18·36	24·33
1933.....	19·22	13·48	13·32	16·07	17·78	18·66	15·63	18·44	14·60	17·17	.....	23·68	13·86	19·55
1934.....	17·75	15·74	16·72	15·53	16·55	16·50	11·10	11·39	10·68	12·27	.....	17·35	10·01	11·14
1935.....	19·75	16·72	17·02	20·80	25·70	23·16	22·95	27·77	20·94	18·54	.....	20·83	24·29	26·52
1936.....	12·60	15·47	15·71	10·70	12·30	11·29	13·95	11·10	11·00	14·89	13·87	16·93	12·02	15·32
1937.....	18·73	24·48	17·63	16·39	20·36	27·47	19·85	18·24	16·90	15·48	14·02	17·89	19·23	24·76
1938.....	12·74	13·31	13·93	13·74	14·34	10·02	10·01	10·13	13·92	13·88	17·70	20·10	14·52	13·91
Ten Year Average	16·87	15·94	15·94	15·28	18·66	18·06	15·34	.....	13·42	15·44	.....	18·73	15·47	18·59

Province wide there have been four wet summers during the last decade, namely: 1930, 1932, 1935 and 1937. During the other six years growing seasons varied from very dry to medium dry. A study of the above table reveals that dry and wet years usually alternate. Forty years records at the Brandon Experimental Farm show that only twice during this time have dry summers extended to two successive years.

Organization and Progress on the Station Farms

ARBORG

M. Shebeski, Operator

At the commencement of work on this station in 1924, projects relating to field crops were conducted on six fields each four acres in size. From these fields information was obtained which indicated that crop systems including hay and pasture could safely be put into practice in this district. Soils here are inclined to be heavy and moist, and when cropped continuously to grain, become infested with weeds. This is a district well suited to mixed farming. Bearing this in mind and making use of the information already obtained from the small fields relative to cropping systems, field crop projects were extended in 1936 to include all of the 160 acres farmed by the operator. Eight fields were staked out and the necessary divisional fences erected. On these an eight-year rotation of crops was established. Each year this plan provides four fields in grain and one each in hay, pasture, breaking and summer-fallow.

During the past two years Thatcher and Renown, two recently introduced rust-resistant wheats, have been grown with more than ordinary success, and this station has made a valuable contribution to the distribution of these as well as to the increasing of the new rust-resistant oat named Vanguard.

Much good feed is grown on the rotation fields. This makes possible the maintenance of a milking herd of grade cows which is being improved by the use of pure-bred dual purpose Shorthorn sires. Several litters of pure-bred Yorkshire pigs are reared and marketed annually.

Attention has recently been focussed upon the improvement of the Barred Rock poultry flock. Blood testing and culling have been in progress for four years. A suitable brooder house for chicks was erected in 1938 and plans are under way to erect a new henhouse.

The demonstration fruit orchard and vegetable garden continue to attract the attention of neighbours. Tree fruits have not been as successful over a ten-year period as was anticipated following encouraging results during the first five years. Crabapples and the hardier sorts of good quality plums can, however, be grown satisfactorily in this district, provided the trees are planted on a well drained location. A shelterbelt of broadleaf and coniferous trees was set out along the north and west boundaries of the farm yard in 1936. Growth has been rapid and these trees will soon prevent snow from banking around the buildings and orchard.

DUGALD

T. H. Roberts, Operator

During the eleven years this station has functioned, the unqualified success of alfalfa as a hay crop has been a feature. Sweet clover for hay and as a cleaning crop has proved of lasting value, while fodder corn, when planted on clean land, has provided an abundance of desirable feed for dairy cows at a reasonably low cost.

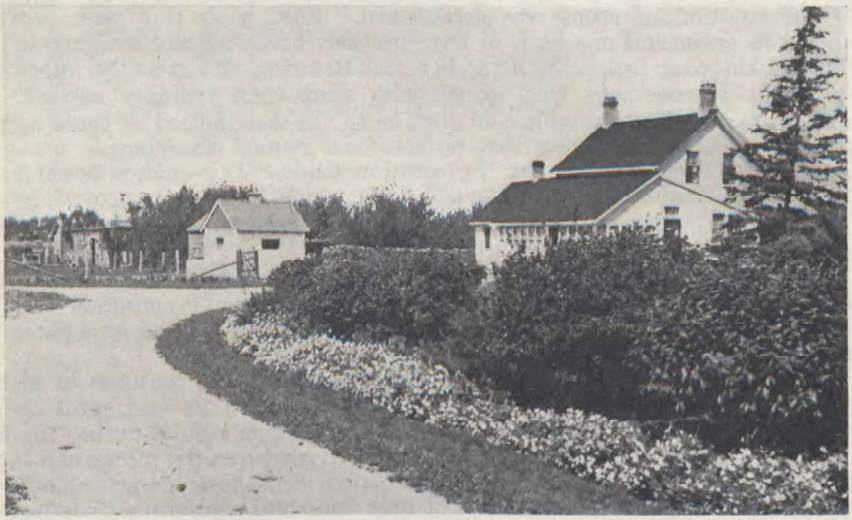
Dairying is the main activity on this farm in common with the majority of farms in the district. They are close to the Winnipeg wholemilk market. Abundance of cheap but good quality feed is a necessity. In order to provide this and at the same time to illustrate an advantageous layout for dairy farms in this locality, the 320-acre farm of the operator was divided into nine fields in 1936. Eight of these accommodated the following rotation:—

First year—Summer-fallow.
Second year—Grain.
Third year—Grain.

Fourth year—Hay.
Fifth year—Pasture.
Sixth year—Breaking.
Seventh year—Grain.
Eighth year—Grain.

The ninth field was seeded with a mixture of alfalfa and brome grass for hay, and to provide auxiliary pasture during late summer and autumn.

In the eight-year rotation, fields are arranged in pairs thus bringing fallow and pasture always together; grain and breaking; grain and grain; hay and grain. By this plan the best possible use of the fields for pasturing and feeding dairy cattle can be obtained by erecting cross sectional fences between every second field. On the heavy soil of this farm it has been found advisable to devote an entire season to sod-breaking. The hay and pasture mixture used is made up of timothy, slender wheat grass, meadow fescue and sweet clover.



A difficult task well done on the heavy soil at the Roberts home, Dugald, Man.

Aside from field crops and dairying, poultry and gardening are accorded special attention at Dugald. Hatchery chicks are reared in a well equipped brooder house. The laying flock is carefully culled each autumn and records of production are kept. Among horticultural projects the trial fruit orchard, started in 1934, has up to the present given favourable results. Crabapples and plums appear well adapted to the location. Fruit was picked for the first time in 1938. Raspberries constitute the bulk of small fruits grown. A new homestead shelterbelt plan was devised in 1935 to replace the old plantation of poplars which was dying out. In compliance with this plan 1,700 trees were set out in 1936 and a similar number in 1937. Several years ago the driveway into the buildings was improved and made attractive by planting caragana hedges, shrubbery, perennial and annual flowers along the margins.

ERIKSDALE

Robt. G. Cowdery, Operator

To more adequately meet the needs of the shallow, stony soils of this district and the kind of mixed farming which must necessarily be practised, the whole of the operator's farm was in 1937 arranged into five fields, four of

these for a crop rotation and the fifth for the production of alfalfa seed. The rotation is as follows:—

First year—Summer-fallow.
Second year—Grain.
Third year—Sweet clover hay (plough as soon as hay is removed).
Fourth year—Grain.

The alfalfa is left down as long as it produces seed profitably. Seeding in rows versus broadcast has been compared with little difference in the yields obtained.

A herd of 25 dual purpose Shorthorn cattle is kept. Improvement within the herd has progressed steadily during the past 15 years by the use of sires made available through a local bull club.

Poultry flock improvement has been a definite project since 1934. The benefit of systematic culling and testing for pullorum has been obvious. Birds are healthier and more uniform in size and markings. Revenue from eggs has appreciably increased. This has been due in part to the higher prices secured from eggs sold to hatcheries, and to the increased sales of breeding stock.

The trial fruit orchard, started ten years ago, has been the source for useful information, enthusiastically solicited by residents in the district. During the first two years nothing interfered with normal tree growth. Rabbits gained entrance in the third and fourth winters and inflicted irreparable damage. As trees grew older, yellow foliage (chlorosis) appeared and was responsible for the loss of several crab and plum trees. It continues to present a problem, but the direct application of iron citrate to the trunks of trees in 1937 resulted in partial to complete recovery of affected subjects. Following this lead, iron was applied in liberal quantities in the form of iron sulphate to the root zones in 1938. Not only does chlorosis attack fruit trees on the high limestone "Interlake" soils, but shade trees and leguminous garden and field plants are subject to its ravages. Orchard trees began fruiting in 1932 and since 1933 fair crops of plums and crabs have been picked annually. Standard apples came into bearing in 1937.

GILBERT PLAINS

G. H. Best, Operator

The soil on this station farm, while inclined to be light in texture, is rich in plant food. Success with cultivated crops is not only assured when rainfall is normal, but weed growth is troublesome.

During the past ten years a mixed farming rotation on small fields proved worthy of trial on a larger scale. Therefore, the whole of the operator's farm was brought into an eight-year cropping system in 1937. The rotation and farm layout is similar to that described under Dugald.

The operator built a substantial poultry house in 1936 and a definite plan for flock improvement began at that time. Blood testing has effectively reduced the number of pullorum reactors. Culling has resulted in more size and a greater uniformity of type in the laying flock. A commodious brooder house was added to the chick rearing equipment in 1937 during which season out of 350 baby chicks purchased, 328 were reared to maturity. The average laying flock in 1938 numbered 150. During this year the sales of eggs and dressed meat brought a revenue of $340. Few other activities on this farm bring more substantial returns for the time and money spent than poultry.

Cattle are not kept in large numbers, but individuals on hand are of good grade dairy breeding. Sales of butterfat in 1937 amounted to $242 and in 1938 to $233. Pure-bred Yorkshire pigs realized $276 and $257 in cash sales respectively for the years 1937 and 1938.

Horticulture occupies a place of importance on this station. Among fruits, raspberries, plums and crabapples are grown successfully. The trial orchard,

started in 1938, is now of fair proportions and has become a centre of attraction to visitors. Plans were completed in 1935 for putting an extensive shelterbelt and snow trap around the north, east and west sides of the farmstead. This belt required 3,200 trees. Planting was completed in 1938.

GUNTON

Ellwood Fraser, Operator

When station work began on this farm in 1924 perennial sowthistle was a troublesome weed. In recent years it has largely disappeared from the station area. The chief reason for this on the basis of comparison with adjacent lands is attributed to the seeding of alfalfa, sweet clover and grasses in rotation with grain crops. Sweet clover alone or mixed with slender wheat grass and brome provides an acceptable hay and pasture crop. Alfalfa seeded alone does well during the first two years, but on the silt loam soils of this farm and locality, which have a decidedly saline reaction, the vigour of alfalfa has repeatedly disappeared after the second year. Better results obtain when it has been seeded in a mixture with grasses.

Among chemical fertilizers tried at Gunton, ammonium phosphate applied at the rate of 40 pounds per acre has materially increased the yields of grain crops.

New rust-resistant varieties of wheat and oats were increased on this station in 1936-37-38 for distribution to the public. These included Renown wheat, registered Vanguard No. 7, and Anthony oats.

The Gunton station features a large and well cared for vegetable garden which supplies a generous variety of table vegetables, sufficient to last throughout the whole year. In addition, a small trial orchard contributes crabapples and plums. The home grounds are kept clean and tidy. A spacious lawn is bordered by trees, shrubbery and flowers.

KATRIME

A. E. Walker, Operator

Field crops, horticulture and poultry rearing are features of the work conducted on this station.

Due to careful cultural methods the land on the operator's farm is kept reasonably free from weeds. The soil is a medium loam and is predisposed to drifting by wind. The operator has prevented damage from this agency on his land by narrowing fields and seeding brome grass in strips at intervals across the large expanse of level cultivated acreage. During the ten years that this station has functioned, crop rotation work has been confined to seven fields of four acres each. Proposals are under way to extend investigations with mixed farming rotations to the larger fields in 1939. Seed production is featured. In 1936 there were 500 bushels of the new Renown wheat sold to Manitoba and Saskatchewan farmers. A car load was disposed of to the Saskatchewan Department of Agriculture, both in 1937 and 1938. Anthony and Vanguard oats have been sold in large quantities in recent years, while the new selection of malting barley named Mensury O. 60 is available from a 1938 increase of seed.

Horticulture occupies a much larger place on the Katrime station than is usual on Manitoba farms. The home grounds are spacious and have been completely isolated from the barnyard by means of tall shelterbelt trees. Caraganas for hedging, evergreens, flowering shrubbery, herbaceous perennials and a generous variety of annual flowers have been employed in a planting plan which lends beauty and distinction to the surroundings for a dwelling house which is fully modern and always attractively painted.

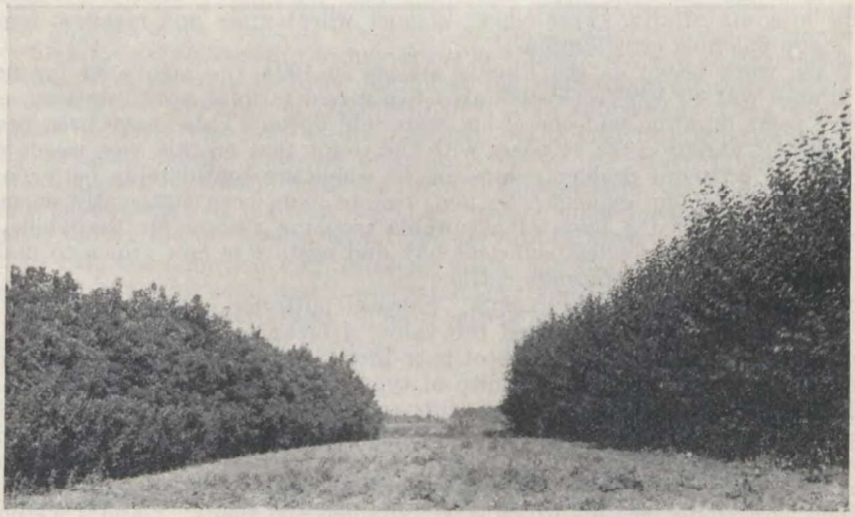
Orchard trees were planted in small numbers several years before the farm was selected for station work. Since 1928 apple trees, crabs, plums, cherries, pears and grapes have been set out in large variety until in 1938 these occupy three acres and total 287 trees. This orchard is rapidly becoming a source of reliable information for a large section of central Manitoba. In addition to tree fruits the operator finds time to care for a generous sized plantation of bush fruits including variety tests of gooseberries, currants, raspberries and strawberries.

The poultry flock has been doubled in size within the past three years. In 1938 there were 300 chicks raised and in the early autumn 150 pullets were placed in laying quarters. Blood testing for pullorum and strict attention to culling have become annual features. Chicks are reared some distance from the adult flock yard, while a temporary laying house was erected in 1937 on new land, to which the flock was removed for one year in order to effect proper sanitation in and about the permanent quarters. Revenues from sales of eggs, dressed meat and breeding stock were $131.00 in 1937 compared with $337.00 in 1938.

PETERSFIELD

Wm. Michael, Operator

Crop rotations, including alfalfa, sweet clover and grass, have done much to control weeds which were exceedingly troublesome when station work began in 1925. Alfalfa does very well in this district and on the station. It has no equal among commonly grown crops as a weed fighter. Corn growing in the earlier years was attended by high costs of production due to weeds. It was, however, fitted into a rotation following sweet clover hay and as the land



Four-year-old shelterbelt plantings on the illustration station, Petersfield, Man.

became cleaner, costs for intertilled crops were reduced as much as 50 per cent. Experience here and at other stations proves that it pays to select clean land for the corn crop. In 1936 Thatcher and Renown, both rust-resistant wheats, were introduced. Several hundred bushels of the latter were sold for seed during the first general distribution of this new variety in 1937. The 1937 wheat crop was largely of Thatcher. Yields were approximately 40 bushels per

acre and from this crop 3,500 bushels were sold as certified seed. The new Mensury O·60 barley succeeds well on the soil of this station and from the first small acreage grown in 1937 sufficient seed was obtained to make a wide distribution in the neighbourhood.

The poultry flock has been tested for pullorum for four years. Careful selection among pullets has helped to develop a flock possessing marked uniformity. Production is high and from 150 birds in 1938 a total income of $232.00 was made. Revenues are substantially augmented by sales of hatching eggs at good prices during the months of April, May and June.

Under the guidance of the Dominion Forest Nursery Station at Indian Head, the operator undertook in 1935 to plant extensive tree shelterbelts. A total of 5,500 trees were required to complete the plan. Previous to this time caragana to the number of 5,000 had been planted in hedges around the buildings. These plantations not only provide complete shelter for the buildings, but enclose a fifteen-acre frontage through which the drive from the highway to the buildings is laid. Single rows of evergreens run along each side of the drive. Tree growth on the deep rich loam soil of this farm is extraordinarily vigorous.

PLUMAS

Fred Buschau, Operator

Farm lands on the station and in the district are light in texture and subject to wind erosion. Extensive acreages have been severely injured by this agency during the past 30 years. However, a process of recovery is now evident, due largely to the adoption of mixed farming which required that much of the cultivated land be kept in clover and grass for hay and pasture. Work on the station fields, among other objectives, has been designed to prevent soil drifting. In this program alfalfa, sweet clover, slender wheat grass and meadow fescue have made valuable contributions.

When work began on the Plumas station in 1924, the area used for field crop studies was 40 acres. On this area two mixed farming crop rotations, one of three years duration and one of six, were laid down. These have been practised without variation for 14 years with the result that on this area weeds are no longer an economic problem, crops on the whole are considerably better, and soil drifting is seldom evident. In fact, results have been sufficiently encouraging to be used as the basis of a suitable cropping system for the whole of the operator's farm on which sufficient hay and pasture is now grown to maintain a large herd of dual purpose cattle.

Sixteen cows are usually in milk. Sales of butterfat in 1938 amounted to $377.00 to which should be added the value of cream and butter used in the home. During recent years the use of pure-bred sires of approved conformation has distinctly increased the uniformity of type within the operator's herd.

Hogs share an important place with other live stock on this farm. For many years the best of Yorkshire breeding has been maintained and the operator is a firm believer in stabilizing his pig population no matter what variations occur between the prices of barley and pork. On this farm hogs are provided with ample pasture, which is well drained and shady. Careful methods of feeding result in rapid gains and early marketing of individuals is usual. Net sales of finished hogs from five litters in 1937 brought $553.00 and from a similar number in 1938, the sum of $569.00. This does not include pork dressed for home consumption.

Distinct improvement has taken place in poultry since blood testing and culling were instituted four years ago. A new laying house was built in 1935. Chicks are reared in a brooder house heated by a coal stove. Total sales of eggs and poultry products amounted to $226.00 in 1937 and $336.00 in 1938. To

each of these amounts should be added approximately $100.00 for the value of eggs and meat consumed in the home.

The operator is an ardent gardener. Vegetables are grown in large quantities and small fruits are accorded an important place. In 1928 several crab and plum trees were planted, starting a small trial orchard which ten years later comprised 125 trees. Crabapples and plums have been picked in liberal quantities annually since 1933 and standard apples bore for the first time in 1937. Visitors to field meetings on this station have considerably increased in recent years due largely to the attractiveness of the orchard trees, the home grounds and garden area.

ROBLIN

Robert Arnott, Operator

Drouth in 1934-36-37 and a severe epidemic of stem rust in 1935 resulted in successively poor crops during four of the last five years on this station and in the surrounding district. According to agricultural history of this area the above four years referred to constitute the longest period during which returns from grain crops have been consistently poor. There was a return to better conditions in 1938 when suitable weather and a preponderance of rust-resistant wheat varieties combined to produce substantial yields of good quality grain. During the four lean years forage crops suffered less than cereals and there was an increase in live stock raising and dairying as farmers devised other means of maintaining revenues.

Weeds have presented a constant problem since work began on this station in 1926. Stinkweed, wild oats, Canada thistle and ball mustard are the most prevalent offenders. Crop rotations including one or two years in hay, have reduced wild oats. Canada thistle is less prevalent than formerly. Ball mustard is sporadic in its infestations, but stinkweed tenaciously remains. It grows freely in grain crops, shedding much seed which in turn gives rise to plants that present a ragged appearance in hay crops and fallow stubble during the month of June. It is perhaps the most difficult of the winter annuals to eradicate, but a well balanced sequence of crops will hold it in subjection. Crop yields are actually not greatly reduced by its presence and its unsightly appearance during early summer months may be accounted one of its worst faults. Russian thistle appeared on station fields for the first time in 1936. It spread from sand banks on an adjacent highway to which it had undoubtedly come from feed wagons during the northward trek from the drouth areas in 1933-34.

In 1936 the four-year crop rotation, which had been practised on the small illustration plots for some years, was extended to include all the cultivated land on the operator's 160-acre farm. The sequence of this rotation is as follows:—

First year—Summer-fallow.
Second year—Grain.
Third year—Clover Hay (plough as soon as hay is removed).
Fourth year—Grain.

The summer-fallow and hay fields are kept together and both grain fields together. By this arrangement and the erection of one intersectional fence, half the farm is available for pasture purposes as soon as the hay is removed. In fact, in normal seasons, live stock can have the run of the fallow and clover fields, excepting during the latter part of June, while the hay finishes its growth and is being cured and stacked.

For the past three years purity tests have been conducted with samples of seed wheat submitted by local farmers. These are analysed at the annual field meetings when the majority of contributors are present.

Vegetable gardening is accorded special attention by the Roblin operator. From the standpoints of arrangement, selection of varieties and methods of culture, his garden is always a first class example.

Turkey raising represents the phase of poultry work to which most time is devoted. Dressed birds in 1938 realized $120.00.

SILVERTON

J. J. Dunn, Operator

Authorization to establish a station in this district was granted in the summer of 1935 and work commenced in 1936. Among field crop projects crop rotation studies have occupied first place, although considerable importance has been attached to variety tests with pasture crops. The operator owns one of the largest and most choicely bred herds of Hereford cattle in Manitoba. The provision of pasture, hay and feed grain for the 90-odd animals in this herd is a constant problem and because of this it has been decided to extend mixed farming rotations from the small station plots to a 480-acre portion of the operator's farm. An eight-year rotation, which features four fields in grain and one each in hay pasture, sod breaking and summer-fallow, will be arranged over this extensive area in the spring of 1939.

To provide more protection from winds and snow drifting for the large and substantial buildings on this station farm, a plan for setting out windbreaks of trees was approved in 1935. These belts were completed in 1938 after a total of 9,000 seedlings had been planted. They are regarded as demonstration plantations, the main belts being composed of from three to five rows of elm, maple, poplar and caragana. Paralleling these belts at a distance of 60 feet and on the outside from the buildings, a single row caragana hedge serves as a snow trap.

Other horticultural projects on this station include the development of a trial fruit orchard, the maintenance of a large vegetable garden and the beautification of home grounds by hedges, shrubbery, lawns and flowers. The showing made by annual flowers in 1938 was especially fine and drew much favourable comment from visitors.

STE. ROSE DU LAC

Mrs. Louise Fitzmaurice, Operator

Soil on the station farm and in its immediate vicinity is of a yellowish, silty clay texture, not particularly fertile, and, subject to wind erosion when the surface remains unprotected by vegetative growth or crop residues. The main objectives connected with field crop projects have been to maintain fertility and prevent drifting by the use of legume and grass crops. Fortunately sweet clover and slender wheat grass have established good stands with little difficulty. Advantages from their inclusion in a four-year crop rotation for the past twelve years have been distinctly visible. Sweet clover is used for hay, pasture and as green manure. Little benefit has resulted from ploughing down the green growth early in July.

Weeds, especially the recently introduced dog mustard and perennial sowthistle present a continual problem. The four-year crop rotation of fallow, grain, clover, grain, has kept sowthistle well under control and the mustard, due to its habit of late season growth, does little harm to grain crops on fallow or after hay, provided the seed bed is thoroughly cultivated prior to drilling.

From 40 to 50 grade cattle are kept on this station. A dozen cows are milked while others nurse calves. Cash returns from this good herd, exclusively from fat calves and steers in 1938, amounted to $600. A herd of this size fits very well into a farming program which is essential to maintain the fertility of the land on the average 480-acre farm in the Ste. Rose area.

SWAN RIVER

Frank E. Smith, Operator

Crop yields have been consistently good on this station since work began in 1929. The soil and climate in Swan river valley favour grain and fodder plants. Unfortunately, however, innumerable weeds flourish. Because of these, the labour necessary to ensure clean grain crops is relatively greater than on the drier soils in more southerly districts. Some plan of mixed farming is obviously the practical solution to the weed problem in this northern area. Having this in mind the whole of the operator's farm was arranged into an eight-year rotation in 1936. The sequence of crops is similar to that outlined under Dugald. This plan is proving satisfactory to the operator who desires to keep his land sufficiently clean in order that he may continue to sell all his surplus grain for seed purposes. He also requires hay and pasture for a pure-bred herd of 25 Holstein cattle and feed grain for these as well as to rear and fatten the progeny of two brood sows and support a fair sized poultry flock.

Legume and grass seed are produced as important sidelines. In 1937, crested wheat grass seed sold for $300. In 1938 alfalfa and crested wheat grass seed netted $330.

Among quantities of grain seed sold during recent years the operator of this station has introduced the following varieties to many districts: Renown wheat, Gopher, Anthony and Vanguard oats, Trebi, Wisconsin No. 38 and Mensury O·60 barley.

Aside from field crops and live stock, horticulture is a featured activity on this station. The buildings are sheltered by well arranged and extensive groves of trees. A small but successful trial orchard is demonstrating that farmers in the valley can, with little extra labour and time, grow their own crabapples, plums and cherries.

Field Crops

CROP ROTATION AND FARM PLANNING

For some years the illustration station Supervisor has given assistance to farmers who have requested information on farm planning. The need for more carefully planned systems of cropping on Manitoba farms becomes increasingly apparent. Certain conditions are either singly or collectively giving rise to new, and, what are hoped to be, improved methods of crop production. For instance natural meadows and pastures are declining in both productive power and quality of vegetation. This calls for the seeding of more cultivated grass. Weeds have increased under a system of continuous grain growing and present a perplexing problem. Soil drifting is inflicting incalculable damage to large acreages of grain land. The natural fertility of the soil is deteriorating. These circumstances, coupled with the decrease in the demand for wheat on the markets of the world during recent years, render grain crops, which are sold for cash, less certain than formerly from the standpoint of both yield and monetary returns. In the light of these facts it is not surprising that productive agriculture in Manitoba is to-day leaning toward a husbandry which combines with grain growing the raising of beef cattle, dairy products, hogs and poultry; the keeping of bees and the production of grass and legume seed, fruits and vegetables. On not a few farms these are no longer sidelines, but represent one or more of the major sources from which revenues are obtained.

For a number of years field crop projects on the station farms were confined to relatively small acreages. After a time when certain of the cropping systems appeared of practical value, some of the operators requested that these be extended to all the cultivated area of their farm. Accordingly plans were

drafted for the Swan River station in 1935, for Arborg, Dugald and Petersfield in 1936, Roblin and Eriksdale in 1937 and Gilbert Plains in 1938. At the close of 1938 projects similar in scale have been considered for the remaining stations, namely at Gunton, Katrime, Plumas and Silverton.

When adapting mixed farming rotations to the expansive fields typical of prairie farms, economy in fencing is of singular importance. Other considerations include the need of leaving grass sufficiently long to rebuild the fibre content of the soil, and preparation of this sod land for a succeeding grain crop. These and other factors have led to the adoption of an eight-year crop rotation on the farms at Arborg, Petersfield, Dugald, Gilbert Plains and Swan River. The crop sequence is as follows:—

First year—Summer-fallow.
Second year—Grain.
Third year—Grain.
Fourth year—Hay.
Fifth year—Pasture.
Sixth year—Breaking.
Seventh year—Grain.
Eighth year—Grain.

On the dairy farm at Dugald fodder corn is grown on part of one of the grain fields.

The rotation years are so arranged that summer-fallow and pasture always come within one fenced area. Similarly the second and sixth year crops are paired; the third and seventh and the fourth and eighth.

Diagram showing necessary fencing and pairing of crops.

	x	x	x	x	x	x	x	x
Field Number....	1	2	3	4	5	6	7	8
Crops.....	Fallow	Pasture	Grain	Breaking	Grain	Grain	Hay	Grain
	x	x	x	x	x	x	x	x

x Necessary fences.
– Field boundaries.

A plan of this kind reduces cross fencing more than half and provides the constant use of one-quarter of all the land for pasture. A full season is given for breaking the sod land. After 14 years of experience on the stations, this is considered the most satisfactory practice. There need be no objection to one field lying idle as sod breaking, because under the majority of grain rotations now employed, summer-fallow usually occupies from one-quarter to one-half of the land. By the use of this eight-year rotation bare fallow is reduced to one-eighth of the total area.

Other crop systems now in use on station farms are as follows:—

Three-year:—

First year—Grain.
Second year—Grain.
Third year—Clover hay.

The clover hay is removed early in July after which the field is ploughed and worked for the remainder of the season as a partial fallow. If the clover field is kept for a second cut of hay or for late summer pasture, the land dries out and during the next two years the grain crops are likely to be poor.

Four-year:—

First year—Summer-fallow.
Second year—Grain.
Third year—Clover hay.
Fourth year—Grain.

This is a good rotation for the drier areas on farms where abundant feed is required for live stock. Like the three-year plan previously described the success of this system depends largely on the handling of the clover. The crop must be removed and the land ploughed early in July for best results.

Six-year:—

First year—Summer-fallow.
Second year—Grain.
Third year—Hay.
Fourth year—Pasture and break.
Fifth year—Grain.
Sixth year—Grain.

When arranging a farm for this rotation a plan of pairing fields and reducing the necessary fencing can be followed similar to that described under the eight-year rotation.

CEREAL CROPS

Varieties of wheat and oats possessing high resistance to stem rust have been introduced on to the illustration stations during the past five years. One of these wheats, Thatcher, was first grown on the station farms in 1935. In 1936 the new variety, Renown, was grown on eleven stations in Manitoba for the purpose of providing a supply of seed. The resulting crop totalled 3,000 bushels, of which 2,400 bushels were used in the first distribution of this variety made to the general public. In 1937 the heavy wheat crops harvested on the majority of stations were composed largely of Thatcher and Renown. From this crop much good seed was shipped into the dried out areas of Saskatchewan. In 1938 Renown had largely replaced Thatcher, when a total for all stations of 10,000 bushels was threshed. Before the close of the year most of this had been disposed of as seed.

The new rust-resistant oat named Vanguard was grown on the stations for the first time in 1937. During this year the operator at Gunton produced 160 bushels of Elite seed of the selection now designated Vanguard No. 7. This was cleaned and sealed as registered first generation stock and disposed of in small lots to seed growers. No registered Vanguard had previously been available for public distribution. The 1938 crop at Gunton grown on new breaking, totalled 800 bushels. It is a stock entirely free from weed seeds and represents the main supply of registered seed of this variety at present available.

New barley varieties grown on the stations in recent years have included Mensury O·60, Peatland and Wisconsin No. 38. The former was introduced in 1937 as a good malting sort. The season favoured its growth and from the heavy crops harvested fair quantities of seed were sold to neighbouring farmers. Peatland has not been grown extensively, mainly because it does not yield particularly well, but it is more resistant to rust than any of the varieties at present accepted for malting. Wisconsin No. 38 is a vigorous growing, smooth awned, feed barley which has yielded higher than most other varieties at Swan River, Dugald, Gunton, Eriksdale and Arborg.

A barley variety test was conducted on six stations in co-operation with the cereal department of the Brandon Experimental Farm in 1938. Included in this test were new selections and varieties from the University of Alberta, the Brandon Farm and other breeding centres. Results showed a new variety originated at Brandon to be distinctly superior to others in yield, strength of straw and in non-shattering characteristics.

COST OF PRODUCING CEREAL CROPS

Cost figures have been kept ever since stations were instituted in Manitoba in 1924. At the present time when market prices are extremely low and the future possibilities of marketing large surpluses of wheat are uncertain, considerable importance is attached to all factors which will keep down the cost of production, leaving as wide a margin as possible in favour of the selling price.

While it has been established that the working of large acreages with the proper complement of modern machinery is the most efficient way to reduce costs, in many districts of Manitoba, the acreage per farm can only support moderate sized equipment. However, wheat is still the most important crop in this province and results on the station farms, which are typical of the average farm set-up, show that the chief influences governing costs are as follows:—

(*a*) Yield with which is coupled quality.
(*b*) The thoroughness of management applied to all phases of crop production.

The importance of high yield per acre is obvious. Costs involved are very nearly as great for a poor crop as for a good one. Quality must also be associated with profitable production. Rust-resistant varieties, treating seed for bunt smut, and handling the crop so that bleaching of kernels will be prevented as much as possible, are factors under the control of the grower which assure a better yield and higher quality.

Thoroughness of management includes the manner in which a farmer performs all the functions necessary to grow crops. It is recognized that he can only influence yield to a certain degree and must await the hand of nature to complete the task. He is, however, fully responsible for the cleanliness and condition of the seed bed and the manner and timeliness in which seeding, harvesting and threshing are done. He must wisely adjust his equipment to the annual average acreage worked; otherwise he may lose on the one hand because of lack of power and machinery, and on the other because of the overhead incurred by too much expensive equipment.

WHEAT.—YIELD AND COST OF PRODUCTION BY STATIONS

District and Station	Yield per acre 1938	Cost per bushel 1938	Average yield per acre 5 yrs. 1934-38	Average cost per bushel 5 yrs. 1934-38
	Bush.	$	Bush.	$
Red River—				
Dugald	26·2	0·38	26·1	0·48
Gunton	20·3	0·49	19·7	0·57
Petersfield	26·1	0·51	25·4	0·54
Interlake—				
Arborg	21·8	0·50	25·5	0·49
Eriksdale	16·5	0·48	16·5	0·58*
Central Manitoba—				
Katrime	26·3	0·38	17·6	0·62
Plumas	22·0	0·41	18·7	0·49
Ste. Rose	17·0	0·55	16·0	0·70
N.W. Manitoba—				
Gilbert Plains	22·0	0·51	24·0	0·52
Roblin	24·5	0·48	15·5	0·79
Silverton	20·4	0·52	14·9	0·64†
Swan River	31·0	0·32	22·2	0·49
Averages	22·8	0·46	20·2	0·58

* 2 year average.
† 3 year average.

OATS.—YIELD AND COSTS OF PRODUCTION BY STATIONS

District and Station	Yield per acre 1938	Cost per bushel 1938	Average yield per acre 5 yrs. 1934-38	Average cost per bushel 5 yrs. 1934-38
	Bush.	$	Bush.	$
Red River—				
Dugald	32·0	0·24	44·1	0·23
Gunton	61·0	0·14	36·0	0·28
Petersfield	—	—	37·8	0·33*
Interlake—				
Arborg	43·0	0·20	41·5	0·25
Eriksdale	26·0	0·29	—	—
Central Manitoba—				
Katrime	35·0	0·24	35·4	0·25
Plumas	35·0	0·18	44·0	0·19
Ste. Rose	31·5	0·24	25·7	0·33
N.W. Manitoba—				
Gilbert Plains	35·0	0·20	32·7	0·26
Roblin	28·5	0·26	27·1	0·35
Swan River	43·0	0·20	39·5	0·23
Averages	37·0	0·22	36·4	0·30

* Three year average.

BARLEY.—YIELD AND COST OF PRODUCTION BY STATIONS

District and Station	Yield per acre 1938	Cost per bushel 1938	Average yield per acre 5 yrs. 1934-38	Average cost per bushel 5 yrs. 1934-38
	Bush.	$	Bush.	$
Red River—				
Dugald	20·0	0·39	35·0	0·25
Gunton	24·0	0·33	31·5	0·28
Petersfield	37·0	0·28	39·1	0·28
Interlake—				
Arborg	40·0	0·21	31·7	0·28
Eriksdale	32·4	0·21	21·7	0·52
N.W. Manitoba—				
Gilbert Plains	19·0	0·35	19·7	0·52
Roblin	24·8	0·31	15·6	0·78
Silverton	30·0	0·27	21·0	0·41*
Swan River	32·5	0·34	35·7	0·29†
Averages	28·9	0·29	27·9	0·40

* Two year average.
† Three year average.

Costs vary considerably between stations even when yields are similar. Reasons for these differences are numerous, but in the main they are,—the varying amount of tillage necessary due to differences in soil structure and the weed growth; whether the crop was grown on bare summer-fallow, stubble ploughed land, corn land or after hay and pasture. In some instances the amount of straw in relation to grain is so great that costs of handling are accordingly increased.

FORAGE CROPS

Crop rotations of longer duration in which grass and legumes remain down from two to five years are being introduced on a number of stations especially in districts where the annual rainfall exceeds 16 inches. New mixtures of grass

and clover have been necessary to meet the requirements of a field which is utilized for hay from one to two years, after which it is pastured for a further period. In the north and east timothy is highly regarded as a pasture plant although it was not formerly used when hay was the sole requirement from seeded-down fields. Because of its vigour during the first crop year, sweet clover is frequently included in mixtures which are cut for hay the first year, and pastured thereafter. Alfalfa is being used sparingly in crop rotations where fields are pastured because of its tendency to cause bloating. Crested wheat grass up to the present has been seeded alone, mainly to determine its value in the localities served by stations.

Hay and pasture mixtures now in use are:—

1. Sweet clover and brome grass—8 pounds each.
2. Sweet clover or alfalfa, meadow fescue and slender wheat grass—5 pounds each.
3. Sweet clover, brome and slender wheat grass—8 pounds of clover to 4 pounds of each of the grasses.
4. Alfalfa, slender wheat grass and timothy or meadow fescue—5 pounds each when meadow fescue is used and 5 pounds of alfalfa and slender wheat grass to 3 of timothy.

Numbers one and three are used in the drier districts while two and four are more suited to the moister areas in the north and east.

Alfalfa.—This crop is annually gaining in favour throughout Manitoba. Its supreme quality as a hay is conceded and fortunately it is proving of wide adaptability. In the north and east, particularly on the high limestone and podsolic soils it sets seed satisfactorily and a rapid increase in the production of alfalfa seed in Manitoba is taking place. The total crop in 1934 was 30,000 pounds compared with 425,000 pounds in 1938.

Portions of alfalfa fields on a number of stations are kept for seed each year and useful information is recorded from the results obtained. Considerable importance is attached to the problem of seed production, especially in districts where farmers in increasing numbers are attempting to produce seed, but, because of uncertain yields, have frequent cause to solicit information relative to this clop.

Sweet Clover.—Following are some of the reasons why sweet clover continues to be a highly regarded crop on the Manitoba stations:—

1. Its ability to produce a large bulk of nutritive forage even in dry seasons.
2. Its capacity for fighting weeds.
3. Its soil enriching properties.
4. The ease with which stands can be obtained.
5. Because of its habits of growth it is well adapted to short rotations of crops on farms where grain growing is the chief objective.

The main objection to sweet clover in recent years has been its tendency to volunteer in grain crops and to spread where not wanted. Occasionally it is branded by farmers as a weed. On station farms sweet clover has not become a weed, because it is grown almost exclusively for hay and as soon as the crop is removed late in June or early in July the stubble is ploughed and subsequent cultivation prevents any seed stems from developing.

A dwarf white sweet clover developed at the Experimental Farm, Brandon, has undergone trial on the north and eastern stations for some years. It has given a good account of itself at Arborg, Gunton, Petersfield, Dugald, Katrime, Gilbert Plains, Roblin and Swan River. In 1938 two acres were reserved for seed at Petersfield from which approximately 1,500 pounds were threshed. Late in 1938 this selection was licensed under the name "Brandon Dwarf".

New Perennial Grasses.—Crested wheat grass was introduced on nine stations in 1937. During that year an experiment was conducted to investigate the practicability of late fall seedings. In some instances the seed bed used was unmolested grain stubble, while in others fall ploughed land and clean potato ground were used. Resulting stands in 1938 were good at Katrime and Gilbert Plains on potato land and at Plumas, Ste. Rose, Silverton and Swan River on clean stubble. Thin stands appeared at Arborg and Gunton on a fall ploughed stubble seed bed, and at Petersfield on unploughed stubble. Growth at Gilbert Plains was early and so rapid that a cutting of hay was taken in early July. This, however, is not a usual expectation from fall seedings and even when such heavy growth does occur, experienced growers indicate that it is better left during the first year, when root development should be the main objective. The operator at Swan River seeded 13 acres to this grass in 1936. The seed stock was registered. Crops of seed were harvested from the area in 1937 and 1938. Net profits respectively of $20.00 and $7.00 per acre were realized.

Reed canary grass was seeded on a low area at Silverton in 1937 for pasture purposes. It made an excellent stand in 1938, and it was decided to save seed from the heavy growth in order to sow a larger area. It is doubtful if any other grass at present available is so well suited to low land which is subject to periodic flooding.

Creeping red fescue has been on trial at the Swan River station since 1934 for pasture purposes. It is a fine, round-leaved fescue, suited mainly to moist northern areas. Its top growth is usually thin and this discriminates against it for hay purposes. At Swan River the growth has never been sufficiently vigorous and heavy to make a good pasture. It was included in the grasses seeded for pasture trials at Silverton in 1937 and showed to advantage on low land in 1938.

Cost of producing hay crops.—The question is frequently raised as to whether cultivated hay crops can be profitably grown on the grain farms of Manitoba. Costs of producing various fodder crops have been kept on the

YIELDS AND COST OF PRODUCING HAY ON THE ILLUSTRATION STATIONS IN MANITOBA

Averages for the five year period 1934-38 inclusive

District and Station	Mixed legume and grass down two years		Sweet clover and slender wheat grass down 1 year		Alfalfa permanent fields	
	Yield per acre	Cost per Ton	Yield per acre	Cost per Ton	Yield per acre	Cost per Ton
	Ton.	$	Ton.	$	Ton.	$
Red River—						
Dugald	1·65	4 25	1·80	3 55	1·91	3 80
Gunton	1·63	4 94	1·87	3 66	—	—
Petersfield	2·11	4 29	2·50	2 98	2·60	3 17
Interlake—						
Arborg	2·14	3 02	—	—	—	—
Central Manitoba—						
Katrime	1·53	4 56	—	—	2·25	5·20
Plumas	1·54	4 02	1·70	3 49	3·19	2 37
Ste. Rose	—	—	1·28	3 25	—	—
N.W. Manitoba—						
Gilbert Plains	—	—	1·36	4 55	0·90	6 40
Roblin	—	—	1·29	6 38	1·05	7 04
Silverton	—	—	1·25	5 25*	2·13	3 36†
Swan River	1·43	4 88	—	—	2·13	4·37†
Averages	1·72	4 28	1·63	4 14	2·02	4·46

* Three year average. † Two year average.

station farms for 14 years. The information gathered is not for the purpose, however, of answering the question as to whether it pays to grow these crops, but rather to establish a cost figure which can be used by farmers who have stock which must be fed, and who consider the price of cultivated hay used is represented by its cost of production. It is impossible to compute the value of cultivated hay. In consequence the question of whether it pays as a farm crop can only be answered in terms of the value of such a crop when utilized through animals for the production of meat and dairy products, or when used as a soil improvement crop.

The mixed legume and grass is composed of alfalfa or sweet clover, slender wheat grass or brome, and meadow fescue or timothy.

Alfalfa yields are from fields which have been down from two to ten years. Those at Roblin and Gilbert Plains have been seeded eight and ten years, respectively. This explains in part the low yield averages at these two points for the past five years. Drouth at both places also helped to curtail yields during this period. Generally, however, a permanent alfalfa field reaches its maximum production during the second to fourth years. Thereafter a gradual decline is apparent.

Weed Control

In not a few instances weeds have been reduced on the Manitoba stations by cropping and cultural practices until they no longer present an economic problem. Among the older stations where heavy infestations of weeds existed when work began, but which are now relatively clean, those at Gunton, Plumas and Dugald are worthy of special mention. Satisfactory progress has also been made at Petersfield, Eriksdale, Arborg, Gilbert Plains, Ste. Rose and Swan River.

Certain weeds, which have been recently introduced into Manitoba, are making their appearance on station farms. Dog mustard has in the past ten years become the worst weed on the Ste. Rose station and in the surrounding district. It is reputed to have been brought to this district in clover seed. Russian thistle constantly invades new territory and within the past three years it has become established on the stations at Roblin, Gilbert Plains and Ste. Rose.

General conclusions relative to weed control based on 14 years of observation on station farms are given as follows:—

1. Methods of combating weeds must necessarily differ in accordance with variations of soil and climate. Under dry conditions the principal noxious weeds are easier to keep in check. Similarly, eradication measures are simplified when the soil is of light friable structure and easy to work, but soil drifting through excessive tillage on these soils must be guarded against.
2. Intensive tillage methods for weed control such as are frequently imployed on bare fallow, or on stubble fields between grain crops may be immediately effective, but have little permanent value as long as an exclusive grain rotation is practised.
3. Mixed farming rotations distribute the necessary work for weed control to better advantage than grain systems. They also provide more time and often the best opportunity for killing weeds.
4. Mixed farming rotations on the stations have obviously controlled wild oats, Canada thistle and sowthistles much better than grain rotations. Annuals such as pigweed, stinkweed, peppergrass, Russian thistle and mustards have not been kept in subjection as thoroughly as perennials but their progress has been more effectively hampered by the use of hay and pasture than by successively growing grain. Annuals

are more spasmodic in their attacks than perennials. The best field crop system will not prevent invasions of Russian thistle and other tumble weeds, stinkweed, pigweeds and mustard, nor will it remove some of these once their long lived seeds get into the soil, but a well balanced rotation of crops will give the farmer a better chance to fight them.

5. To be fully effective for weed control it is now evident that grasses and legumes must remain down for longer periods than the one or two years which have been the usual practice up to the present. The value of a pasture year in the course of a cropping sequence cannot be over emphasized.

Horticulture

Tree Fruits.—Testing of tree fruits began on the stations in 1928. Planting material is obtained from the Experimental Station at Morden. Thirteen stations have trial orchards. These serve to demonstrate the practicability of growing large fruits under the varying conditions of climate, soil and location found throughout Manitoba. The following table presents a statistical summary showing when each orchard was started, the numbers and condition of the trees in 1938 and the results as measured in yields of fruit:—

SUMMARY OF TRIAL FRUIT ORCHARDS—MANITOBA STATIONS

Station	Year when planting began	Total number of trees which had died up to 1938	Number of trees in orchard 1938	Condition of trees 1938			Crop picked 1938			
				Good	Fair	Poor	Apples	Crabs	Plums	Total
				No.	No.	No.	lb.	lb.	lb.	lb.
Illustrations Stations—										
Arborg	1928	42	64	25	25	14	0	220	16	236
Dugald	1934	5	87	67	16	4	0	15	50	65
Eriksdale	1929	35	50	18	26	16	40	200	25	265
Gilbert Plains	1928	9	110	60	30	10	47	320	400	767
Gunton	1928	6	30	19	6	5	0	45	120	165
Katrime	1925	53	287	247	27	13	0	720	1615	2335
Kenville	1932	28	357	340	9	8	50	900	875	1825
Petersfield	1928	7	46	24	16	6	0	25	40	65
Plumas	1928	23	125	68	41	16	10	240	200	450
Silverton	1936	6	78	66	12	0	0	0	8	8
Swan River	1930	21	71	52	18	1	0	310	125	435
District Exp. sub-Stations—										
Goodlands	1936	16	34	22	10	2	0	0	0	0
Lyleton (Edgar)	1938	0	36	36	0	0	0	0	0	0

Up to the present very few varieties of standard apples have been found hardy. Many crab varieties are, however, showing wide adaptation and bear heavy crops of excellent quality fruit annually. Plum-cherry hybrids of superior quality succeed reasonably well, while several Minnesota productions of high quality plums show promise in favoured locations as far north as Swan River. Aside from these a generous list of hardy plums selected from the Manitoba wild sorts has been included in all orchards. While the quality of these is not all that could be desired, the trees are hardy everywhere and bear heavy crops of useful fruit.

Bush Fruits.—Raspberries are grown more extensively than other bush fruits in station gardens. Varieties in general use are Herbert, Chief, Latham and Starlight. Strawberries are highly prized, but since they do not succeed well under dry conditions their culture is largely confined to northern locations

where moisture is more abundant, such as at Swan River, Kenville and Silverton. Mr. R. W. Allen, who co-operates with the Illustration Stations Division in testing crops at Wanless on the Flin Flon railway north of The Pas, reported heavy crops of strawberries in 1938 from the everbearing variety, Green Mountain. Senator Dunlap is still the most popular June bearing variety on the stations.

A section of the illustration stations fruit exhibit at the Manitoba Horticultural show, 1938.

Red, black and white currants are grown at all stations. Red Cross, Diploma and Prince Albert are first choices among red sorts; Climax, Kerry and Magnus among blacks; while the White Grape has so far been grown exclusively as a white variety. Gooseberries have been the least popular among bush fruits up to the present, due largely to the absence of good quality varieties. Recently, however, such new and high quality introductions as Pixwell, Abundance, Perry, Kopa and Kataga have been planted in station gardens and in not a few instances they have demonstrated that the gooseberry is the most dependable crop among bush fruits.

Vegetable Gardens.—Station gardens are so planned that they provide useful information relative to the choice of varieties, the various kinds of vegetables which should be included in farm gardens and the best practical garden lay-out. Noteworthy progress has been made during recent years in the distribution of Macdonald rhubarb within station districts, in the development of asparagus beds and in demonstrating methods for the production of head lettuce, large onions from seedling transplants, and successful tomato culture.

Ornamental Gardening.—The illustration station program recognizes that attractive home grounds and tidy farm yards not only give pleasure and pride to the farmer and his family, but they definitely contribute to the value of the farm. Consequently, operators are encouraged to improve their home surroundings by laying out neat drives, setting out shrubbery and planting flowers. Distinct progress has been made along these lines at Arborg, Dugald, Eriksdale, Gilbert Plains, Gunton, Katrime, Kenville, Petersfield, Plumas, Silverton and Swan River. Plantings are in no instance elaborate because it is recognized

that the time a farmer has to spend on such work is limited. This project is, however, designed to illustrate the beneficial effect of tastefully arranged hedges, shrubbery, perennial and annual flower beds, in conjunction with a small lawn adjacent to the dwelling house, or along the approach to the buildings.

KENVILLE HORTICULTURAL STATION

A. A. Douglas, Operator

It is seven years since work began on this station, which is situated in the Swan river valley. Chief interest is centred in the trials with tree fruits, but all phases of horticulture receive attention.

Tree Fruits.—Trees on the four acres now planted total 360. These include 20 varieties of standard apples, 18 of crabs, 40 of plums and plum-cherry hybrids, 2 of pears and 5 of grapes. The soil is a deep, black loam recently broken from rich, virgin woodland. The topography is sharply undulating, providing north, east and western slopes. Natural shelter from trees and hills is adequate.

Haralson apple tree bearing fine large fruits at the Kenville station, northern Manitoba.

During the winter of 1933-34 bush rabbits (Varying Hare) over-ran the orchard. Fortunately most of the trees were small and benefited from snow protection, but a number of large trees were girdled. In 1934 a five-foot fence of "Layflat" poultry netting was erected around the plantation. This has prevented further intrusion by rabbits.

All rows of trees run north and south. First plantings were made in rows 12 to 18 feet apart with trees spaced 12 feet in the row. Growth has been surprisingly vigorous and already these distances are becoming inadequate. Recent plantings of apples and plums have been in rows 24 feet apart.

The winters of 1933-34 and 1934-35 rated among the longest and coldest since settlement began in Manitoba. Tree fruit growers classified them as "test" winters. The trees at Kenville survived these winters extremely well. Had they been older and in bearing for some years, damage would undoubtedly have been heavier. Crabapple varieties showed little ill effect from the severe conditions. Most of the standard apples killed back slightly, but soon recovered.

All hardy plums showed little evidence of distress. In fact the only tree losses during these two winters were among plum varieties introduced from southern Minnesota.

Seven varieties of standard apples bore fruit in 1938. The outstanding example was a tree of the Haralson variety, which four years after planting bore enough large, bright coloured fruits to fill an apple box. This is a standard sort in Minnesota where it originated.

The performance of crabapples has been fully satisfactory. Most varieties began fruiting four years after planting and have continued to yield heavy crops annually without signs of deterioration from weather or disease.

Variation in reaction to climate has been more visible among plum and cherry varieties. This is possibly the result of introducing the less hardy but higher quality originations from southern nurseries. Mammoth, Assiniboine, Mina, McRobert and Cheney, all native selections, do perfectly well, but those derived by crossing with tender sorts such as Pembina, Ojibwa and Radisson tend to kill back during severe winters. Hansen hybrids such as Opata, Sapa, Ezaptan and Tom Thumb are low growing and have benefited by the heavy snow covering usual at Kenville, to the extent that they have been highly successful.

Vegetable Gardening.—In 1933 a small plantation of the new Macdonald rhubarb was started. Growth has been almost phenomenal and the rapid increase from a meagre beginning has provided a surplus of roots, many of which have been distributed locally. Other features among vegetable tests include the successful culture of sweet corn, sweet Spanish onions from transplants, asparagus, early potatoes and head lettuce.

Tree Shelterbelts

In 1935 planting of shelterbelts began on stations where a lack of protection from winds and driving snow existed. Assistance in this project was had from the Dominion Forest Nursery Station at Indian Head. Plantations were designed to illustrate new and improved ideas which have resulted from years of experience in prairie tree planting by the Forest Nursery Station. A tabular summary of this project is contained in the following table:—

SUMMARY OF TREE SHELTERBELT PLANTING—MANITOBA STATIONS

Station	Number of trees planted 1936–38	Refills necessary 1937–38	Total trees planted 1936–38	Refills required in 1939	Percentage stand at end of 1938
Illustration Stations—					%
Arborg	1,370	83	1,453	93	93
Dugald	1,675	80	1,755	105	94
Gilbert Plains	3,300	106	3,406	266	92
Petersfield	5,270	220	5,490	300	96
Plumas	525	50	575	10	98
Silverton	8,400	554	8,954	634	92
Ste. Rose	1,760	—	1,760	340	81*
District Experiment Sub-Stations—					
Goodlands	3,620	525	4,145	80	98
Lyleton	5,295	910	6,205	80	99
Pipestone	1,475	150	1,625	75	95

*Planting did not begin at Ste. Rose until 1938. Others were started in 1936 and 1937 and refills have been made, thus building up the percentage stand as indicated in the last column.

Live Stock

Horses—Operators of stations are following the general trend of replacing horse power with tractors. The subjoined table enumerates the kind and amount of power used in relation to the acreage under cultivation on each station.

FARM POWER EQUIPMENT ON MANITOBA STATIONS IN RELATION TO CULTIVATED ACREAGE

Station	Acreage under cultivation	Has operator a tractor?	Number of work horses maintained
Illustration Stations—			
Arborg	165	No	7
Dugald	320	Yes	8
Eriksdale	65	No	4
Gilbert Plains	190	No	6
Gunton	400	Yes	8
Katrime	310	Yes	4
Petersfield	290	Yes	4
Plumas	580	Yes	10
Roblin	160	No	5
Silverton	560	No	15
Ste. Rose	400	No	8
Swan River	155	No	5
District Experiment Sub-Stations—			
Boissevain	291	Yes	8
Crystal City	890	No	16
Goodlands	830	Yes	10
Lyleton—Edgar	450	Yes	8
Lyleton—Parsons	620	Yes	10
Pipestone	580	No	14
Averages	404	0·5	8·3

Cattle.—Numbers of cattle on the stations have fluctuated during the past five years, especially in the south and west where drouth in the years 1933-34-36 caused serious feed shortages. Particulars relative to each station herd are contained in the following table.

CATTLE HERDS ON MANITOBA STATIONS—NUMBERS AND BREED KEPT AND REVENUE FROM CASH SALES DURING 1937-38

Station Designation	Breed	Number in herd	Revenue from sales of breeding stock, beef and dairy products	
			1937	1938
			$	$
A	Shorthorn (grade)	18	264·99	226·86
B	Holstein (pure-bred)	24	1,839·14	2,436·62
C	Shorthorn (grade)	22	271·67	290·26
D	Shorthorn (grade)	14	522·18	247·63
E	Shorthorn (grade)	36	774·68	427·74
F	Shorthorn (grade)	10	250·37	207·36
G	Shorthorn (grade)	38	813·59	776·51
H	Hereford (pure-bred)	12	48·60	63·00
I	Hereford (pure-bred)	90	2,143 31	1,788 51
J	Shorthorn-Hereford (grade)	35	548 93	594 50
K	Holstein (pure-bred)	22	319 48	548 30
L	Holstein (grade)	20	.....	647 18
M	Shorthorn (grade and pure-bred)	40	.....	560 40
N	Shorthorn (grade)	14	74·86	109 33
O	Shorthorn Angus Cross	22	687 81	444 22
P	Angus (grade)	18	.....	484 11
Q	Shorthorn (grade and pure-bred)	40	754 30	483 33
Averages		28	665 28	607 99

The herd on station B is used exclusively for the production of whole milk, which is sold to the Winnipeg market. The greater proportion of the income from the herds on stations A, C, D, E, G, K, and L is from the sale of butterfat. Breeding stock and beef represent the bulk of revenue from cattle at stations I, J, H, F, M, N, O, P, and Q. Cash sales from the herds utilized entirely for beef in 1937 and 1938 were significantly lower per head than from those where dairy products shared in the revenue.

Poultry

Improvement of the poultry flock has been an outstanding achievement on a number of stations during the past five years. Operators particularly interested in this class of husbandry have been encouraged to comply with the requirements of the Manitoba Approved Flock Policy. Their flocks have accordingly been blood tested for pullorum and culled since 1935, and their buildings have been brought up to standard requirements. In addition these operators record the production of their flocks, report their sales of eggs and the price received.

The following table summarizes the production of flocks and revenue from sales of meat, breeding stock and eggs:—

PRODUCTION AND REVENUE FROM ILLUSTRATION STATION POULTRY FLOCKS IN MANITOBA IN 1938

Station Designation	Number of laying hens	Total eggs laid	Laying percentage	Average sale price of eggs per doz.	Total value of eggs	Total sales of meat and breeding stock	Total income from flock
				Cents	$	$	$
A	38	5,037	36·3	18·7	78 49	10 40	88 89
B	32	4,979	42·6	23·0	95 43	14 80	110 23
C	63	6,603	28·7	18·2	100 15	24 55	124 70
D	72	10,406	39·6	19·5	169 15	145 17	314 32
E	95	16,594	43·3	18·5	255 82	129 75	385 57
F	65	10,180	42·9	19·9	168 82	63 40	232 22
G	108	17,540	44·5	20·0	292 32	112 00	404 32
H	82	13,638	45·6	18·6	211 46	16 80	228 26
I	65	10,708	45·1	20·9	186 80	90·01	276 81
J	55	6,702	33·4	17·9	99 79	145 78	245 57
Averages	67	10,239	41·9	19·5	165 82	75 27	241 09

Revenue from eggs was calculated on the basis of commercial prices. During the months of April and May, however, the bulk of the eggs were sold to hatcheries at premium prices. The returns above commercial prices received for the hatching eggs are not included in the above tabulation. The table shows the actual income from the flocks when computed on the basis of prevailing prices for commercial eggs, and the prices received for meat birds and birds sold for breeding.

Blood Testing for Pullorum.—This project was started in 1935 with station operators who were in a position to conform to the regulations required by the Manitoba Approved Flock policy. Progress achieved since blood testing began is summarized in the accompanying table.

BLOOD TESTING FOR PULLORUM 1935 TO 1938—MANITOBA STATION FLOCKS

Station	Number of birds tested				Number of reactors			
	1935	1936	1937	1938	1935	1936	1937	1938
Illustration Stations—								
Arborg	57	46	48	.....	12	23	4	.....
Eriksdale	67	82	101	64	11	1	4	4
Gilbert Plains	.....	124	91	152	.....	61	14	1
Katrime	108	117	149	132	30	3	3	0
Petersfield	48	96	98	131	16	5	1	5
Plumas	.....	65	163	100	.....	3	5	5
District Experiment Sub-Stations—								
Goodlands	.....	60	93	101	.....	5	0	1
Lyleton (Edgar)	.....	70	86	86	.....	0	0	0
Lyleton (Parsons)	.....	145	153	154	.....	23	5	18
Pipestone	.....	77	76	56	.....	2	0	1
Percentage of Reactors	.....	.....	.....	.....	24·6	14·3	3·4	3·6

Arborg discontinued testing in 1938 because the flock was below the minimum requirements of 50 birds.

Farm Revenue

Beginning in 1937 station operators have for two years submitted weekly statements of their sales of farm produce. While it is realized that this information provides only a fraction of the data required to make a study of farm business, it does make available facts relative to the sources from which a living is derived on Manitoba farms. Results obtained can be employed as a guide in determining the lines of production which can advisably be engaged in and the size of business required to ensure a steady flow, of sufficient revenue to meet all obligations.

The following table summarizes the relative importance of each line of production.—

FARM REVENUE SHOWING PERCENTAGE INCOME DERIVED FROM EACH SOURCE—MANITOBA STATIONS

Year	Grain	Grass and clover seed	Cattle	Dairy products	Hogs	Poultry	Miscellaneous
	%	%	%	%	%	%	%
1937	58·7	2·3	17·6	10·2	4·5	3·8	2·9
1938	45·5	3·6	14·4	15·5	6·9	7·7	6·4
Average	52·1	2·9	16·0	12·8	5·7	5·7	4·6

Miscellaneous products include sales of horses, hay and straw, potatoes and other vegetables, fruits, honey and wood for fuel.

The differences existing between the various major sources of revenue for the two years reveal some interesting facts. The amount of grain sold was about the same each year, but appreciably lower prices in 1938 significantly depressed the income from this source. Dairy products were produced in larger volume in 1938 and at slightly better prices for butterfat, greater relative returns were obtained from this source than during the previous year. Better prices for hogs had a similar influence under this division of production. The

explanation of why the relative percentage returns from poultry were doubled in 1938 lies mainly in the fact that flocks were increased and the average egg production was higher. Prices for eggs were on the average fractionally higher. Under miscellaneous revenue, wood for fuel represents the bulk of income. Several operators cleared new land and had cord wood to sell in varying quantities. Fruits and vegetables gained slightly in 1938, but were still under one-half of one per cent. Sales of horses accounted for little more than one-half of one per cent of all income obtained.

Fourteen stations submitted complete revenue statements for 1937 and twenty for 1938. The average sales revenue per farm in 1937 was $2,816.77 and in 1938 it was $2,039.10. Low grain prices were entirely responsible for the drop.

Publicity

Field meetings are held on the stations each summer, whenever arrangements for these are feasible. During the past five years an aggregate of 6,975 people attended 59 meetings or an average of 118 per meeting.

In 1934 and again in 1938 samples of fruit were contributed by operators who have trial orchards, for the purpose of placing an exhibit at the Manitoba Fruit Show. The 1938 exhibit occupied 100 square feet of space and included 10 varieties of standard apples, 15 of crabs, 30 of plums and 3 of grapes. At the Provincial Seed Shows in 1936 and 1937 the Supervisors co-operated with the Experimental Farm, Brandon, in staging exhibits dealing respectively with Farm Planning and Soil Drifting Control.

In addition to meetings and exhibits, publicity has been given to the results of work done on the stations by way of numerous press articles and radio talks.

REPORT OF ILLUSTRATION STATIONS IN EASTERN SASKATCHEWAN

Supervisor, E. V. McCurdy, B.S.A.

The fall of 1938 completed the fourth year the experiment sub-stations and illustration stations in eastern Saskatchewan have been under the direction of the Indian Head Experimental Farm. A station at Calder, in the north-eastern part of this territory, was selected late in 1937 and the work was started the following spring. The supervision of the Davidson farm was transferred to the Indian Head district because it could be more conveniently supervised with the station at Aylesbury. The stations now total 16. In this portion of the district, where the rainfall has been more favourable, five illustration stations are still in operation. A sixth station at Avonlea consists of two acres of orchard where tree fruits are being tested under prairie conditions. This report will deal particularly with the projects on these six stations, but in order to get a more comprehensive picture of the Indian Head territory, a brief summary of the work on the sub-stations is being included. A number of what are now termed sub-stations were classified as illustration stations before the Prairie Farm Rehabilitation Act was passed in 1935, but in order to carry on the extensive program a change in the entire set-up was necessary. Instead of putting most stress on plot work the projects were enlarged and the whole farm, up to an area of one section of land, was placed under development and supervision. The main considerations are cropping plans that will aid in the control of soil drifting. The stations in operation, together with the names of the operators, are listed below:—

ILLUSTRATION STATIONS

Location	*Operator*	*Location*	*Operator*
Calder	Kost Marteniuk	Wawota	Chas. Pryce
Canora	Chris. Hoehn	Yorkton	James Harris
Pelly	W. J. Bettinson	Avonlea	Joseph Dombowsky

SUB-STATIONS

Alameda	Young Bros.	Radville	J. H. Stockton
Arcola	Alex. Craib	Strasbourg	Ambrose Coles,
Avonlea	J. W. Miller		J. G. Hooper
Aylesbury	Chas. McMillan	Weyburn	E. Meredith
Davidson	Reuben Lloyd	Willow Bunch	G. Boisvert
Lisieux	Omer Prefontaine		

Regional Precipitation and Crop Growth

Much of the district in the eastern part of the province had some fair rains in the fall of 1937, otherwise little reserve moisture was available. The northern part of the territory was more fortunate, but none of the districts had normal rainfall. On the farms in the south, 1938 seeding started as early as April 12 and was general by the third week of that month. On the northern farms the spring work was somewhat later and was not general until the first week of May. Favourable rains fell in May and this moisture and the warm spring weather stimulated rapid germination. A good ground cover soon resulted which minimized the chance of damage from soil drifting. In most districts moisture was fairly satisfactory throughout the season and growth was continuous.

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In early July a serious rust epidemic appeared and a severe loss was apparent where rust-resistant wheats were not sown. The bulk of the wheat on the illustration stations was Thatcher and Renown, so this did not cause much alarm to the operators. A small amount of the other wheats was sown and rusted quite severely with the expected result, a reduced yield and grade.

The crop was ripe about the first week of August and cutting was general by the middle of the month. In the south, harvest operations were much earlier and were pushed ahead rapidly. Large numbers of grasshoppers flew in, and these, with the ones that were already in the district, greatly reduced the yield on many of the farms. Grasshoppers caused no serious alarm in the northern part of this territory. Wireworms and sawfly were responsible for a limited loss. No frost injury was noted in either the spring or the fall.

The operators on the illustration stations had a fairly good year. The yield of feed and fodder was ample and would more than supply the needs for the winter of 1938-39. The yield of grain of the rust-resistant varieties averaged around 20 bushels to the acre and graded No. 1 and No. 2 Northern. Most of the crops were profitable this year. Of the five years under review, three, 1934, 1936 and 1937, had rainfall below normal for the districts, the years 1934 and 1937 being two of the driest on record. In 1935 and 1938 the moisture was sufficient to produce a normal crop, but rust greatly reduced the yield and grade. The loss was less severe in 1938 because much rust-resistant wheat had been sown.

The following table gives a summary of the precipitation data on the illustration stations and the sub-stations in this territory:

PRECIPITATION TABLE SUMMARY

INCHES

STATION	FALL	WINTER	SUMMER 1938				Total for crop year Aug. 1, 1937 to July 31, 1938	Total for calendar year 1938	Average for calendar years 1934-1938 inclusive
	Aug. 1, 1937 to Oct. 31, 1937	Nov. 1, 1937 to Mar. 31, 1938	April	May	June	July			
Alameda	3·04	4·07	0·20	1·79	2·51	2·43	14·04	16·17	12·76(3)
Arcola	3·48	3·24	0·07	3·06	1·76	2·87	14·48	15·58	13·48(2)
Avonlea	3·50	3·86	1·65	2·09	1·78	1·58	14·46	13·83	10·85
Aylesbury	2·05	3·12	0·71	2·07	2·25	1·38	11·58	14·63	
Calder	.....	.....	1·21	1·02	1·73	2·54	.....	15·58	
Canora	8·99	4·98	0·80	1·49	2·79	2·93	16·98	17·15	14·79
Davidson	2·15	4·07	1·63	2·76	3·21	2·95	16·77	19·71	13·75(2)
Lisieux	2·82	3·46	0·56	3·16	3·58	0·97	14·55	15·79	11·45
Pelly	4·13	5·82	1·88	1·25	1·97	4·78	19·83	19·83	16·29
Radville	4·47	5·04	0·24	2·66	2·59	3·10	18·10	16·37	12.94
Strasbourg	2·80	2·83	0·75	1·11	2·35	2·42	12·26	13·94	10·81(3)
Wawota	6·29	4·89	0·25	1·79	2·39	3·77	19·38	20·38	18·72
Weyburn	5·31	4·86	0·21	2·26	3·09	2·78	18·51	18·31	13·09
Willow Bunch	4·72	5·98	0·52	4·55	3·40	1·28	20·45	19·96	13·59
Yorkton	4·41	5·60	0·85	1·12	1·89	4·50	18·37	17·58	16·39(4)

NOTE.—Figures in brackets in the average column indicate number of years.

Organization and Progress on Station Farms

Avonlea, Saskatchewan,

Joseph Dombowsky, Operator.

The soil in the Avonlea district is a brown clay loam. The area is naturally treeless and since settlement the farmers have specialized in wheat growing. Precipitation has been decidedly light the last few years. Even in 1938, there was not enough rain to produce a profitable crop. On this farm, two acres of land are set aside for fruit growing. The orchard was started in 1929 and since that time additions and replacements have been made. Most of the replacements are received from the Morden Experimental Station. Under test are varieties of plums, plum-cherry hybrids, crabapples, standard apples, cherries and the small bush fruits.

Mr. Dombowsky has built a large and expensive set of buildings. His farmstead was very bare and treeless so he started an extensive shelterbelt. This grove of trees provided much protection but the operator has continued to do more planting throughout the past three years. Three hundred spruce were set out in 1936. Some lived the first year but all died in 1937. They were unable to stand two dry years in succession. A large percentage of the deciduous trees are still living.

This operator farms on quite a large scale. He does all his work with the tractor and is able to get his work completed quickly. This leaves considerable spare time to be used around his garden, orchard and home.

A good stock-watering dam was constructed in a ravine just east of the buildings. This dam held water all last summer and could be used to irrigate the garden. Up to the present an adequate supply of vegetables could be produced without irrigation. As a result, it has not been necessary to develop this project.

Calder, Saskatchewan,

K. Marteniuk, Operator.

Mr. Marteniuk's farm at Calder was selected for an illustration station late in the fall of 1937, and field work was started the following spring. This farm is east of the town of Calder in a district with many bluffs and sloughs. Thirty-three acres were selected for experimental work and divided into eleven, three-acre plots. The soil is a greyish, black loam. The top two or three inches is loose and breaks down readily into fine granules. The plots are fairly well drained into shallow sloughs, one on the east and the other on the west.

Weeds are giving serious trouble in this district. On the illustration station wild oats cause the most severe loss, followed closely by Canada thistle and sowthistle. The rotations were planned with weed eradication the major consideration. The two rotations are: the four-year, summer-fallow, wheat sown to clover, clover hay, and barley or wheat; and a seven-year, alfalfa, summer-fallow, wheat, wheat sown to clover, clover, oats, and barley. The plot of alfalfa is worked into the rotation every seventh year. The value of these rotations will be discussed later. All the crops are in their proper sequence now with the exception that the crops normally following clover will be following summer-fallow in 1939. The fallow required a large number of operations this year to keep it black throughout the season. In the early part of the summer many wild oats sprouted and were killed.

Live stock forms quite an important part of the farm program in this section of the province. This operator has a pure-bred Hereford bull to head his herd of cattle, and keeps a few hogs, a fair sized flock of poultry, some turkeys and geese. The poultry were of mixed breeding but are being replaced by Barred Rocks hatched from eggs procured from the Experimental Farm. Horses are used to do all of the field work.

CANORA, SASKATCHEWAN,

Chris. Hoehn, Operator.

This farm has been operated as an illustration station since 1929 by the late Mr. Chris Hoehn. Mr. Hoehn was unable to supervise the work this year because of ill health, and during his illness and since his death in November, the station has been operated by Mr. Gus. Hoehn, a son of the former operator.

The illustration station is south of Canora on No. 9 highway. The soil is medium-textured, dark-grey, silt loam. The drainage on this particular farm is good. A creek near the buildings runs in the spring and, with this exception, most of the farm area is arable land. Few stones are present. The plot work consists of 13 four-acre plots, arranged in a six-year rotation, two three-year rotations and one test plot. The three-year rotation, summer-fallow followed by two crops, is the principal rotation on one quarter-section, whereas, a slight modification of the six-year was planned for the quarter near the buildings.

Wild oats and sowthistle have been giving the most trouble on this farm but in the last three years the number of weeds has been markedly decreased. Growth has not been excessive during the past three years and eradication has been easier. One plot in the six-year rotation still has too many wild oats but it is hoped in the summer-fallow year to grow out many. Surface cultivation has been receiving more attention than ploughed fallow and is giving very satisfactory results.

This operator is pushing the sale of good seed grain in his district. This year Renown wheat, Vanguard oats, and Regal barley are being offered for sale. The sales are usually in small lots and hence are spread throughout the district.

Gardening has been important in past years but has not been pushed as much the last summer. The local market in Canora takes less of the surplus than it has in the past, especially in a year such as this, when all gardens were better than usual. The operator still produces more than can be used at home. A very extensive and effectively arranged flower garden improves the appearance of the farmstead. The operator has won numerous prizes at the horticultural shows at Yorkton and Canora.

More honey was produced this year than in either of the past two years. The operator keeps around 14 colonies of bees.

The live stock on the farm are grade Shorthorn cattle, grade Shropshire sheep and Barred Rock poultry.

PELLY, SASKATCHEWAN

W. J. Bettinson, Operator

The illustration station at Pelly is in the extreme northern section of the territory supervised from Indian Head. The town of Pelly is just a little south of the Swan river valley and borders the section of the province where the native bluffs of aspen begin to contain some spruce and the growth of trees and shrubs is more dense. The soil is a dark greyish black. On this particular farm it is quite granular in structure and is classified as a gravelly, sandy, loam of the Pelly series, which consists of degraded black soils, derived from glacial till.

A very serious weed problem exists in this district. Sowthistle is giving definite trouble, and this year the growth was excessive. Canada thistle, wild oats and stinkweed are also difficult to control. The rotations are designed on a weed control basis and are a six-year—alfalfa, summer-fallow, wheat and clover, clover, wheat, and oats, and a three-year—wheat, oats sown to clover, and clover. The operator has the farm divided into five fields and has selected the longer rotation from the plots for his farm.

Brome grass provides a pasture for his herd of grade Shorthorn milk cows. The alfalfa and clover supply more feed than the operator needs and each year he has some clover hay for sale.

This operator has an excellent garden. More produce is grown than is needed for home use. The orchard also produced considerable crabapples and plums this year. This was the first time many of the trees had borne any fruit.

Field work on this farm is done with a combination of horses and tractor. The latter was purchased this spring and speeds up the work considerably. In spite of the adequate power it took the operator all his time to keep his summer-fallow in good shape. Frequent rains prevented work on the land when it was most needed.

Yorkshire hogs and Barred Rock hens provide additional income for this operator.

WAWOTA, SASKATCHEWAN

Chas. Pryce, Operator

Mr. Pryce has been farming in the Wawota district since it opened up in the 1880's and is therefore very familiar with the district and the changes taking place from time to time. He has been operating an illustration station since 1924. The farm has been gradually built up and now the operator has a well-landscaped farmstead with a comfortable, although not elaborate home and a fine set of buildings for his machinery and stock. The hedges and shelterbelts receive particular attention, and the shelterbelt affords adequate protection for a large garden. The orchard produced a good supply of crabapples and plums this year.

This farm is also in a mixed farming district. Over 100 head of cattle are kept and run in the Moose mountains in the summer. Much sweet clover is grown each year for winter feed and as a result the rotations are designed to fit in with this system of farming. The main rotation on the farm is the five-year—summer-fallow, wheat, clover, wheat, and oats. A three-year rotation—barley sown to clover, clover, and wheat, is also tested on the plots. Only one hay crop is taken on the clover fields which are ploughed as soon as possible after it is removed. So far the operator has not had any difficulty getting the land ploughed on time.

Mr. Pryce is most interested in the production of good seed and has been growing high quality seed for years. Each year a large number of sales are made in the district. This station is serving a most useful purpose in this field.

The cattle are of mixed Shorthorn and Hereford breeding. The herd sire is a Hereford and the operator has decided to continue the use of Hereford sires and build up his herd from the Hereford standpoint rather than the Shorthorn. The Barred Rock flock of poultry has been improved by stock from the Indian Head Experimental Farm and has greatly increased in production the past two years.

YORKTON, SASKATCHEWAN

James Harris, Operator

The illustration station at Yorkton was started in the fall of 1934. A group of rotations were designed but were slightly re-arranged in 1935. There are now 16 three-acre plots, with four groups of rotations.

These rotations are designed for a mixed farming district, and consideration is given to the production of considerable feed, a cash crop, and enough summer-fallow to control weeds. The four main weeds to give particular concern are wild oats, Canada thistle, sowthistle and quack grass. The weeds on this farm are well under control and the grain samples threshed this fall contained a very light dockage. The operator farms three quarter-sections of land and has an additional quarter for pasture. His main rotations are the three-and four-year,

similar to the third and fourth group on the plots. The soil is a well-drained, greyish-black, medium-textured, silt loam. It has good moisture holding capacity and is highly fertile. The farm is quite level and has few small sloughs.

This operator has a well-balanced farm program suited to the particular district. A herd of good Shorthorn cows supply milk and about ten cows are milked throughout the year. Cream is sold to the creamery in Yorkton. White Leghorn chicks are purchased each spring from the first hatch of the Yorkton hatchery and hence the pullets come into production in the early fall and continue to produce throughout the winter. A number of colonies of bees supply an abundance of honey. Most of the honey was sent to England with a shipment from Yorkton this year. The garden is given special attention and much produce is marketed in Yorkton. The potato and root crop was good. The orchard was not so productive as it has been in the past. A number of the trees were killed in the winter of 1937-38.

Field work is done with horses and tractor. The tractor was used more this season than in previous years. The one-way disk is the important implement in summer-fallow work and is being used almost to the exclusion of the plough. Results have been most encouraging as far as weed control is concerned.

Crop Rotation Studies

Probably one of the most important phases of the illustration work is the study of the different cropping practices. Since the weed problem has become somewhat serious in the eastern section of the province the yield of grain has decreased. As a result, the farmers have become more interested in rotations other than those based entirely on the straight growing of wheat. The rotations under test embody feed and hay crops and are planned to give careful attention to weed eradication. In all rotations where clover hay is grown, one crop of hay is cut and then the plot is ploughed as soon as the hay is stacked. The operators have experienced no difficulty in getting good catches of clover when the proper attention has been given to seeding methods and the grass seed has been sown with the first crop after fallow. The rotations under study on the five illustration stations are reviewed in the following paragraphs.

Three-Year Rotation.—Wheat, oats or barley, sweet clover hay. This rotation, with slight modifications is under test on the five stations. At Calder, Canora, and Yorkton, the work has not been carried on long enough to permit any conclusions. At Wawota, the rotation has not been as effective in weed control as another containing a complete summer-fallow. In the past two dry years Russian thistle has made considerable gains. Bindweed showed an increase on the plots this year. The yields from this rotation are a little lower than from the longer rotation.

A slight modification of this rotation is under test at Pelly. The Sixty-day variety of oats grown as a second crop, has been cut for feed. The growing of this oat has given the operator a real chance to get rid of wild oats. As a matter of fact, the number of wild oats has been so materially reduced that it has been safe to grow oats for grain instead of a feed crop. This change will be watched and if any increase in the numbers of wild oats is noted the oat crop will be cut for hay. This rotation has proved a more paying proposition than the other on this farm and should fit well into a small farm where considerable feed is needed and where weeds such as wild oats and sowthistle are giving some trouble.

Three-Year Rotation.—Summer-fallow, wheat, wheat. This is the simplest three-year rotation on the prairie farms. In many districts, where little feed is needed, wheat is grown as the second crop. On others, oats or barley is substituted for the wheat. This rotation is arranged on the plots at Yorkton and Canora mainly for comparative purposes. The rotation will be compared with

those including legumes and partial fallows, both from a yield and cost standpoint.

Four-Year Rotation.—Summer-fallow, wheat, clover, hay and coarse grain. This rotation is included at Yorkton and Calder. This is probably one of the best rotations under study in these districts. Many of the farmers follow a four-year rotation in any case. This slight modification or the growing of clover allows the farmer to give the weeds an additional check by partial fallow, after the clover is taken off. Yield data are not extensive enough to provide any conclusions. This four-year rotation is arranged so that a farmer could build one fence across his farm and make use of half for pasture. The fallow and the clover could be arranged in one half and the two grain crops would be in the other.

Five-Year Rotation.—Fallow, wheat, hay and break, wheat, and a coarse grain. This rotation is well balanced. There are two wheat or cash crops, a hay and a coarse grain. The rotation also contains a partial summer-fallow and a complete summer-fallow which should keep the weeds under control. It does not lend itself well for pasture purposes as too much fencing is necessary. The operator at Pelly has his whole farm divided into this five-year rotation. He utilizes some land near the buildings for pasture so does not need to do any fencing. It is surprising how well the wheat after clover has yielded. The fourteen-year average at Wawota, after fallow has been 15·9 and after clover, 15·7. In the same rotation, at Pelly, the ten-year average after fallow is 22·2 and after clover, 19 bushels per acre. The yield therefore has been very satisfactory, the crop after clover being a better paying crop than that after the fallow. A very similar rotation is under study at Yorkton but a sixth field is included. This field of alfalfa is ploughed every sixth year and a different field of the rotation is sown to alfalfa. The one that had the legume is moved into the regular rotation.

Seven-Year Rotation.—Summer-fallow, wheat, wheat sown to clover, clover hay and break, wheat, oats, and alfalfa. This rotation is under test at Calder and is very similar to the one discussed above with the exception that two crops are taken after the fallow instead of one. A start was just made at Calder this year so no results are available.

Cultural Methods and Weed Control

Perennial weeds, particularly sowthistle and Canada thistle are causing the most worry on the farms in the northeastern part of this area. Wild oats are plentiful and probably account for the greatest direct loss each year. In the southern part of the territory Russian thistle is the most serious weed and has been moving further north the past three or four years. The first was seen on the Yorkton farm last year but none was noted since that time at the above point or on the illustration stations at Canora or Pelly. It is causing some loss each year at Wawota. The normal crop of 1938 greatly suppressed the growth of this weed in many districts. The summer-fallow methods are designed to eradicate the perennials and, if possible, to get many wild oats to grow. It is almost impossible to get large numbers of the wild oat seeds to germinate when very frequent cultivations are necessary to control the perennials. This was noted particularly during the last two dry years, in the longer rotations, such as the five- and six-year. In order to get a more complete control of the wild oats, the shorter rotations, such as the three-year, wheat, barley sown to clover, and clover hay, and the four-year, fallow, wheat, clover and barley, were planned and have brought about a marked reduction in the wild oat infestation. The success of the rotation at Pelly was mentioned previously.

The new clover plots at Pelly and Wawota, have been given a light disking in the fall after the growth of the clover is almost finished for that year. This

covers up some of the weed seeds which will germinate in the spring. The weeds are cut with the hay crop before they have a chance to go to seed. No injury seems to have resulted to the clover, as at that season of the year, the plants are well established and should not be harmed by the light disking. All other stubble fields are either disked or shallow ploughed in the fall. Some seeds germinate in the fall and are either killed by the frost or by the first operation in the spring.

Stinkweed gave more concern this year than it has for some time. It seemed to be severe in practically all districts. Careful spring cultivation killed many of these weeds but in spite of this, many were noted in the crop. The perennials are controlled by thorough working of the summer-fallow. This is the most expensive method and in a year such as 1938 when growth was somewhat continuous the cost was high. On the new station at Calder, eight operations were necessary to get results. The operators at Yorkton and Canora are getting good results with surface cultivation. The one-way disk and cultivator at Yorkton and the cultivator alone at Canora play the most important part. The plough is used on all these farms. After the crop of clover the land is ploughed, harrowed, then cultivated when needed, throughout the rest of the season. The first main operation on all summer-fallows is always completed before the middle of June. The perennials are further held in check by the use of the rotations containing clover. By ploughing the field in July and treating it as a fallow from then on, the more shallow-rooted sowthistles are given a very severe set back.

Chemical Fertilizer Trials

Up to the present year superphosphate had been tried on most of the stations and ammonium phosphate on others. In order to get more uniformity in the experiment, ammonium phosphate was selected, and for the present, only the one fertilizer will be tested. Although the nitrogen content of the soil may be helped with clover in the rotation, only one crop of clover is taken, is cut quite short, and ploughed immediately. The added cost being slight, it was decided to use the more complete fertilizer. The experiment has not been carried on for many years but indications point to an increase of from four to six bushels as a result of the use of the fertilizer. The yield at Yorkton was slightly decreased this year. The crop was sown at the normal rate on a field very free from weeds. The crop stooled heavily and although moisture conditions were fair in the district the fertilized crop did not make the gain expected.

Below is a summary of the yields on the three illustration stations where fertilizer is tried. Ten-acre fields are used as the unit for the test.

WHEAT YIELDS PER ACRE IN FERTILIZER TRIAL

Station	Rate per acre	Yield with fertilizer		Check—no fertilizer		Increase	Remarks
		1938	Average	1938	Average		
	lb.	bush.	bush.	bush.	bush.	bush.	
Canora	20	27·0	.....	20·2	.....	6·8	
	30	28·0	23·1 (3)	20·2	19·0 (3)	4·1	
Yorkton	20	30·0	.....	32·5	.....	−2·5	
	30	28·0	21·9 (2)	32·5	23·2 (2)	−1·3	
Pelly	30	32·0	23·2 (2)	20·0	16·6 (2)	6·6	Some low spots in check field reduced yield.

Note.—Ammonium phosphate used in all cases in 1938. Number of years tested in brackets.

Cost of Producing Crops

A knowledge of the cost of growing the crops on the illustration stations has a definite value. These data give added information when different rotations are compared and when one is deciding the suitability of certain crops for a district. Cost figures also serve a useful purpose in checking and comparing summer-fallow practices. Most methods have been found to give very comparable yields so long as weeds are kept under control. Here then the cost is a most important factor.

When calculating the costs given in the following table, all items, from pre-seeding operations to harvesting, are taken into consideration. As well, interest on investment in land, taxes, use of machinery, horse and man labour, seed, twine, and the charge for summer-fallow are added to the cost. The operator keeps an accurate check on the time taken to do any work, the number of horses and the number of men. Labour charges are calculated at the prevailing wage in the district, for this year estimated at $25.00 a month. An additional $15.00 a month was allowed for board. The total worked out to 16 cents an hour. The horse labour rate was based on the prevailing price of horses, feed, etc., and was six cents an hour. Two-thirds of the cost of fallow is charged against the first crop after summer-fallow and the other third is charged against the second crop.

Wheat occupied the largest place in the region under study. It is the main source of revenue on all these farms and has proved to be the most dependable crop even in a region where oats and barley are grown very much more extensively than in the south and the west. In 1937 when many feed crops failed the operators were able to reap some returns from their wheat.

In past years, Ceres, Reward, and Marquis were the three leading wheats in this area and have given some very profitable returns. The average yields at Wawota and Pelly extend over a period of years and can be noted from the table. At these two points Reward wheat was grown because of its earliness. As a result of a change in the rotations, the table contains shorter averages for Canora but the yield of Reward wheat on summer-fallows for the past six years averaged 19·2 and the yield of Ceres 22·8 bushels per acre. These yields were fairly satisfactory when no better wheat was available but in a year such as 1938 when a serious rust epidemic occurred it brought clearly to the farmer the need of shifting to a wheat that would yield, not only a larger number of bushels to the acre, but also a wheat that would grade decidedly better. Thatcher, Renown, and Apex have replaced these wheats. Renown was the principal wheat grown but some Thatcher was also noted on all these farms. The yield of the Thatcher was a few bushels to the acre more, and was very much in line with the results expected and the differences were very similar to those shown in the rod row tests. No wheats except the rust-resistant varieties, will be grown on any of the illustration stations next year. These varieties were produced at a decided profit this year.

The following table gives the complete information on the yields of wheat, the cost per bushel, and the cost per acre:

WHEAT YIELDS AND COST OF PRODUCTION BY STATIONS

Location of station	Wheat After	Number of years grown	Yield per acre		Cost per bushel 1938	Cost per acre	
			1938	Average		1938	Average
			bush.	bush.	$	$	$
Calder	Stubble in 6-year rotation, Renown	1	11·0	.....	0 70	7 74	.....
	Stubble in 6-year rotation, Reward	1	7·0	.....	1 10	7 71	.....
	Stubble in 4-year rotation, Marquis	1	5·0	.....	1 48	7 39	.....
Canora	Clover in 3-year rotation, Ceres	3	15·0	16·2	0 62	9 30	10 42
	Fallow in 3-year rotation, Ceres	3	14·5	17·5	0 72	10 41	11 46
	Fallow in 6-year rotation, Renown	3	27·0	17·8	0 42	11 43	9 96
	Clover in 6-year rotation, Renown	3	19·0	16·7	0 49	9 41	9 90
Pelly	Fallow in 5-year rotation, Reward	10	19·0	22·2	0 57	10 84	12 32
	Clover in 5-year rotation (This year Renown)	10	22·5	19·1	0 38	8 49	9 51
	Clover in 3-year rotation (This year Renown)	8	27·5	21·3	0 32	8 85	9 84
Wawota	Clover in 5-year rotation (This year Renown)	14	20·0	15·7	0 42	8 41	9 37
	Fallow in 5-year rotation (This year Renown)	14	19·0	15·9	0 47	8 99	11 02
	Clover in 3-year rotation (This year Renown	7	19·0	12·4	0 45	8·52	7 91
Yorkton	Fallow in 6-year rotation (This year Renown	3	31·0	19·2	0 42	13 13	10 53
	Clover in 6-year rotation (This year Renown	3	30·0	17 9	0 36	10 82	8 65
	Clover in 3-year rotation (This year Renown	3	25·0	14·2	0 42	10 47	8 83
	Wheat in 3-year rotation, Ceres	3	14·0	14·3	0 67	9 33	9 20
	Fallow in 3-year rotation, Ceres	3	11·0	15·9	1 04	11 47	10 85
	Fallow in 4-year rotation, Ceres	3	13·0	14·0	0 89	11 63	11 92

Forage Crops

Fodder crops find a place on all these stations, not only to supply feed for live stock but to aid in weed control in the rotations. Sweet clover is of most importance. It works in readily with the rotations and has averaged from one and one-half to two tons per acre over a period of years. It is sown with a nurse crop on summer-fallow at the rate of 16 pounds to the acre and has only failed on one occasion, that is, on one plot at Yorkton this year. One plot was sown with the grass seed attachment after the wheat and was an excellent crop. The other was sown with the wheat on rather loose summer-fallow in 1937 and made a poor start because of the hot, dry weather. The Arctic variety is used in all cases. Alpha was sown at Yorkton on the plot mentioned above but was patchy and was ploughed down early in the season. At Wawota and Pelly, western rye grass is sown with clover. Even in the past few years, somewhat below normal in moisture, the grass has added to the value of the hay and also added some fibre to the soil.

Brome is not used in any rotation studies. It has a strong creeping root system and is too difficult to eradicate. It finds a place on some of the farms in permanent pasture fields.

Grimm alfalfa is the only other fodder crop to receive much attention. It is grown on all the illustration stations except Wawota. At the latter point the crop has never given a yield that compared favourably with sweet clover. The clover so greatly outyielded alfalfa that the use of the latter was discontinued. The plot at Pelly had been down for eight years. Dandelions were beginning to encroach to quite an extent and patches had winter killed. It was resown this year. The land was ploughed and cultivated, a firm seed bed made and then the alfalfa was seeded with a grass seed attachment on May 30, at 12 pounds to the acre. No nurse crop was used. An excellent

catch resulted and one and one-quarter tons to the acre were cut in the early part of the season. The plot went into the winter with a strong healthy growth. The plot at Canora was similarly treated last year and with good results. Two cuttings were taken from the other stations this year.

The following tables, give the yields of the hay crops, oats and barley:—

YIELD AND COST OF PRODUCTION

Location of station	Crop Sequence	Number of years grown	Yield per acre ton or bush.		Cost per ton or bush. 1938	Cost per acre	
			1938	Average		1938	Average
			bush.	bush.	$	$	$
Calder	Banner oats after wheat	1	28·0	.....	0 25	7 08	.....
	O.A.C. 21 barley after wheat	1	20·0	.....	0 36	7 25	.....
Canora	Clover after Banner oats in 3-year rotation	3	2·00	1·17	3 42	6 85	6 19
	Banner oats after wheat in 3-year rotation	3	35·00	31·3	0 22	7 71	6 23
	Regal barley after wheat in 3-year rotation	2	40·0	27·5	0 24	9 44	9 20
	Sweet clover after wheat in 5-year rotation	3	2·5	1·67	3 64	9 10	5 85
	Vanguard oats after wheat in 5-year rotation	3	42·5	30·5	0 19	8 03	7 49
	Alfalfa (2nd year)	2	2·50	1·25	3 42	8 55	8 60
Pelly	Alfalfa	8	1·25	1·50	4 62	5 78	5 94
	Banner oats after wheat in 5-year rotation	10	40·5	38·5	0 19	7 90	9 20
	Sweet clover after wheat in 4-year rotation	10	4·00	2·01	2 93	11 73	9 34
	Banner oats after wheat in 3-year rotation (grain hay)	3	33·0	34·6	0 23	.....	.....
		5	.....	1·59	.....	7 60	8 51
	Sweet clover after oats in 3-year rotation	8	3·00	2·04	2 93	8 78	7 16
Wawota	Banner oats after wheat in 5-year rotation	14	35·0	34·1	0 22	7 78	8 68
	Sweet clover after wheat in 5-year rotation	14	2·00	1·40	3·20	6 39	7 25
	O.A.C. 21 barley after wheat in 3-year rotation	7	18·0	21·4	0 37	6 67	6 56
Yorkton	Alfalfa	2	1·30	0·77	3 75	4 87	4 95
	Banner oats after wheat in 6-year rotation (grain hay)	2	44·0	46·0	0 17	7 67	7 65
		1		0·25			
	O.A.C. 21 barley after clover	3	32·0	25·5	0 32	10 28	9 30
	Sweet clover	3	5·00	2·25	1 97	9 87	6 14
	Banner oats after wheat in 3-year rotation (grain hay)	1	32·0	.....	0 24	7 57	6 56
		2		0 75			

Banner oats were used up till the past two years, with the exception of Gopher oats grown in the three-year rotations for hay. In this part of the province rust has been seriously affecting the oat crop. Vanguard oats were used at Canora for the past two years and the yield has been above the older variety. A plot of Vanguard will be sown at Wawota next year. Anthony has been giving some satisfaction at this point.

O.A.C. 21 barley is the standard barley and is grown for sale as a malting barley. Regal was tried for the first time at Canora this year and yielded 40 bushels to the acre under field conditions.

Rod Row Tests

In the last three years a series of rod row tests have been sown on a number of the stations. This year the project was carefully organized by the cereal department of the Indian Head Experimental Farm. Five varieties of wheat, four of oats, five of barley, and two of flax, were sown in four replicates and

randomized in a similar way to this test on the Experimental Farm. The most difficulty with the work was noted at cutting time. The operators did some of the cutting but the Supervisor, with some assistance, did the bulk of this work. It meant that some of the varieties were cut at a slightly more mature stage than others but the final results were quite satisfactory. These rod row tests are of decided interest to the general public at field meetings and give a chance to draw attention to the small differences in varieties in each district. A very limited number of varieties can be grown on the fields as it is the aim to keep the number to a minimum in order to prevent mixing, particularly at threshing time and in the granaries. By sowing these tests, early and late varieties can be compared and the newer varieties can be tested on soils varying in type. The rod row tests were sown on three illustration stations and five sub-stations this year. The 975-1, Thatcher, and Apex wheats did remarkably well. All stood the severe rust epidemic. The 975-1 showed very little leaf or stem rust. The other rust-resistant wheat, Renown, was satisfactory but was consistently a few bushels lower in yield. Vanguard and Anthony oats yielded well in the extreme eastern part of the province. Barley yields were in accordance with the known results from years of testing by the farmers and on experimental plots. Grasshoppers did much damage in the southern districts, in some cases almost spoiling the test. The following table gives this year's results. The total yield of all stations was added and the average was computed by dividing by the number of stations reporting the yield of each variety.

ROD ROW TESTS GROWN ON THE SUB-STATIONS AND ILLUSTRATION STATIONS IN 1938

Variety	Yield per acre in bushels								
	Alameda	Avonlea	Aylesbury	Canora	Strasbourg	Wawota	Weyburn	Yorkton	Average
Wheat—									
Marquis	7·1	6·5	9·4	12·5	16·9	7·4	0·9	8·1	8·6
Thatcher	10·3	13·1	12·6	22·3	22·4	26·0	11·7	25·3	17·9
Apex	12·6	8·3	14·8	24·0	19·6	24·1	16·0	25·6	18·1
Renown	8·6	7·8	8·4	23·8	17·8	22·6	5·2	25·4	14·9
975–1	13·9	10·1	13·6	21·0	21·1	26·6	19·3	28·9	19·3
Oats—									
Anthony	.....	16·1	18·1	67·4	33·8	54·1	.....	68·6	43·0
Victory	.....	16·8	12·9	57·9	37·6	31·1	.....	60·8	36·2
Vanguard	.....	13·0	14·8	72·0	38·9	36·8	.....	53·7	38·2
Gopher	.....	21·9	.....	55·5	36·4	28·9	.....	40·3	36·6
Barley—									
Regal	.....	11·5	8·8	34·5	33·3	15·3	39·8	37·4	25;8
Trebi	.....	17·6	20·4	49·8	44·2	37·4	64·5	49·5	40·5
Hannchen	.....	11·3	11·8	43·2	25·4	36·1	15·5	44·3	26·8
Olli	.....	9·8	9·0	15·5	32·3	21·8	33·0	25·2	20·9
O.A.C. 21	.....	20·6	19·4	40·8	31·9	28·1	31·5	39·3	30·2
Flax—									
Bison	.....	1·8	2·3	19·1	12·8	11·8	17·7	21·8	12·5
Redwing	.....	2·8	3·0	12·7	12·5	7·2	14·8	20·4	10·5

Seed Sales

The operators are encouraged to make as many seed sales as possible. The crop was not heavy in 1937. Most of the rust-resistant wheat grown by the operators was needed for their own seed. The sales will be much heavier this year and a large percentage will be made in the early months of 1939. At the close of the year the sales amounted to 488 bushels of wheat, 152 bushels of oats, 65 bushels of barley and 2,600 pounds of sweet clover seed.

Horticulture

The beautification of the home and the production of a good vegetable garden is of utmost importance on every farm. As a result, the illustration station operators put forth a special effort to have this phase of the work up to a high standard. It adds to the farm and creates the desired impression on the stranger.

Every operator has a vegetable garden. The recommended variety of each vegetable is grown and during the past few years all operators have had more vegetables than they needed for their own use. The local market is rather limited although the operators at Yorkton and Canora have a sale for a small quantity each year. Good seed potatoes are grown on all the farms. The operators at Pelly, Yorkton and Wawota had their potatoes inspected. These men will have some certified seed for sale. The three varieties grown extensively are Early Ohio, Irish Cobbler, and Warba. The operator at Yorkton sows an acre or two of turnips each year and this root crop provides considerable feed for his cows.

The operators at Canora, Pelly and Wawota have well planned perennial borders and additions are being made from time to time. Most attention is given to the beautification of the farm by the use of the more rapid growing and showy annuals. Although the success of the annuals greatly depends upon the moisture conditions, even in a year as dry as 1937 all operators had a fine display. The garden at Canora is particularly extensive. The varieties are not as choice from the exhibition standpoint as some but the mass colouring has the desired effect of brightening up the surroundings. A number of the districts had horticultural shows and the operators of the illustration stations were able to win their share of awards.

Fruit Plantations.—Tree fruits, of the hardy varieties suited to the prairies, have been planted on all illustration stations. Much of the material for trial comes from the Morden Experimental Station. Little additional planting will be done but replacements will be made from time to time. Each station has enough crabapple and plum trees to supply all of this fruit the operator needs. It is not the intention to extend this project to a place where it would take too much of the operator's time. Four crabapple trees and the plum seedlings at Pelly were very productive and the Robin crabapples at Wawota yielded well. The fruit plantations at Yorkton and Canora were not so productive this year as they have been in past years. Considerable winter injury was noted in the orchard at Yorkton. The small bush fruits were loaded and continued to yield throughout much of the summer.

The first fruit trees were planted in the orchard at Avonlea in 1929. Since then additions have been made from time to time and now the orchard consists of six rows of trees, with over 30 trees or bushes to the row. In the last two years no extension has been planned, only the necessary replacements have been made. Since starting this work, climatic and other conditions prevented any project from making normal progress. In 1931 a hailstorm did much damage; in 1932 the beet webworm stripped the leaves from the trees; in 1933 and 1934 grasshoppers did much damage and as well 1930, 1934, 1936 and 1937 were low in rainfall. In spite of these adverse conditions the trees in the orchard have steadily grown and those in the rows planted in 1929 are ten to twelve feet high.

The orchard consists of 22 varieties of crabapples, five of standard apples, nine varieties of plums, and two of cherries. In addition to the tree fruits, sandcherries, gooseberries and currants are under test.

The district suffered severely from drought in 1937 so that the orchard was not in very good condition last fall. More injury was noted on the trees this spring than in any previous year. A number of the more hardy varieties that

had no injury apparent in past years showed some injury on the tips of the branches. Some of the sandcherry plum hybrids that have been showing injury in past years were not injured as severely as was expected. Last winter was not very severe so it was concluded that most of the injury was caused by the very dry season the summer before.

The Dolgo, Osman, and Transcendent crabs had a few blossoms this spring and fewer fruits this summer. In 1936 and 1937 the crabapples produced a considerable quantity of fruit. The plums and plum-cherry hybrids were a mass of bloom in the spring. Mammoth, Opata, Sapa, and Tom Thumb were loaded with plums this year. Sandcherries have been very productive throughout the past three seasons. The season's growth has been very satisfactory, rather excessive in the case of the Opata and the Sapa.

Considering the group of orchards as a whole for the past five years, growth has been continuous and the trees in all cases have made a noted advance. Most of these trees have been planted during a period when weather conditions have been somewhat severe but now the trees are reaching the age when they produce fruit the operators feel that the little time spent caring for them has been very worth while. Not one of the men wish to let this project lapse but are anxious each year to make some additions and try out some new variety.

Shelterbelts

Most of the illustration stations are supplied with a fair protection by the native bluffs of aspen but the natural protection can be supplemented in order to give more adequate protection and at the same time a more attractive arrangement. A shelterbelt of willow, poplar and elm was started along the border of the creek at the Canora farm and has made remarkable growth. In addition, a belt of spruce makes the approach to the farm more attractive. A somewhat similar belt has been planted at Yorkton and a hedge started around the orchard. Additional belts of caragana, maple, and elm have also been planted at Pelly, Wawota, and Avonlea. At these three points further protection was needed in the line of snow traps to keep the snow from piling in the yard or the orchard. When the snow drifts into the orchard, damage results by breaking many of the branches from the trees.

Three hundred spruces were under-planted in the aspen groves around Mr. Bettinson's home this year and a large percentage of these trees were living this fall.

Live Stock

In this section of the province the time of the station operator is divided between live stock and field crops. Although field crops provided the bulk of the revenue, when all the small sales of cattle, dairy, poultry and other products are added up at the end of the year a rather surprising portion comes from this source. Every effort is put forth to encourage the operators to build up their herds by the use of good sires. All the illustration station operators, except the one at Canora, have pure-bred bulls and this operator, with a group of his neighbours, is negotiating at present to get a Shorthorn bull. The importance of this phase of the work is fully realized not only by the farmers but by anyone driving through the country and seeing the quantity of poor type cattle that are found in many districts. The herd of non-registered Shorthorn cattle at Yorkton is probably the best of the group. These cattle are good milk producers and are quite typical of the Shorthorn breed.

The operators keep one or more brood sows. Mr. Pryce at Wawota and Mr. Bettinson at Pelly have good pure-bred Yorkshires. This pure-bred stock has left a decided mark on the swine in the district. A few Shropshire sheep are on the farm at Canora. None of the operators go in for raising pure-bred horses but all raise one or two colts each year. These are merely for replace-

ments and to have the occasional horse for sale. Even on the illustration stations there is a slight shift from horses to tractors. Three of the operators did much of their summer-fallow work with tractors this summer, more than they have done in any previous year.

Feed and Seed Reserves

On all farms, it should be the intention to build up a feed and seed reserve. Operators are encouraged to keep enough fodder and feed grain to do them at least one year in advance and to keep enough seed until the crop of the next year has been harvested. These reserves were markedly reduced in 1937 but the operators were able to carry their live stock without making many purchases. One or two of the operators had feed for sale. Much of the surplus is attributed to the growing of clover.

Poultry

Good flocks of poultry have been, or are being, developed on the stations. All are Barred Rocks, with the exception of the White Leghorn flock at Yorkton. The operators have been encouraged to buy baby chicks or male birds, much of this stock coming from the Experimental Farm, with the result that a continued improvement is noted in the flocks. The sales of cockerels and hatching eggs have gradually increased each year.

Field Meetings

Field meetings are held on as many stations as possible each year. Most of these gatherings on the farms were in July. This month seems to be the most suitable. The crop is somewhat advanced and the farmer has time to attend a meeting after the summer-fallow rush is over and before the harvest starts. Meetings were held at the Avonlea Horticultural Station, Canora, Pelly, and Yorkton. The attendance averaged 144. With the meetings held on the substations approximately 1,795 people were reached in this part of the province. Staff members from the Indian Head Experimental Farm, Forest Nursery Station, and the Entomological Laboratory, Saskatoon, helped with the meetings. The attendance has shown a gradual increase throughout the past five years.

REPORT OF ILLUSTRATION STATIONS

IN NORTHERN SASKATCHEWAN AND NORTHEASTERN ALBERTA

Supervisors: N. F. Bell, B.S.A., R. H. Anderson, B.S.A.

In the district of supervision directed from the Experimental Station, Scott, there were eighteen illustration stations in 1934.

Since then five of these were changed and enlarged into district experiment sub-stations. Three new sub-stations and eight illustration stations have been established. Two have since been transferred into another district of supervision and four others have been discontinued, leaving seventeen illustration stations and eight district experiment sub-stations in operation in 1938.

The location and name of the operator of each station follows:—

ILLUSTRATION STATIONS AND OPERATORS

Birch Hills, Sask.	J. W. Ward
Chauvin, Alta.	E. A. Pitman, Jr.
Chelan, Sask.	H. M. Clark
Glaslyn, Sask.	E. A. Lee
Glenbush, Sask.	J. C. Grant
Hafford, Sask.	Henry Hudek
Lens, Sask.	H. J. Larcombe
Loon Lake, Sask.	G. E. Nichols
Meadow Lake, Sask.	Martin Gran
Meota, Sask.	John Tait
Paddockwood, Sask.	G. L. Endicott
Parkside, Sask.	W. D. Willoughby
Pierceland, Sask.	E. M. Bates
St. Paul, Alta.	Hector Therrien
Tisdale, Sask.	H. A. Last
Weirdale, Sask.	F. P. Meyers
White Fox, Sask.	P. Tornquist

DISTRICT EXPERIMENT SUB-STATIONS AND OPERATORS

Consort, Alta.	C. A. Fawcett & Sons
Dunblane, Sask.	N. R. Stewart
Guernsey, Sask.	C. H. Snider
Juniata, Sask.	A. M. McMillan
Kindersley, Sask.	Robt. Simpson
Loverna, Sask.	Robt. Brumwell
Metiskow, Alta.	Ed. Masson
Rosetown, Sask.	J. H. Macey

Organization and Progress on Station Farms

BIRCH HILLS, SASKATCHEWAN

J. W. Ward, Operator.

Mr. Ward's farm is situated some 28 miles southeast of Prince Albert in the black soils zone area. The soil is of the Melfort silty clay loam type. Low alkaline sloughs on the farm are of little value for cutivation and these

areas are used for pasture purposes. Mr. Ward farms 320 acres of land and has other land for pasture. The home farm consists of 160 acres all of which is used for pasture and the growing of feed for the dairy herd, with the exception of a few acres used for illustration station plots. The following is a list of studies carried out on the station: Rotations, Fertilizers, Forage Crops, Pasture Tests and Cereal Variety Tests. Revenue on this farm is obtained from three main enterprises, namely, cereal crops, the dairy herd, and hogs. Wheat is the main cereal crop. A herd of 40 pure-bred Jersey cattle is maintained on the farm and is continually being improved. Cream is shipped to Prince Albert and milk is sold in the town of Birch Hills. Milk records are kept and the cows are tested periodically for per cent butterfat. Hogs are not raised on the farm, but are bought as feeders, much of the skim-milk from the dairy herd being fed to the hogs. A small flock of Barred Rock poultry has been started, baby chicks being procured from the Experimental Station, Scott, in the spring of 1938. A small fruit orchard supplies a portion of the fruit used by the household. The dairy barn was enlarged in the fall of 1938. Electric lights and an electric milking machine and electric cream separator make for easier handling of the milk and cream. A well ventilated ice-well is used for storage of dairy products.

CHAUVIN, ALBERTA

E. A. Pitman, Jr., Operator.

This farm consists of 640 acres of medium loam in the park country, three miles northwest of Chauvin, and 300 acres of pasture land on the Ribstone creek. The farm is well planned with fields arranged to suit the contour of the land and the convenience of the operator. Both horse and tractor power are used for farming. Nine work horses are kept and one or two colts are raised annually. The cattle herd consists of fifteen registered Aberdeen-Angus females and an outstanding bull, also five Ayrshire milch cows. The herd is fully accredited. Yorkshire sows and a boar, all bred from Advanced Registry stock at the Experimental Station, Scott, are kept. The poultry flock of about 50 Barred Plymouth Rocks is pullorum tested. Wheat is the major crop on this farm, but oats, barley, hay and grass seed are grown in relatively large quantities. The farm garden with its well planned and protected shelterbelt is a model that could be copied by many farmers. The shelterbelt contains a variety of deciduous and evergreen trees and the garden itself carries an excellent balance between tree and bush fruits and a wide range of vegetables for home use. In front of and beside the house, annual and perennial flowers and shrubs create an atmosphere of beauty.

CHELAN, SASKATCHEWAN

H. M. Clark, Operator.

This station, situated 40 miles east of Tisdale in the degraded black soils zone, has been in operation for one year only. The soil is quite fine and sandy and subject to drifting, especially if given too much cultivation. Both horses and tractor are used to do the farm work. One hundred and eighty acres are under cultivation on the home farm, and some two or three hundred acres are rented. Considerable acreage is taken up in pasture for live stock of which a herd of 25 Shorthorn cattle is part. Hogs are raised in fairly large numbers and this year 100 Barred Rock baby chicks were procured from the Experimental Station, Scott. Twenty sheep have been kept on the farm and have been found of considerable value in keeping down weeds on the summer-fallow land and weedy sloughs. This phase of the work is being increased, and 103 ewes were purchased this fall at the Moose Jaw sheep and swine sale. Only one rotation

is under test on the station, an eight-year cycle of fallow, wheat (one-half fertilized), barley, hay, pasture, wheat, oats and barley. The fields are so arranged that the fallow field and the pasture field are together and both may be pastured. Natural tree bluffs provide adequate shelter for the vegetable garden. An excellent supply of vegetables was grown this year. A start will be made in the growing of tree fruits as soon as a location has been selected and prepared.

GLASLYN, SASKATCHEWAN

E. A. Lee, Operator.

This farm is situated about 50 miles north of Battleford on number four highway. Mr. Lee owns 480 acres, about one-third of which is under cultivation, the balance being in light bush. The soil is mostly of the grey bush type, with small areas of darker and more fertile soil, and in the main is rather stony. The farm has been under the present ownership about 20 years. The cropping system followed was wheat after new breaking or fallow and oats as a second crop. A fair herd of cattle has been kept. Frost, drought and a poor soil are very limiting factors in this district. With the opening of the illustration station in 1932, an attempt to build up the soil with sweet clover, commercial fertilizer and manure was commenced. Alfalfa was sown in experimental fields and plots, and success in these fields led to more experimental work with this crop, especially in seed production, and in 1938 about ten acres of alfalfa, seeded in various ways, was cut and threshed. An additional 28 acres was seeded under experimental conditions in larger fields and 140 small randomized plots were sown. With the advent of alfalfa seed production as a major project, the problem of eradicating sweet clover became important and was commenced at once. The experimental work with alfalfa has received a great deal of attention locally. The operator has spent considerable time discussing the work and showing visitors over the plots and fields. Field Day interest was keen, and in the early winter a special meeting was called by farmers at which the Supervisor and a Seed Inspector discussed alfalfa seed production. The operator's farm is now being rearranged and alfalfa given a more prominent place in the set up.

GLENBUSH, SASKATCHEWAN

J. C. Grant, Operator

This farm consists of 320 acres less part of the village of Glenbush. About half of this land is under cultivation, the remainder is in light to heavy bush, an additional 160 acres is leased for pasture. The present owner homesteaded this farm about 25 years ago when North Battleford, 40 miles distant, was the shipping point. From a small beginning, Mr. Grant developed an excellent herd of about 100 head of high-grade Shorthorn cattle. Later when pasture became less plentiful the herd was reduced until only a dozen head remained. Wheat and oats are the major crops grown, but the farm is well balanced with revenue from the sales of grain, cattle, dairy and poultry products. One or two colts are raised each year. An excellent garden is surrounded by a shelterbelt, some of which has reached its full development, while the greater portion has been planted within the past four years. Both deciduous and evergreen trees were used. An excellent flock of Barred Rock poultry, fully accredited, adds substantially to the family resources. Experimental work in small plots included twelve varieties of wheat, six of oats, four of barley and four of flax. Eighteen plots of forage were also seeded in 1938. Two and a half acres of elite alfalfa were sown in 1938 and made a fair stand, although somewhat thin in spots.

HAFFORD, SASKATCHEWAN

Henry Hudek, Operator

The station at Hafford has been in operation for six years. The area of the farm is around 800 acres, most of which is under cultivation. The farm is slightly rolling and contains some low alkaline sloughs and a large hay meadow, which is flooded from a dam each spring. The farm is in the black soils zone and the soil is of a loam texture with the exception of the clay lowlands. Wheat is the main cash crop grown in the Hafford district, although a substantial acreage is used for the growing of feed crops such as barley, oats, clover and alfalfa as live stock are kept in fairly large numbers. Mr. Hudek farms with both horse and tractor power, the tractor being used only at seeding time and for threshing. A herd of some 20 grade Shorthorn cattle is maintained on the farm and milk is delivered to the town people each morning and night. Usually enough revenue is received from the sales of milk and cream to pay all household expenditures. Mr. Hudek does not follow any hard and fast cropping system on the farm for the reason that it is almost impossible for him to do so. Variations in season, soil and seasonal requirements make it necessary to vary the rotation somewhat from year to year. Summer-fallowing is done every third year, wheat is grown on the summer-fallow and the second crop may be wheat one year, oats or barley another year, and possibly clover another year, according to the season or feed requirements. The station area is divided into 23 fields, and work carried out on these fields consists of rotation, fertilizer studies, weed control and forage crop studies. From five to ten brood sows of pure Yorkshire breeding are kept on the farm. Probably more breeding stock is distributed from this station than from any other in this district of supervision. A small flock of Barred Rock poultry supplies the home with eggs and fowl for the table. A good sized fruit orchard is now beginning to bear, and this year a fair supply of crabapples, plums and cherries, besides much small fruit, was harvested. The orchard is a place of interest to all who attend the field day and to visitors throughout the season. Seldom does a day pass during the growing season without one or more farmers visiting the station to get information on some agricultural work.

LENS, SASKATCHEWAN

H. J. Larcombe, Operator

This station is situated in the degraded black soils zone some 60 miles south and east of Tisdale. The soil is of a heavy loam texture and is difficult to work, stones being numerous. Mr. Larcombe owns 480 acres of land and rents 160 acres. The farm work is done with the tractor and power machinery. A three-year rotation of fallow, wheat and oats or barley is followed. On the station plots the following rotations are used: two, three-year rotations; one, fallow, wheat, oats; the other, wheat, oats, hay, and a six-year rotation of fallow, wheat, hay, wheat, oats and alfalfa. Ammonium phosphate fertilizer is used on all crops grown, with the exception of one field used as a check. Cereal crops are sold for seed purposes. A small flock of Barred Rock poultry supplies the household with eggs and some meat, and a few settings of eggs are sold for hatching purposes. Hogs are kept in small numbers, just enough to supply the household, and two cows and one colt are the only other live stock kept. A small fruit orchard started a few years ago is now beginning to bear. Hundreds of people visit this station during the growing season.

LOON LAKE, SASKATCHEWAN

G. E. Nichols, Operator

This station is located in township 58, range 21, west of the 3rd meridian, the closest railway point being St. Walburg, 40 miles away. The soil varies

from low black land bordering on peat to a shallow grey bush soil classed as Shellbrook loam. The station farm serves a settlement of pioneers and consists of 160 acres, about 80 of which is cleared and broken, the remainder is still in timber, some of it in the saw log class. The same rotations were laid down here as at Glaslyn, a three-year rotation, wheat, oats, and sweet clover, with and without fertilizer, and a five-year rotation of fallow, wheat, oats, mixed hay and hay. Six acres were set down to various forage crops with and without fertilizers. Here, as at Glaslyn, alfalfa seed production has been very successful, yielding 300 pounds per acre in 1938. This development makes it necessary to discontinue the use of sweet clover and to eradicate this plant from the farm. A small herd of grade Ayrshires headed by a bull purchased at the Experimental Farm, Indian Head, is kept. A foundation flock of Barred Rock poultry was obtained from the Scott Experimental Station. The farm work is done with horses.

MEADOW LAKE, SASKATCHEWAN

Martin Gran, Operator

This station is situated on rich black loam soil in township 59, range 17, west of the 3rd meridian, where moisture is usually plentiful and where frost is not a serious factor. To offset these advantages the generous growth of many kinds of plants makes summer-fallowing expensive because of the frequency with which cultivation must be given to control weed growth. The relatively small acreage handled by one unit or by one man also adds to the cost per acre in the new northern district. The control of wild oats by the use of a six-year rotation of fallow, wheat, oats, barley and two crops of hay, has been a practical demonstration on this station. A three-year rotation of fallow, wheat, and wheat has been used as a check and is still polluted with wild oats. Both tractor and horses are used for power. Only a small herd of cattle is kept and enough cows are milked to supply the household needs. The herd bull was purchased from the Experimental Station, Scott. An excellent flock of Barred Rock poultry is kept. The swine are high quality registered Yorkshires from the Experimental Farm stock. The experimental plots included six varieties of spring wheat, four of winter wheat, six of oats and six of barley. Forty plots were used in forage crop tests. An excellent fruit orchard first came into bearing in 1938. Rows of plum, cherry and crabapple trees, raspberries, strawberries, currants and gooseberries are protected by a shelterbelt of spruce and pine trees, also a close meshed rabbit-proof fence surrounds the orchard. An outstanding improvement to this station is found in the well planted rows of spruce, pine, maple, ash and elm trees on either side of the drive. The roadway has been nicely graded and the ditches trimmed and seeded with Kentucky blue grass and white Dutch clover.

MEOTA, SASKATCHEWAN

John Tait, Operator

The operator's farm has passed through a period of reorganization in the past year or two. Two of Mr. Tait's sons have started farming for themselves and the land has been divided into three, half-section farms. Thus, the illustration station farm is now 320 acres instead of the larger unit referred to in previous reports. The farm has been and still is one of the show places of northwestern Saskatchewan. A six-year rotation of fallow, wheat, wheat, oats, hay and hay has been used on this land for about 12 years, but under new plans will be broken up and replaced by one requiring a smaller number of fields. In 1938, one 40-acre field was sown to permanent pasture experiment.

The plan included (1) alfalfa (2) brome grass (3) alfalfa and brome (4) crested wheat grass (5) crested wheat grass and alfalfa. A small experimental block near the centre of this field was taken to compare three kinds of alfalfa in pasture mixtures, Grimm, Cossack and Siberian Yellow alfalfa were each sown with a mixture of brome and crested wheat grass. Both tractor and horse power are employed on this farm. Grade Shorthorns are kept. Twenty cows are milked and the product is disposed of through a fluid milk route in the nearby village. The annual production averages slightly over 6,000 pounds per cow. All surplus cream is made into butter, the quality of this product made by Mrs. Tait is indicated by her consistent successes in the keenest competition, local, provincial and at the Royal Winter Fair in Toronto. At the last mentioned show Mrs. Tait's butter won first prize and championship in 1937 and was a close second in 1938. The fruit orchard has been producing excellent returns for several years, and Mr. Tait has supplied Sunbeam, Herbert and Viking raspberry canes for a number of northern stations.

PADDOCKWOOD, SASKATCHEWAN

G. L. Endicott, Operator.

Mr. Endicott has been operating the station since 1931. The farm consists of 320 acres in the black soil zone area. The soil is of a loam texture inclined to be a little sandy, it is easy soil to work and requires very little cultivation except to keep down weeds. As well as working the home land, additional acreage is leased. Farm work is done both with horses and tractor. The rotation followed on the farm is one in which summer-fallowing is done every fourth year, followed by three crops of grain, the first crop being wheat and the second and third crops wheat, oats or barley. Two, three-year rotations and two, six-year rotations are under test on the illustration station plots to study control of wild oats. Surface tillage practices appear to be better than ploughing in controlling this weed. Fertilizers have been tested for some years but the response has been slight. Alfalfa has proved a profitable crop both as hay and as a seed crop. Apart from the field work a profitable sideline on the station has been the growing of strawberries for commercial purposes. An acre or two of strawberry plants are set out each year, and two crops of strawberries are harvested from each plantation before being ploughed up. The plants are grown in rows as individual plants rather than in a matted row. An orchard consisting of crabapple trees, plum trees, cherry trees and small fruits such as the raspberry, currant and gooseberry, supplies the household needs and usually considerable fruit for sale. The poultry flock is well kept, the foundation stock being obtained from the Experimental Station, Scott. A herd of some twelve grade Shorthorn cattle supplies the house with milk, cream, butter and beef. Another important sideline on this farm is the raising and feeding of hogs. From 10 to 15 brood sows are kept, and two litters of pigs are raised from each sow annually. A number of young pigs are sold to farmers for breeding purposes, the remainder being kept on the farm and fed until ready for market. A large percentage of the hogs from this station grade "Selects".

PARKSIDE, SASKATCHEWAN

W. D. Willoughby & Sons, Operators.

This station has been in operation for only four years. It is situated in the degraded black soil zone some 40 miles west of Prince Albert. The land is quite sandy and subject to drifting and requires very little cultivation, except to keep down weeds. The station section consists of 11 fields. Two five-year rotations are in use, the first one being fallow, wheat (half fertilized), oats,

hay and hay, the second rotation is fallow (half manured), wheat, hay, barley and alfalfa. The alfalfa in this rotation is down for five years at a time. The hay crop in the first rotation is a mixture of alfalfa, western rye grass and sweet clover. The hay in the second rotation is sweet clover. The field problems on this station are of fertility and control of weeds such as wild oats and Canada thistle. Barnyard manure as a fertilizer has given better results than has ammonium phosphate. Alfalfa has done well both as a hay crop and when used for seed production. Home beautification is an important feature on this station, the perennial flower border is large, well kept and displays a mass of bloom throughout the flowering season. Windbreaks consisting of deciduous as well as evergreen trees, provide shelter for the flowers, vegetable garden, and fruit orchard. Several acres of land are used for testing varieties of fruit such as crabapples, plums, cherries and small fruits. Each year additional plantings are made of new and recommended varieties of fruits. Almost three tons of fruit was harvested in 1938. Poultry has proved a profitable sideline, a fully approved flock of two to three hundred barred Plymouth Rocks are kept. When tested in the fall of 1938 for pullorum disease, no reactors were found. Cockerels are sold for breeding purposes and eggs are sold to hatcheries. Seventeen prizes were won with exhibits of fruit and vegetables at the Prince Albert Exhibition in 1938.

PIERCELAND, SASKATCHEWAN

E. M. Bates, Operator.

This is the most northerly illustration station in Saskatchewan. It is located in township 62, range 26, west of the 3rd meridian, near the northern edge of agricultural land in the province. Settlement has taken place within the past seven or eight years under the Northern Settlers' Re-establishment Board and all farms are still in the pioneering stage. Little attempt has been made as yet to establish any definite rotations. During the past two years, the success of alfalfa seed production has upset the previous ideas and plans for farming in this area. On the illustration station the rotations designed to improve the fertility of this rather inferior soil through the use of sweet clover and fertilizers were discarded almost as soon as commenced. Alfalfa is being used to replace sweet clover on the station and considerable acreage has been used to study the reaction of alfalfa to various fertilizers and to rates of seeding. About 70 acres are now under cultivation, most of this is either in alfalfa or is prepared for alfalfa seeding in 1939. A small herd of grade cattle is kept, the herd bull is a good useful type of Shorthorn obtained through the Dominion Live Stock Branch. Experimental plots include cereal varieties, forage crops and about 40 plots dealing with cultural practices and use of fertilizer for alfalfa seed production on grey bush soils, and an additional 20 plots of forage on peat land. Eight blocks of pasture experiments were seeded in 1938 when a good stand was obtained. A flock of Barred Rock poultry has been established from chicks procured from the Experimental Station, Scott.

ST. PAUL, ALBERTA,

Hector Therrien, Operator.

This station is located in township 58, range 9, west of the 4th meridian. The farm consists of 1,200 acres, of which about 500 are under cultivation, the remainder is in hay, pasture and bush. The soil varies from rich black loam to the brown silty loam type. In the earlier years Mr. Therrien maintained a large herd of cattle and milked a number of cows. In more recent years the herd was reduced to about 100 head and in 1937 to 60 head. These are grade

Angus headed by an excellent registered Angus bull. Only a sufficient number of cows are milked to supply the household needs, the herd is free from tuberculosis. About 60 pure-bred Yorkshire hogs are kept on the station. Breeding stock of both sexes has been purchased from time to time from the Experimental Station, Scott. On the station fields two rotations are followed, one of six years' duration; fallow, wheat, wheat, oats, hay and hay; the other a four-year cycle; fallow, wheat, wheat and oats. The latter is followed on the farm proper, except that some barley is used in the fourth year. The home grounds are nicely planted and a good garden is grown every year within the protection of a suitable shelterbelt. A start has been made with both tree and bush fruits. Experimental plots include cereal varieties, forage varieties, fertilizer tests and pasture tests. The latter covers 40 acres close to the buildings where eight kinds of forage crops were sown separately in narrow strips across the field. Eight fields were seeded to various mixtures in 1937, when good stands were obtained in each field.

TISDALE, SASKATCHEWAN,

H. A. Last, Operator.

The field work on this station is done with horses and tractor. Four to five hundred acres are used for crop, some of which is owned, and part is leased from a neighbour. The soil is clay loam in texture and difficult to work when wet and also when dry. The station consists of 19 small fields, nine of which are used for wild oat control studies. Two rotations are being tested, one of wheat, oats and hay, and one of fallow, wheat, hay, wheat, oats and alfalfa. The alfalfa is left down for six years at a time. Due to the fact that a large amount of stock is kept on the farm, much of the land is taken up in growing forage crops, one-third of the acreage being used for growing alfalfa hay. Incorporated in the rotation followed on the farm is a crop of sweet clover, which is used for hay, for pasture or is ploughed under as green manure according to the requirements of the farm. A good flock of Barred Plymouth Rock poultry contributes to the household table, and also supplies hatching eggs and breeding stock for farmers in the district. The small fruit orchard is now coming into bearing.

WEIRDALE, SASKATCHEWAN,

F. P. Meyers, Operator

This station was opened in 1935, it is situated in the grey soils zone area north and east of Prince Albert. The soil is of a light loam texture and is easily worked. The farm at one time was covered with a heavy growth of trees, mostly poplars, now over 200 acres are under cultivation, and this year 160 acres were leased from a neighbour. The station consists of 14 fields on which rotations, fertilizers, stubble crops and coarse grain crops are being tested. The rotations used are: A five-year of fallow, wheat (half fertilized), wheat, hay and oats; a six-year of fallow, wheat, hay, barley, oats and alfalfa and a three-year rotation of wheat, oats and hay. The latter is used to get information on the value of this type of rotation without a summer-fallow. The growing of forage crops for seed production is an important feature on this station. Some 60 acres have been sown to alfalfa, and the yield of seed this year was over 300 pounds per acre. Twenty acres of crested wheat grass produces a good crop of seed each year. Considerable work has been accomplished in the beautification of the home surroundings, flowering shrubs and flowers have been set out in the front yard and more trees have been added to the shelterbelts.

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WHITE FOX, SASKATCHEWAN,

Peter Tornquist, Operator.

This station is situated 90 miles east of Prince Albert and north of the North Saskatchewan river. The farm consists of 160 acres all under cultivation, with the exception of the building site which comprises some ten acres, the soil is of the grey bush type and is light loam in texture. The main source of revenue on the farm comes from the sale of forage crop seed, 40 acres of alfalfa produces a fair crop of seed. Ten acres of crested wheat grass is grown in rows, three feet apart, from which a heavy crop of seed has been harvested each year. There are only a few acres of land sown to cereal crops apart from the station. Three rotations are being tested; one of fallow, wheat (half fertilized) and oats; one of fallow, wheat, hay, hay, wheat and oats; and one of wheat, oats, hay and hay. The hay crop used in the rotations is a mixture of alfalfa and western rye grass. Cereal variety tests and forage crop tests are carried out on small plots. Enough cattle and hogs are kept to supply household needs. A small fruit orchard has been started, and additional land has been prepared for further fruit tree planting. Home beautification has been one of the most important features on the station. Shelterbelts have been increased in size by the planting of 2,870 trees. A new house was built this year and the grounds about the house have been completely renovated. Lawns have been sown, a gravelled driveway has been made, and perennial flowers and flowering shrubs have been planted.

The new home and beautiful layout of the Tornquist family, White Fox, Sask.

THE WEATHER AND CROP GROWTH

The winter of 1937-38 was not unusually long nor was it exceptionally cold; heavy snowfalls were received in all districts. Rains in the fall of 1937 added much needed moisture to the land before freeze-up, but despite this, the soil went into winter in a comparatively dry condition. Spring opened during April and by the first week in May seeding became general. Growth was good in most districts until about the tenth of June when crops began to show the effects of drought, which continued until the first week in July when a few light rains came. By the end of the month additional rains had been received and crops were beginning to revive. Light yields were the result in most districts, Birch Hills

and Hafford experienced almost a total crop failure. Cool, damp weather prevailed during August and September and rust was severe in the eastern districts and was found for the first time on some of the more northerly stations. Late rains caused some sprouting of grain at the eastern stations. Cutworm injury was severe at Meota and Parkside, wireworms did damage at Glaslyn, Glenbush and Meota, while grasshoppers reduced some crop at Meota, Glenbush, Hafford, Lens and Birch Hills.

The following is a short review of the seasons for 1934 to 1937, inclusive: *1934*— The crop season opened almost a week later than the average date for the previous eight years. The "first seeding" reports ranged from April 13 to May 17, with the average around May 5. Fair to good crops were harvested in the northern districts, light yields were experienced in the southern section. *1935*—The crop season opened about eleven days later than the average date for the previous nine years. Northwestern districts experienced serious damage from early harvest frost on August 16. Eastern stations suffered from rust infestation. *1936*—An extreme heat wave during the latter part of May caused severe damage to both early and late crops. The hot, dry growing season resulted in light crops in most districts and an early harvest. Harvesting commenced on all stations ten days to two weeks earlier than the average date. *1937*—Seeding was general by May 1. Crop growth was good until June, then drought set in and continued until mid-July, when heavy rains relieved the situation somewhat. The late rains did not benefit the wheat to any great extent, but they helped the feed situation. Very light crops were harvested at Meota, Glaslyn, Glenbush and Hafford.

Mean yields in districts served by the stations during the years 1934-36, inclusive, were considerably below the long-time average, mainly due to lack of precipitation during the critical period of growth.

PRECIPITATION

(In Inches)

Station	Fall	Winter	Summer 1938				Crop year Aug. 1, 1937 to July 31, 1938	Total for calendar year 1938	Average for calendar years 1934-38 inclusive
	Aug. 1, to Oct. 31, 1937	Nov. 1, to March 31, 1938	April	May	June	July			
Birch Hills, Sask.	3·35	3·48	0·59	0·81	0·23	2·51	10·97	13·42	11·68(1)
Chauvin, Alta.	3·07	3·91	0·42	3·38	1·38	2·36	14·52	15·59	12·92
Chelan, Sask.	1·73	6·55	0·77	2·19	1·81	4·23	17·28	20·02	.....
Consort, Alta.	4·98	4·42	0·69	1·85	1·76	2·26	15·96	14·33	12·35
Dunblane, Sask.	2·30	4·52	0·50	1·87	2·78	1·87	13·84	14·57	10·13(1)
Glaslyn, Sask.	3·19	3·40	0·20	1·90	0·97	2·02	11·68	14·70	12·50(2)
Glenbush, Sask.	3·95	2·00	0·08	1·36	1·70	1·26	10·35	12·48	10·01
Guernsey, Sask.	2·18	4·19	0·66	1·23	2·18	1·19	11·63	12·77	12·24
Hafford, Sask.	2·26	3·26	0·28	1·84	0·48	1·46	9·58	13·49	11·78
Juniata, Sask.	3·74	3·22	0·79	2·01	3·61	1·66	15·03	16·35	12·36(1)
Kindersley, Sask.	2·24	2·32	0·61	1·42	3·57	2·69	12·85	14·03	9·25
Lens, Sask.	3·40	5·97	0·27	2·62	1·78	5·43	19·47	20·85	15·57(1)
Loon Lake, Sask.	3·03	6·23	1·15	1·47	0·58	2·19	14·65	14·61	15·62(2)
Loverna, Sask.	2·48	4·85	0·77	0·88	2·31	1·80	13·09	13·23	11·19
Meadow Lake, Sask.	2·50	3·99	0·12	1·82	1·27	2·22	11·92	13·54	13·71
Metiskow, Alta.	3·75	4·52	0·51	2·62	1·73	1·22	14·35	14·81	14·00(2)
Meota, Sask.	3·07	3·46	0·37	1·98	1·19	2·11	12·18	17·48	12·74
Paddockwood, Sask.	3·40	3·61	0·83	0·88	0·36	2·77	11·85	12·37	11·24
Parkside, Sask.	4·74	2·16	0·72	1·50	0·38	1·84	11·34	13·42	14·37(2)
Pierceland, Sask.	.....	.....	0·82	1·46	0·45	1·92	.....	12·24	.....
Rosetown, Sask.	2·12	4·98	0·73	2·24	3·87	1·96	15·90	19·86	12·62(1)
St. Paul, Alta.	4·26	3·90	0·25	1·47	1·51	2·83	14·22	15·58	15·95
Tisdale, Sask.	2·27	5·56	0·50	0·79	1·13	2·50	12·75	15·67	15·49(2)
Weirdale, Sask.	3·80	2·45	0·55	0·51	0·64	0·73	8·68	11·15	11·25(1)
White Fox, Sask.	4·35	3·70	0·84	1·34	1·42	3·79	15·44	16·40	14·88(3)

(1) Three-year average. (2) Four-year average. (3) Two-year average.

Cost of Producing Crops

Cost of producing crops is a study carried out on the stations to determine the cost per acre of tillage methods being used, the most suitable rotation or rotations for individual districts, to discover methods of reducing cost and to determine what crops give the most profitable returns. Conditions are continually changing over a period of years and thus adaptations in methods of farming are necessary.

When compiling the costs of producing crops as given in the following table, items such as use of land, taxes, machinery, manual labour, horse labour, seed, twine, threshing and other expenses have been included. Each operator keeps a record of labour and expenses incurred in producing the various crops.

From a study of yields and costs, it will be observed that the cost per bushel varies inversely with the yield per acre, thus all controllable factors which will increase the crop must be carefully developed. The efficient use of the power unit whether horses or tractor, and the proper proportion of power and manual labour in relation to the size of farm, are all important factors influencing cost of production. The frequency of fallow in a rotation has a direct bearing on the cost of crop. Uncontrollable factors, such as rust, grasshoppers, frost, cutworms and drought have materially affected yields.

In rotations of two years' duration, the summer-fallow cost is charged against the succeeding crop, in rotations of longer duration, two-thirds of the cost of fallow is applied to the first crop and one-third to the second.

Wheat after bare fallow and wheat after hay with partial fallow have, during the past five years, yielded almost the same. The difference has been two bushels per acre in favour of wheat after bare fallow. Due to greater expense incurred when grown on fallow, wheat after hay has been produced on the northern stations in the supervisory district centering out from the Scott Experimental Station at eight cents per bushel less. This has been the case only when the hay land was broken up immediately after the hay was removed and the land then given a partial fallow. In cases where the hay land was left unbroken until late fall or the following spring the yield of wheat following has been greatly reduced.

YIELDS OF WHEAT AND COST OF PRODUCTION IN DIFFERENT ROTATIONS

Location of Stations	Wheat after:	No. of Years Grown	Yield per Acre		Cost per bushel 1938	Cost per Acre	
			1938	Average		1938	Average
			bush.	bush.	$	$	$
Birch Hills, Sask....	Fallow, check, 5 year rotation.	3	19·5	26·17	0 52	10 05	10 98
	Hay, 3 year rotation.....	3	6·0	13·50	0 96	5 75	7 31
Chauvin, Alta.....	Fallow, 6 year rotation.....	6	21·0	17·7	0 33	6 90	9 09
	Fallow, 4 year rotation.....	6	22·5	16·2	0 31	6 87	8 87
Glaslyn, Sask.....	Hay in 3 year rotation.....	4	6·0	6·6	1 23	7 37	7 82
	Hay (fert) 3 year rotation.....	4	8·3	8·8	1 08	8 95	9 32
	Fallow, 5 year rotation.....	4	10·0	8·1	1 10	10 98	11 02
Glenbush, Sask.....	Fallow, 6 year rotation.....	9	7·5	26·6	1 27	9 56	10 04
	Wheat, 6 year rotation.....	9	8·0	17·0	1 01	8 07	8 24
	Fallow, 4 year rotation.....	9	8·1	26·1	1 08	8 76	9 86
Hafford, Sask.....	Fallow (fert), 3 year rotation..	4	5·9	13·09	1 59	9 39	9 64
	Fallow (check), 3 year rotation	4	8·5	13·63	1 02	8 66	8 89
	Fallow, 6 year rotation.....	7	7·3	14·10	1 17	8 56	9 02
	Fallow, 4 year rotation.....	6	8·9	12·22	1 09	9 71	8 85
Lens, Sask.....	Fallow (fert), 3 year rotation...	6	31·0	32·4	0 41	12 70	11 96
	Fallow (check), 3 year rotation	4	26·0	19·5	0 44	11 45	10 20
	Fallow, 6 year rotation.....	6	25·0	25·8	0 46	11 44	10 45
	Hay, 6 year rotation.....	6	20·0	23·7	0 42	8 43	7 94

YIELDS OF WHEAT AND COST OF PRODUCTION IN DIFFERENT ROTATIONS—*Concluded*

Location of Stations	Wheat after:	No. of Years Grown	Yield per Acre		Cost per bushel	Cost per Acre	
			1938	Average	1938	1938	Average
			bush.	bush.	$	$.	$
Loon Lake, Sask.....	Hay, 3 year rotation.....	4	8·5	10·6	0 73	6 21	6 43
	Hay (fert), 3 year rotation.....	4	18·0	14·9	0 47	8 39	8 36
	Fallow, 5 year rotation.....	4	25·0	18·8	0 44	11 03	10 65
Meota, Sask.....	Fallow, 3 year rotation (fert)..	4	7·5	10·0	1 43	10 73	10 40
	Fallow in 3 year rotation (check).....	4	7·0	8·4	1 37	9 62	9 27
	Hay in 3 year rotation.....	7	12·3	16·3	0 58	7 09	7 28
	Fallow in 6 year rotation.....	6	8·3	13·5	1 25	10 37	9 62
	Wheat in 6 year rotation.....	6	9·3	10·9	0 93	8 62	8 46
Paddockwood, Sask.	Fallow (Cult), 6 year rotation.	3	15·0	16·4	0·61	9·19	10·32
	Hay in 6 year rotation (cult)..	3	10·0	8·6	0·61	6·11	6·67
	Fallow in 6 year rotation (ploughed) (check).....	6	16·0	19·6	0·61	9·83	9·55
	Hay in 6 year rotation (ploughed) (check).....	6	16·0	18·71	0·43	6·88	7·67
	Fallow in 6 year rotation (fert).	4	16·5	17·8	0·65	10·77	11·01
	Hay in 6 year rotation (fert)..	4	15·0	17·3	0·51	7·71	8·96
Parkside, Sask.....	Fallow in 5 year rotation (check).....	3	8·5	9·0	1·22	10·39	9·98
	Fallow in 5 year rotation (fert).	3	9·5	11·2	1·19	11·35	11·03
	Fallow in 5 year rotation (check).....	3	13·0	9·7	0·78	10·19	10·00
	Fallow in 5 year rotation (manured).....	3	17·0	16·3	0·64	10·93	10·78
St. Paul, Alta.....	Fallow in 6 year rotation.....	10	11·2	25·2	0·87	9·76	11·22
	Wheat in 6 year rotation.....	10	9·0	18·0	0·93	8·39	9·58
	Fallow in 4 year rotation.....	10	13·0	24·5	0·74	9·56	10·84
	Wheat in 4 year rotation.....	10	6·0	17·6	1·35	8·07	9·41
Tisdale, Sask.....	Hay in 3 year rotation.....	4	11·0	13·9	0·75	8·23	9·23
	Fallow in 6 year rotation.....	5	11·0	16·8	1·01	11·07	11·46
	Hay in 6 year rotation.....	5	11·5	12·5	0·77	8·87	8·48
Weirdale, Sask.....	Fallow in 5 year rotation (check).....	3	18·0	17·0	0·55	9·89	10·52
	Fallow in 5 year rotation (fert).	3	25·0	20·3	0·46	11·51	11·92
	Wheat in 5 year rotation.....	3	13·0	14·9	0·67	8·66	8·93
	Fallow in 6 year rotation.....	3	15·3	19·2	0·64	9·73	10·48
	Hay in 3 year rotation.....	3	13·3	13·5	0·50	6·59	7·46
White Fox, Sask.....	Fallow in 3 year rotation (check).....	3	18·0	18·3	0·65	11·72	11 72
	Fallow in 3 year rotation (fert).	3	23·0	21·3	0·58	13·27	13·23
	Fallow in 6 year rotation.....	3	27·0	22·1	0·44	11·99	11·66
	Hay in 6 year rotation.....	3	20·0	18·4	0·41	8·23	8·79
	Hay in 4 year rotation.....	3	20·0	19·6	0·41	8·23	8·88

NOTE.—Abbreviations: fert.=fertilizer.
cult.=cultivated.

CROP ROTATIONS

A study of crop rotations using 25 rotations or modifications thereof has been made on the illustration stations. In the majority of these rotations, summer-fallowing is an important factor. The length of the rotation depends upon the frequency with which it is necessary to fallow in order to store more moisture or to control weeds. In the area served by the illustration stations, experience indicates that a three-year rotation with a fallow once in every three years is short enough. In fact, a fallow once in four years is much more common. One of the three-year rotations used has only a partial fallow, this rotation is wheat, oats and sweet clover. The clover sod is ploughed as early

as possible after the removal of the first cutting, thus providing a partial fallow for the succeeding crop.

At Meota, where this rotation is used, wheat grown after a partial fallow has yielded as much as wheat after bare fallow, the six-year average being 13·4 bushels per acre after sweet clover and 13·3 after bare fallow. The rotation has not been employed to control weeds. Not every farm however, can utilize as much sweet clover as can be grown on one-third of the crop land. This rotation has been laid down to add fertility to some of the poorer grey bush podsolic soils of the north, but with the advent of alfalfa seed production, sweet clover at once became a bad weed and the rotation is being discontinued in alfalfa seed producing areas.

Four-year rotations are more commonly used in the north than shorter cycles, as few farmers wish to have more than one-quarter of their cultivated land in fallow. Wheat is grown on fallow land on most farms and in all four-year rotations on the stations. In the third and fourth years, wheat, oats, barley or hay are grown according to local needs.

Adding another year to the four-year rotation, using a second year in hay or pasture makes it possible to obtain two years of forage with one cost of seeding. A rotation consisting of fallow, wheat, oats, barley and hay has been used at Meadow Lake for nine years when wild oats disappeared from the fields after one complete cycle, but increased rapidly in the three-year rotation of fallow, wheat and wheat adjoining it. In 1936, a second year in hay was added to make this a six-year rotation, alfalfa and western rye grass being the mixture used.

As a result of observations made on these rotations, their influence on various kinds of weeds and their effectiveness in meeting the farm needs, as well as the statistical records over a ten-year period, it would appear that every farm should be carefully planned. A cropping system should be adopted to meet the needs of the type of farm. It should be sufficiently flexible to permit of change. This change should provide more cash crop or feed to meet contingencies such as a crop failure. While changes are often necessary from the standpoint of successful farming, they are not desirable from the statistical viewpoint.

Forage Crops

Oats either as green feed or cut in a more mature stage and fed as oat sheaves have long been the most common and perhaps the most satisfactory winter fodder for horses, cattle, sheep, and in many cases, milch cows in the area served by these stations.

With a better understanding of the handling of grasses and legumes under northern environment and general decline in seed prices, more tame hay and pasture is being used. Slender wheat grass (western rye), brome grass, alfalfa and sweet clover have been in general use on the illustration stations since their inception in the north. These crops have been employed both in regular rotations and in separate fields set down for a period of years. During the past five years a wider range of varieties have been tried out in small plots on various soil types and under different moisture conditions. During the earlier stages of plot testing, single varieties were used exclusively and included the following grasses and legumes:

Grasses	*Clovers*	*Alfalfa*
Brome	Arctic (sweet)	Grimm
Crested wheat	Alpha "	S401
Red top	Alsike	Ladak
Reed canary	Altaswede (red)	Cossack
Slender wheat	White Dutch	
Timothy		

The above were tested on all illustration stations and created considerable interest among farmers on field days. The results of these tests were used as a guide in successive seedings.

During the past five years, more than 1,000 plots have been sown to grasses and legumes, singly and in combination, some with and some without fertilizer and with different rates of seeding.

In 1938, seventy-five fields were in hay in regular rotations. Sixteen separate fields are in special tests for specific purposes. Twenty fields are used for study of pastures apart from rotation studies, and more than 600 plots are used to study the adaptability of grasses and legumes. About 200 plots are used in testing the production of alfalfa seed.

In twenty-one tests, slender wheat grass produced an average yield of 1·43 tons of hay per acre, as compared with 1·46 tons for crested wheat grass and 1·41 for timothy. In seven tests where brome was compared with slender wheat grass, the yields were 1·55 tons and 1·43 tons per acre respectively. Crested wheat grass in the same series produced 1·46 tons of field dried hay, while timothy gave 1·31 tons per acre. A closer study of these plots reveals the fact that when moisture was plentiful, brome and timothy outyielded slender wheat and crested wheat grass, but in seasons of light precipitation, brome and timothy produced less than the more drought-resistant grasses.

Forage plots on the illustration station, Meadow Lake, Sask. From left: Arctic sweet clover, Altaswede, white Dutch, reed canary grass, red top, crested wheat grass, timothy and western rye grass.

In eighteen tests comparing red top and timothy, the yields were 1·73 and 1·60 tons per acre respectively. These tests were conducted under moist conditions suitable for these grasses. Alfalfa has proved as hardy as sweet clover and is fast replacing the latter on northern farms. Grimm has proved as hardy as any of the varieties of alfalfa tested in the north. Reed canary grass has done well when flooded for a month or two in the spring. Alsike has been fairly satisfactory on land that is too wet for alfalfa but yet is not covered with water for more than a short period.

Pasture tests include Grimm, Cossack and Siberian Yellow alfalfa. Altaswede red clover and white Dutch clovers, alsike clover, common brome and Parkland brome, timothy, crested wheat, slender wheat, Kentucky blue, creeping red fescue, meadow fescue, and reed canary, alone and in 25 combinations, on 175 acres of land located on nine stations. These pastures are still new, but have been the centre of much interesting discussion on field days.

At White Fox where a fence divides the field and pasture is rotated, greater carrying capacity has been indicated. Grimm alfalfa has not stood up well under continuous close grazing.

The production of forage crop seed is being fostered. During the past few years, seed production of alfalfa, crested wheat grass, brome grass and slender wheat grass, has developed in the north. Of these, the first two mentioned have been most outstanding, with returns per acre such as to cause a general trend toward seed production.

At Glaslyn and Pierceland, alfalfa seed has returned substantial profits when wheat was produced at considerable loss. Yields of alfalfa seed have ranged from 100 to 500 pounds per acre in dry seasons and on very shallow grey bush soils. In order to study this phase of the work, alfalfa has been sown at Glaslyn solid and in rows with and without nurse crop, at rates from one to twelve pounds per acre.

Three, four-acre fields and 24 plots sown in 1937 were harvested in 1938. A further 26 acres seeded in various ways and 120 plots were sown in 1938, when an excellent stand was obtained. Counts were made to determine the number of plants per square yard in different rates of seeding. Seeding three pounds per acre in 36-inch rows produced an average of 46 plants per square yard. Solid seeding (6″ drills) five pounds per acre, gave an average of 100 plants per square yard. Seven pounds of seed gave 210 plants. Nine pounds of seed, 260 plants; 12 pounds per acre produced 479 plants per square yard in 1938. Counts were made of the number of plants in square yards from which seed yield samples were cut with the following results:

16 plants per square yard yielded	330 lb. per acre
40 plants per square yard yielded	621 lb. per acre
98 plants per square yard yielded	320 lb. per acre
108 plants per square yard yielded	181 lb. per acre
159 plants per square yard yielded	151 lb. per acre

Samples taken from areas showing 400 plants per square yard produced no seed, while square yards containing only three plants produced seed at the rate of 200 pounds per acre. When the seeding was done with a nurse crop, the yield was increased over the alfalfa sown without a nurse crop, apparently due to the fact that a thinner stand was obtained. The yields were 525 pounds and 409 pounds of seed per acre respectively.

Twenty-four plots were used to test the reaction of alfalfa to various fertilizers. These are discussed under the section dealing with fertilizers.

Fertilizers

Since 1932 considerable attention has been given to experimental work with fertilizers both in small plots and on fields ranging from two to fifteen acres in size. On the larger fields ammonium phosphate and barnyard manure were the only fertilizers used, these were used singly and in combination. On the small plots a wider range of fertilizers are being tested. In 1938 fertilizer studies in relation to alfalfa seed production as well as for hay were commenced. This work is being continued and extended.

The following table shows the yields in bushels per acre for wheat fertilized and the wheat from the check fields, also the increase or decrease in yields, as well as the number of years tested in the fields.

YIELDS FROM FERTILIZED AND CHECK FIELDS

(Phosphate fertilizer trials)
1932-1938

(Bushels per acre)

Stations	Number of years	Wheat fertilized	Wheat Check	Increase or decrease
Birch Hills, Sask.	2	28·5	26·0	2·5
Chauvin, Alta.	4	15·0	14·5	0·5
Glaslyn, Sask.	3	9·0	6·8	2·2
Glenbush, Sask.	5	18·6	14·7	3·9
Hafford, Sask.	4	13·1	13·6	0·5
Lens, Sask.	5	32·4	24·4	8·0
Loon Lake, Sask.	4	14·9	10·6	4·3
Meadow Lake, Sask.	4	41·1	36·3	4·8
Meota, Sask.	4	10·0	8·4	1·6
Paddockwood, Sask. (after fallow)	4	17·8	15·3	2·5
Paddockwood, Sask. (after hay)	4	17·3	16·4	0·9
St. Paul, Alta.	5	27·4	24·9	2·5
Tisdale, Sask.	3	8·3	7·9	1·3
Weirdale, Sask.	3	20·3	17·0	3·3
White Fox, Sask.	3	21·3	18·3	3·0

Triple superphosphate was used in these tests in 1932 and 1933 and was applied at the rate of 40 pounds per acre. Since that time ammonium phosphate has been employed. The 11-48 was used on the prairie stations and 16-20 farther north.

Where moisture was not a limiting factor, the fertilizer not only showed increased yields, but hastened maturity by several days—a desirable factor where frost or rust are hazards. Fertilized wheat also showed added strength in fighting weeds and root-rots.

At Meota and Hafford a series of fields were set apart for fertilizer trials, using ammonium phosphate 11-48 and barnyard manure, alone, and in combination. The following table shows the yields of wheat after fallow in these tests:

MANURE AND FERTILIZER TESTS AT MEOTA AND HAFFORD

(Four-year ave. yield of wheat)

Treatment	Meota	Hafford
	Bush. per acre	Bush. per acre
A.P. 11-48, 30 pounds per acre	10·40	9·64
Barnyard manure, 15 tons	10·03	9·41
Ammonium phosphate and barnyard manure	10·88	9·92
Check	9·27	8·89

The constant light yields indicate dry seasons which would limit the response to fertilizers. However, the tests are being continued. At Glaslyn and Pierceland, 12 plots of alfalfa were measured out and staked. Six treatments were given in duplicate at each station, namely: (1) Barnyard manure, 15 tons; (2) Check; (3) Ammonium phosphate 16-20 at 75 pounds per acre; (4) Single disked; (5) Ammonium sulphate at 75 pounds per acre; (6) Barnyard manure and ammonium phosphate 16-20. At Glaslyn the manure was applied early in the winter previous, while at Pierceland it was applied early in May. In neither case did it increase yields, in fact in all cases these plots yielded below the check. Disking did not appear to change the results at all, but wherever ammonium phosphate 16-20 or ammonium sulphate were applied either alone or with manure, increased yields were shown. Since these plots

were compared in 1938 only, the results cannot be regarded as more than a lead for further trials.

Cereal Varietal Tests

Cereal variety tests have been conducted in rod row plots on the illustration stations for the past three years. These tests are carried on in co-operation with the Cereal Division, to find the variety or varieties best suited to the various districts and to test out new varieties. The seed and plans were prepared by the Cereal Division, seeding was done by the Supervisors, using a Kemp belt seeder. Harvesting was done by the operators and Supervisors. The product of each plot was labelled and wrapped in cotton, delivered to Scott and stored until winter when it was threshed, cleaned, weighed and graded.

Rod row cereal variety test plots, Rosetown, Sask., 1938.

This test in 1938 consisted of 320 rod rows of winter wheat (four varieties); 2,088 rows of spring wheat (twelve varieties); 1,920 rows of oats (six varieties); 1,440 rows of barley (six varieties); and 1,440 rows of flax (two varieties), fertilized and non-fertilized.

Good tests were obtained from most of the stations. At Hafford, Birch Hills and Weirdale, drought lowered the yields of wheat, oats and barley. The flax at Birch Hills and Weirdale could not be harvested because of the stand being too uneven.

Weed Control

Weeds are being controlled on the illustration stations through crop rotations combined with proper cultural practices. The procedure followed depends largely on the kind or kinds of weeds to be controlled. Canada thistle, perennial sowthistle and wild oats have been the main weeds to contend with on the stations. Stinkweed and Russian pigweed have been present on a number of stations, but have been easily controlled and have given very little trouble. Darnel grass was prevalent on the station at Hafford. Russian thistles have been gradually creeping northward as the drought area has been extending in that direction.

Canada thistle.—This deep-rooted perennial is a serious menace in the northeast districts; it is moving westward and is a difficult weed to control.

Canada thistle has been subdued on a number of stations by following certain rotations and cropping practices. The rotations used include a hay crop. The breaking up of the hay land in July has proved a very practical method of control; at this time the thistles are usually at their weakest stage. Keeping the land black for six weeks after breaking has killed the thistle.

At Birch Hills, Tisdale and Lens, Canada thistles have been controlled by seeding the infested land down to alfalfa. No thistles have appeared after the second year. Several years of close pasturing at Birch Hills has reduced the number of thistles. In a straight grain rotation at Lens the thistles have been set back during the summer-fallow year by never allowing the new shoots to appear above the ground. This is an expensive remedy.

Perennial sowthistle.—The treatment of this weed is similar to that of Canada thistle, although the control is not so difficult as the sowthistle roots are shallower and more tender. Sowthistles have been successfully controlled on the stations by using certain mixed farming rotations. The hay land in these rotations has been ploughed in July, followed by thorough cultivation until freeze-up. Suppression of this weed by black summer-fallowing is quite successful but rather expensive.

While Canada thistle and sowthistle can be successfully checked, it is almost impossible to eradicate them as the weed seeds blow in from roadsides, native bluffs and vacant infested land.

Wild oats.—This weed is found on the majority of farms in this district of supervision. Special wild oat control projects are being carried out at Tisdale and Paddockwood, results of which should be available in 1939. Wild oats have been best controlled by growing them out. Deep ploughing is not recommended since the buried seeds remain dormant until turned up again. Surface tillage practice at Paddockwood and Tisdale has reduced wild oats considerably.

The three-year rotation of wheat, oats and sweet clover hay, also the six-year rotation of fallow, wheat, sweet clover hay, wheat, oats and alfalfa (down for five years) at Lens have lowered the wild oat infestation. The rotation of fallow, wheat, oat hay and clover hay at Hafford, has reduced the weeds by approximately 90 per cent since it was started six years ago. This rotation allows for a long fallow, from the time the clover hay is removed until freeze-up and all of the following year. With favourable moisture conditions several crops of wild oats have been killed during such a period. The rotation of fallow, wheat, clover hay, barley and alfalfa (down for five years) has been used at Parkside for four years. Wild oats have been reduced some 50 per cent by the use of this rotation.

Darnel grass at Hafford has been completely eradicated in six years by the four-year rotation of fallow, wheat, oat hay and clover hay. This rotation allows for a long summer-fallow.

Distribution of Seed

Since their inception the illustration stations have been a source of pure seed grain. In recent years grass and alfalfa seed have been distributed in increasing quantities. The sales of seed for the past four years are shown in the following table:—

Year	Wheat	Oats	Barley	Grass	Alfalfa
	bushels	bushels	bushels	lb.	lb.
1935	6,548	4,924	384	1,261	113
1936	3,875	1,370	1,628	950	162
1937	7,430	725	2,239	8,370	5,068
1938	4,557	2,379	271	12,611	24,200
Total	22,410	9,398	4,522	23,192	29,543

Pure seed of the most suitable kinds and varieties has been supplied to the operators in such quantities and at such times as required to maintain a high standard. The influence of this good seed in each district is difficult to estimate. In some of the districts, where stations have been distributing seed for a number of years, grain buyers report that up to 90 per cent of the wheat grown originated from seed produced on the stations.

Poultry

A choice flock kept under good sanitary and practical farm conditions has been the objective in poultry. These flocks have not only increased the farm revenue, provided eggs and chicken dinners as required, but have also been a source of supply for better breeding stock in the communities served by the stations. A few of the operators were owners of excellent flocks before commencing work in co-operation with this division, while other operators had but very common flocks.

All stations now maintain a high class flock of Barred Plymouth Rock poultry. New poultry houses have been built on the majority of stations, on others old houses have been re-modelled and brought up to a satisfactory standard.

The revenue from poultry varies with the size of flock, but the better flocks show a monthly cash return of from ten to twenty-nine dollars, in addition to supplying eggs and meat for the home.

The following table gives the distribution of hatching eggs and breeding stock from the illustration stations since 1934:—

Year	Hatching eggs	Breeding stock
1934	3,840	188
1935	9,306	215
1936	11,237	205
1937	8,072	288
1938	9,045	33

The farm flocks established from these illustration stations also distribute eggs and breeding stock and in some districts practically all poultry is closely related to the Experimental Station stock through this method of distribution. The larger flocks have been tested for pullorum and are hatchery approved.

Live Stock

The objective of every station has been to maintain herds and flocks of superior quality and to provide a source of supply for better breeding stock. The kinds and numbers kept depend upon the individual preference and local conditions. As a general rule the type of farmer selected to operate an illustration station is one that would ordinarily use only good pure-bred sires. On such stations very little assistance has been necessary and the live stock has been kept up to a high standard. On a few stations, however, considerable change has been made in order to eliminate inferior sires and to develop improved stock. Assistance has been given wherever possible in the selection and purchasing of good breeding stock. The Dominion Experimental Farms have been the source of supply for the herd bulls on five of the illustration stations. Shorthorns were obtained from the Scott Experimental Station, Jerseys from Summerland and Ayrshires from Indian Head.

Yorkshire boars and sows have been purchased from the Experimental Farms by all operators who raise hogs commercially. The improved quality of hogs shipped from districts where this stock has been used for a few years has been commented upon by shippers as well as live stock officials. At Paddockwood, where a check was made of all rail shipments, 73 per cent of all hogs shipped were sold in the two top grades. At St. Paul, Alta., a similar report was

made by the District Agriculturist. A close check up of results is difficult because of the number of descendants of this stock that reached the yards and later returned to farms as breeding animals without retaining their identity.

Dairy products are an important item on the revenue sheet of the majority of stations, and three stations specialize in dairying, namely Birch Hills, Hafford and Meota. At Birch Hills, the herd consists of about 40 head of registered Jerseys and is fully accredited. At Hafford and Meota, grade Shorthorns are kept and both herds are tuberculin tested. Dairy records are kept on each of these stations and the milk is carefully handled, cooled and bottled before delivering to customers.

Horticulture

Horticulture in all its phases is becoming more prominent on the stations and also on farms throughout this district of supervision. The growing of fruits and the beautification of home surroundings have been promoted on the stations in order to make farming more self-sustaining and to make farm life more pleasant. Special talks on horticulture have been given at the field days and the people in attendance have exhibited keen interest when shown around the grounds and the orchards.

The Vegetable Garden.—A large substantial vegetable garden has been maintained on each station. The operators, without exception, rotate their garden. By following this procedure better results have been obtained than where the same vegetables are grown on the same area year after year. The use of the best-known varieties has added to the success of growing vegetables, while the application of barnyard manure, and in some cases commercial fertilizer, has proved of distinct advantage.

Perhaps one of the main reasons for good vegetable gardens is the fact that adequate shelter is found on each station and in most cases the garden has been on an area which was heavily covered with snow during the winter. The vegetables were grown in rows which facilitated ease of cultivation and provided adequate space from which to draw moisture.

The following is a list of prizes won by Mr. Willoughby, operator at Parkside, from vegetable exhibits at Prince Albert Exhibition in 1938:—

1st Prize	2nd Prize	3rd Prize
Collection of vegetables	Tomatoes (open class)	Tomatoes (farmers)
Watermelon	Pickling onions	
Cabbage (open)	Carrots	
	Cabbage (farmers)	
	Citron	
	Onions (grown from seed)	

Flower Growing and Flowering Shrubs.—Perennial flower borders are found on 13 of the 17 stations in this district. In most instances they are well kept. They form various designs according to the tastes of the operators or guidance given. Perennial flowers required less attention than annuals and the display of beauty was similar. They are particularly adapted to varying conditions of soil and moisture and thus are well suited to most farms. The operators have distributed a number of cuttings and supplied seed to neighbours.

The common perennials found on the stations that have proved hardy are: delphinium, peony, phlox, lychnis, columbine, iris, tulip, poppy, candytuft, dianthus, baby's breath, ribbon grass, yarrow, dahlia, sweet rocket, Jacob's ladder and speedwell. Annual flowers were grown on all stations, their success depending largely on the nature of the season. The most common annuals in use are those which can be successfully started and grown outside.

Flowering shrubs are more or less permanent and require only a limited amount of attention, thus they are found on all stations and play a large part in the beautification of home surroundings. In the main the shrubs have been set out according to a plan. The plans were drawn at Scott—this is a service extended to many farmers besides the operators. Landscape gardening was

started at White Fox and Weirdale in 1938. The schemes for these stations included shrubs, annual and perennial flower borders, lawns and driveways.

The operators have been making use of such shrubs as the lilac, honeysuckle, caragana, cotoneaster, Russian almond, spiraea, rose, saskatoon, flowering plum (*Prunus triloba*), dogwood, creeping juniper, Missouri currant and the silverleaf buffaloberry.

Shelterbelts.—Shelterbelts are a part of each station and in most cases have been planted by the operators, but in a few instances they consist of native bluffs. Improvement and extension of established shelterbelts has been featured. These shelterbelts not only add beauty to the surroundings but they afford much-needed protection to buildings, vegetable garden, stock and the fruit orchard. During the years 1936 to 1938 inclusive some 67,000 trees were added to the shelterbelts on 17 stations. The trees planted were: Deciduous—caragana, elm, ash, northwest poplar, maple, and willow. Evergreens—white spruce, Colorado blue spruce and Scotch pine.

Good success has been obtained with tree planting on the illustration stations. Approximately 90 per cent of trees planted survived the hazardous seasons of 1936-37-38. In 1935, the operator at St. Paul moved 30 ten-foot spruce trees some 14 miles, with a frozen ball of earth attached, and planted them in his farmyard. The trees all lived and have since made considerable growth. Certain trees have had to be protected from attacks of rabbits. This has been done by fencing and also by growing a temporary shelter to hold snow so that the trees might be covered.

Fruit Growing.—Trial orchards have been set out on the stations. These orchards were designed to meet the needs of a given territory and to illustrate proper methods of handling. Small fruits such as strawberry, raspberry, currant and gooseberry, and tree fruits such as plum, crabapple and cherry are grown on all stations with the exception of Chelan, which has only been in operation for one year.

The success of the orchards depends largely on the shelter available and the varieties used. Adequate shelter from strong winds and protection from attacks of mice and rabbits is essential. Fencing with woven wire is the most effective means of protection, and this type of fence is now in use on nine stations. Orchards at Meota, Glenbush, Chauvin, Lens, Paddockwood, Birch Hills, Meadow Lake, St. Paul, Parkside, Hafford and Tisdale are now bearing.

Very little winter killing has been experienced during the past five years. Yields of fruit have been heavy but due to the dry seasons in 1937 and 1938 the size of fruit was materially reduced. Some 300 crabapple trees, 400 plums and cherry-hybrid trees and 150 cherry trees, have been planted on the stations since 1934. These trees consisted chiefly of the hardiest recommended varieties.

The orchard at Parkside is worthy of special mention. It occupies four or five acres of land and consists of small as well as tree fruits. First planting was made in 1931 and additions have been made each year since. In the fall of 1934, 252 raspberry canes were planted, these came through 100 per cent. Twelve Assiniboine plums were set out in the fall of 1935, all of which withstood fall planting without loss. Forty-seven crabapples and plum trees were set out in the spring of 1936. Several hundred strawberry plants were started in 1936. The following fruit trees, bushes and vines were planted during May 1938—Rosthern seedlings (crab) numbers 18, 6, 19, 12, 3, 20, 15, 22 and 17; three Rescue apples; grape vines—Fredonia, Antonia, Lucile, Portland and Beta; Ross and Abundance gooseberries; Perfection red currants; a hedge of Pembina seedlings; (100 yards long), Scout apricot; Ussurian pear; and 600 Gem and Dakota strawberries.

In 1935, some 800 pounds of fruit was harvested; 898 pounds in 1936; 852 pounds in 1937 and almost three tons in 1938. The bulk of the fruit harvested was sold commercially.

In 1938, the following plum and cherry-plum hybrids produced fruit:—Valley River, Wilson River, Assiniboine, Cree, Olson, Champa, Oka, Cree seedlings, Ojibwa, Mammoth, Mordena, Tom Thumb, Sapa, Opata, Cheney and Cheney seedlings. The combined yield of fruit was approximately 1,200 pounds. Of six varieties of sandcherries grown on this station, the Sioux is outstanding both in size and flavour.

The Robin, Red Siberian, Osman, Dolga and Lyman crabapples fruited in 1938—the three last named varieties were the heaviest bearers. The Columbia crabapple developed "silver leaf" and was rogued out.

The Latham raspberry has given better results than the Sunbeam. The Sunbeams were ploughed up because of a heavy infestation of red spider. Two rows of Black Naples and Boskoop Giant black currants provided 1,000 pounds of fruit in 1938. The strawberries favoured on this station are Dakota and the Gem.

Prizes won with fruit exhibits at the Prince Albert Exhibition in 1938 were as follows: 1st with a collection of fruit; raspberries 1 pint; crabapples 1 pint; plums 1 pint; and black currant jam and jelly; and a special prize for the farmer winning the most points in the horticultural classes.

Trial orchards on the stations have proved that certain fruits can be grown successfully on farms in northerly sections of the province. They have demonstrated also methods of handling fruit trees. These orchards have given incentive to many farmers to start plantations of their own. They have shown that it requires less work and energy to grow tame fruit in a small orchard near the farmstead than it takes to go out to the bush and pick wild fruit. The operators have been generous in the distribution of small fruit plants such as strawberry, raspberry, gooseberry and currant. Budding and grafting stock has also been given to any farmer wanting such material. From time to time new originations and hardy varieties of fruits will be tested out to ascertain their relative adaptation in comparison with the varieties now being grown.

Field Days

The annual field day has been an important phase of the illustration station program since its inception. It is on this occasion that the farmers of the community can best see and discuss the work of the illustration station with the operator, the Supervisor and other departmental officers.

In the early years of the work field days were of the simplest type. Only a few farmers were sufficiently interested to attend. They were shown over the fields and plots and the work was explained to them. In 1932, a truck with tent and exhibit was used for the first time in this district of supervision and more attention was given to this feature of the work. Since then the progress has been constant and encouraging to those associated with the conducting of the meetings.

The following table gives the year, number of field days, and total and average attendance for the past ten years.

FIELD DAY ATTENDANCES 1929-1938

Year	Number	Total attendance	Average
1929	4	120	30
1930	6	306	51
1931	3	122	41
1932	9	1,095	122
1933	10	2,075	208
1934	14	3,070	219
1935	21	3,015	144
1936	25	4,731	189
1937	27	4,745	175
1938	24	5,670	236

The field days held on the District Experiment Sub-stations since 1935 are included in the table. The figures shown are based on conservative estimates made by at least three people at each field day.

The field days are planned well in advance, some of the features of the program having been arranged more than a year ahead. Exhibition material has been prepared during the winter months. Advertising has been done by posters at strategic points and notices in local papers. Care has been taken to avoid announcing speakers who will not attend and in selecting speakers for field days. Specialists have been chosen who are keenly interested in their work and know their subject well. During the past five years these have included, plant pathologists, entomologists, agrostologists, cerealists, farm machinery specialists, apiarists, horticulturists and instructresses in household science.

Regularity and punctuality have been important. Field days commenced and closed at advertised time—in ten years the Supervisors have not missed a field day nor have they been late. Time has helped to build up an assurance that a worthwhile field day will be held, confidence in the operators and in the speakers and a knowledge that in event of rain or other unpleasant weather the meeting will be held under cover. These ten years of growth and progress have been the result of a great deal of co-operative effort. Farmers, business men, clubs, the press, women's associations and representatives of the Dominion and provincial Departments of Agriculture, together with University men, have shown the heartiest co-operation with the objective of making the field days of even greater interest and practical value each year.

REPORT OF ILLUSTRATION STATIONS IN SOUTHERN ALBERTA

Supervisors: H. Chester, B.S.A.; H. J. Mather, B.Sc.

In 1934 there were eleven illustration stations in southern Alberta, but with the inauguration of the P.F.R.A. program in 1935, those stations situated in the drought area were reorganized as district experiment sub-stations to study the problems due to drought and soil drifting which faced the farmer at that time. Since 1935 new stations have been established, and at the present time there are thirteen sub-stations and seven illustration stations supervised from Lethbridge.

DISTRICT EXPERIMENT SUB-STATIONS

Location	*Operator*
Lomond	E. M. Benson
Foremost	C. G. Wolfe
Whitla	Mrs. R. H. Babe & Son
Blindloss	J. Barnes
Acadia Valley	W. A. Heiden
Cessford	G. E. Griffith
Craigmyle	J. L. Branum
Castor	C. F. Pals
Drumheller	C. Andrew
Rockyford	A. D. Kettenbach
Nobleford	Chris. T. Withage
Claresholm	D. L. Reynolds
Pincher Creek	D. J. Cyr

ILLUSTRATION STATIONS

Location	*Operator*
Iron Springs	J. L. Nelson
Chedderville	A. May
Sangudo	J. Liss
Leslieville	C. Lynn
Dickson	A. Larsen
Stettler	G. Green
Jenner	Nels Klein

Regional Precipitation and Growth of Crops—1938

From the point of view of soil and climate, there is very little in common between any two illustration stations supervised from Lethbridge. Sangudo is the station farthest north while Iron Springs is most southerly with a distance between them of almost 300 miles. Jenner is the driest with an average precipitation of 10·19 inches for 1934-1938 while Chedderville received an average of 21·07 inches during the same period.

Soil types vary from peat and infertile grey wooded soils on the northern stations, to the richer brown soils on the parkland and prairie stations.

The spring of 1938 was cold and backward, and while sufficient moisture was received, low temperatures delayed growth and enabled weeds to become established in many fields. Almost a month of hot dry weather followed the early cool period and crops especially the later sown ones, were again adversely affected. Precipitation was patchy during most of the summer and consisted mainly of local showers. The total precipitation on most of the northern illustration stations was below normal with Sangudo suffering a decidedly dry year. As will be seen by the precipitation table, only 9·22 inches of moisture were received at this station whereas the long time average would be about twice this figure.

Hail did considerable damage at the Chedderville station and completely ruined the crops at Dickson. Sawflies damaged the wheat crop slightly at Stettler and drought reduced the yields at Sangudo.

PRECIPITATION ON ILLUSTRATION STATIONS AND DISTRICT EXPERIMENT SUB-STATIONS IN SOUTHERN ALBERTA

INCHES

Station	Fall	Winter	Summer 1938				Total for crop year Aug. 1, 1937 to July 31, 1938	Total for calendar year 1938	Average for calendar years 1934-1938
	Aug. 1, to Oct. 31, 1937	Nov. 1, to Mar. 31, 1938	April	May	June	July			
Lomond	4·28	2·96	·61	2·67	1·59	1·53	13·64	11·73	10·23 *
Foremost	2·35	3·15	·52	2·25	3·30	·40	11·97	13·41	10·81 *
Whitla	1·88	4·60	·55	1·9	1·52	·51	11·03	11·88	11·06
Bindloss	2·09	2·40	·56	1·14	1·87	·64	8·70	10·68	8·35
Jenner	3·28	2·95	·55	2·03	·97	·76	10·54	11·69	10·19
Cessford	4·05	5·30	·95	2·37	1·53	·76	14·96	14·20	11·02
Castor	6·11	3·85	1·25	2·18	3·77	2·01	19·17	17·68	16·30 *
Stettler	5·89	3·52	1·80	3·39	2·04	3·25	19·89	18·08	.....
Drumheller	5·53	4·92	2·43	2·66	·88	2·09	18·51	17·30	.....
Rockyford	4·19	3·10	·47	2·60	1·57	1·30	13·23	12·22	.....
Claresholm	5·29	4·51	·28	2·79	1·63	2·34	16·84	16·57	16·72**
Pincher Creek	5·06	8·45	1·20	5·06	2·12	1·25	23·14	20·07	18·86
Dickson	.....	.....	2·00	1·52	·76	3·91	.....	15·19	.....
Leslieville	.....	.....	·90	2·74	1·98	2·55	.....	16·70	.....
Sangudo	.....	.....	·38	·48	2·33	1·45	.....	9·22	.....
Chedderville	10·14	3·30	·90	2·78	2·34	4·79	24·25	18·48	21·07
Iron Springs	2·81	3·90	·60	2·32	1·20	1·10	11·93	13·22	11·10

* Average for 1936-38. ** Average for 1937-38.

ORGANIZATION AND PROGRESS ON STATION FARMS

IRON SPRINGS, ALBERTA

J. L. Nelson, Operator

The station at Iron Springs is situated about 25 miles northeast of the city of Lethbridge on the Lethbridge Northern Irrigation Project. The 320 acres comprising the station, slope gently to the southeast and are almost 100 per cent irrigable. The soil is a clay loam which is typical of a large part of the project.

Work was commenced in 1938 and initial steps were taken to reorganize the cropping system on the whole farm. The principal rotation outlined is, grain, grain, grain, sweet clover hay, sugar beets, sugar beets. The rotation can be easily adapted to economic conditions as they arise from time to time. The grain crops may be either wheat or coarse grains. The sweet clover can be taken for hay, pasture or be ploughed in as a green manure for sugar beets, depending on the amount of hay required. The acreage of sugar beets may be varied by substituting grain for part of the second year in beets. In addition to this rotation there will be 20 acres of alfalfa and 10 acres in a permanent pasture.

Sugar beets of which there are 60 acres, constitute the main cash crop although a limited amount of wheat is sold for cash when prices warrant. Coarse grain, straw, hay and sugar beet pulp from the sugar factory at Picture Butte, are used for finishing feeder steers or feeder lambs during the fall and winter months. In the fall of 1938, 150 steers were put in the feed lot.

From the point of view of manure alone, the feeding of live stock on an irrigated farm is very important, since manure is practically a necessity in

maintaining and increasing the soil fertility to a point where the maximum tonnage of sugar beets possible may be maintained.

During the year a mile of fence was rebuilt, buildings were painted and an implement shed was built. A large number of trees were planted in shelterbelts around the farmstead.

CHEDDERVILLE, ALBERTA

A. May, Operator

Chedderville is situated about 18 miles south of Rocky Mountain House on a phase of grey wooded soil. This type of soil compared to the black and brown soils is low in fertility and lacking in organic matter. The first crop grown on grey wooded soil is usually much poorer than is expected from newly broken land and subsequent crops are still more disappointing. It might be well to mention that there are about 100 million acres of this type of soil in Alberta and that this is more than double that of all other types of soil present. Practically all of the better soils are now occupied and consequently all future large scale settlement must take place on the grey wooded soil. When the extent of this area and the serious fertility problem are considered, the importance of experimental work being done can readily be appreciated.

Legumes on grey wooded soils at Chedderville, Alta., respond to fertilizers containing sulphur.

The soil on the greater part of the Chedderville illustration station, comprising about 300 acres, is poorer than that on farms in the immediate neighbourhood. It is very low in fertility and the physical texture is not good.

Work was commenced on this station in 1927. At this time very little was known about the grey wooded soils and the program carried on was more or less a matter of testing every available kind of fertilizer in an attempt to discover which elements were deficient in the soil. During the first few years, the results of the fertilizer trials were very disappointing. It was found, however, that ammonium sulphate gave the best results on both grains and clovers. It was quite easy to believe that the nitrogen in the fertilizer caused the higher yield of cereal crops, but it was not thought possible that this element was responsible for the decided improvement in the legumes.

Previous to this experiment, no thought had been given to the possibility of a sulphur deficiency, but in the light of these results, it seemed advisable to make a special test with this element. Accordingly a strip through an alfalfa field was treated with flowers of sulphur at the rate of 50 pounds per acre. The alfalfa on this strip almost immediately took on a rich dark green colour and made a very satisfactory growth. The following year the same experiment was conducted with sweet clover and similar results were obtained, indicating that this particular phase of grey wooded soils had a decided sulphur deficiency. The effect of the clover crop on succeeding grain crops was also very encouraging as the yield of grain was much increased. It was apparent, however, that there was a deficiency of other elements necessary for proper cereal production and experiments were laid down to determine what additional elements were required.

The fertilizer trials included ammonium sulphate, ammonium phosphate, potassium sulphate, and barnyard manure separately and in combination. The result of these tests carried over three or four years indicated increased yields from each of the above when used singly and further increase when a complete fertilizer was applied. The effect of a previous crop of sweet clover in almost every case was greater than the application of a complete fertilizer on land where no clover had been grown.

It was decided in 1935 to apply the information obtained so far to a definite rotation. The following rotation was laid down as a result:—

1st year—Grain.
2nd year—Grain seeded down to red clover and timothy along with an application of 50 pounds of flowers of sulphur per acre, followed in the fall with an application of barnyard manure.
3rd, 4th, 5th years—Red clover hay and timothy.

In 1936 a further rotation was outlined which consisted of:—

1st year—Grain with the west half of plot manured.
2nd year—Grain seeded down to sweet clover with 100 pounds of ammonium sulphate.
3rd year—Sweet clover hay.

Live stock is important in the grey wooded soils area and it was thought that this latter rotation would give an opportunity of raising sufficient grain to feed dairy cows and fatten bacon hogs.

As these rotations, however, have been laid down only recently, and have not yet completed a cycle, it would not be fair to put too much stress on the results obtained to date. In addition to this a severe hail storm seriously affected the yields on the five-year rotation in 1935.

The information obtained by 1937, however, seemed sufficient to apply to a farm-wide policy and as a result part of the farm was divided into four fields of approximately 26 acres each. One field each year will be sweet clover pasture, while the others will be used for grain growing. The dairy herd has been pastured on native bush land in the past and as the feed on this type of land is scanty and of poor quality, it has resulted in stunting and lowering the production of the herd. It is thought that this can be rectified by maintaining a good clover pasture which may possibly be used for a night pasture only. Pasturing in this way will also return a large amount of valuable fertilizing material to the soil. It is hoped that the manure in this form will improve the physical condition of the soil and promote greater bacterial activity.

SANGUDO, ALBERTA

John Liss, Operator

The Sangudo station, which consists of 320 acres, is situated partly on the Paddle river flats and partly on the higher ground above. The soil on the low land is mixed, some being of a sedimentary origin and some peat. A very heavy impervious subsoil underlies part of the river bottom land. Crops grown on the heavy soil have in the past been subject to root-rot. The high land on the station is a better phase of the grey wooded soil or a transitional type.

On the low land the operator has grown chiefly coarse grains while wheat has been produced on the higher ground. Usually about 100 hogs are marketed each year. A few cows are kept and also a small flock of sheep. A flock of Barred Rocks of Experimental Farm breeding was established in 1938.

In 1938 sweet clover was seeded on the heavy impervious soil on the river flat to test its value in opening up the soil and a 20-acre field was surface worked in an attempt to control hemp nettle which is a serious weed on low land in the area.

It is planned to carry on fertilizer tests on both the high land and low land, to lay down rotations containing clovers on both types and to attempt to find a solution to the weed and root-rot problem on the river flats.

LESLIEVILLE, ALBERTA

C. W. Lynn, Operator

Work was commenced on the Leslieville station in 1938. This station is situated on peat soil and consists of 480 acres most of which is now under cultivation. The major problem in the Leslieville area is that of bringing peat soil into production and ripening cereal crops on it. The newly broken peat soils are rather wet and cold with the result that crop growth is slow especially in the early part of the season and damage from frost frequently results.

Some beef cattle have been kept in the past but no dairy cattle or hogs. Most of the beef animals have been disposed of and are being replaced with dairy cows. Three pure-bred Yorkshire sows and one Yorkshire boar were purchased in 1938 and it is planned to milk eight or ten cows and fatten a number of hogs each year. Foundation stock of Barred Rock poultry was procured from the Experimental Farm in the spring of 1938 and the operator plans to maintain a flock of about 200 pullets each year.

Clovers and alfalfa will be featured in the rotations to be laid down because of their value as feed and as cleaning crops.

As the farm is newly broken up and free of noxious weeds, it is planned to grow a considerable amount of coarse grains for sale as seed.

DICKSON, ALBERTA

Andrew Larsen, Operator

The Dickson station, consisting of 160 acres, was established in 1938. It is situated in an area where most of the high land has been broken up and the considerable percentage of low land which remains is now being brought under cultivation. The low land is chiefly peat soil and one of the major projects on the station is experimenting with various fertilizers on the peat soil. Unfortunately hail destroyed the plots as well as the other crops on the station in 1938.

On the higher land which has been under cultivation for about ten or twelve years, a rotation consisting of fallow, grain, grain seeded down, sweet clover pasture, grain, grain is being tested out.

An area of peat which has grown up to wild grass will be ploughed and seeded down mainly to timothy and alsike clover. An acre or two of this area will be seeded down to various other grasses and mixtures, and pasture tests carried out to determine the suitability of the various grasses to these particular conditions.

The operator maintains a herd of dairy cows which are under the provincial Testing Plan and also raises about 100 hogs each year. A poultry flock of Experimental Station breeding has also been established.

JENNER, ALBERTA

Nels Klein, Operator

Jenner is situated about 55 miles northwest of Medicine Hat in the dry area administered by the Alberta Special Areas Board. The soil on the station is a clay loam and during years of sufficient rainfall, which are not any too frequent, is capable of producing good crops. During the period 1934 to 1938, the average yield of wheat on fallow was 9·9 bushels.

The area about Jenner is essentially suited to a farm-ranch set up and the station at Jenner is organized in a small way along these lines. One quarter section is used for producing wheat and fodder and there are two sections used for grazing purposes. A quantity of slough hay is put up each year and by carefully harvesting all available, the operator has generally been able to carry a reserve of feed from one year to the next. About 30 to 35 head of cattle are maintained which is about all the range land is capable of supporting.

In 1937 a dam was completed and the water stored is used for stock watering purposes. About half an acre below the dam was levelled in 1938 for an irrigated garden. Rows of caragana and poplar have been planted on the west side of the impounded water to act as a snow trap.

Shelterbelt planting around the farmstead was completed in 1937 and in spite of the dry seasons, 1936, 1937, and 1938, at least 90 per cent of the trees have survived.

STETTLER, ALBERTA

Gus Green, Operator

The Stettler illustration station, which consists of 160 acres, is situated on the southern edge of the park belt. The soil is a light clay loam over most of the farm with several acres of gumbo near the south side.

Stettler is not generally considered as being within the dry area, but the extreme drought of the past few years has seriously affected crop production throughout the district. Hail did considerable damage in 1935 and 1936 and wheat stem sawfly has also taken a rather heavy toll in the past few years. Soil drifting occurred on many farms in the surrounding district in recent years and as more trees are removed it will no doubt become a more serious problem.

Work was commenced on the Stettler station in the spring of 1936 and consisted of grain rotations, fertilizer trials and tests with various forage crops.

The farm was originally cut up into small irregular fields which were inconvenient to work. Therefore in 1937 it was decided to rearrange the entire cropping system and adopt a more efficient farm plan. The east half of the farm was divided into four fields of 20 acres each and the following rotation was laid down:—

1st year—Fallow.
2nd year—Wheat, seeded down to sweet clover.
3rd year—Pasture.
4th year—Oats or barley.

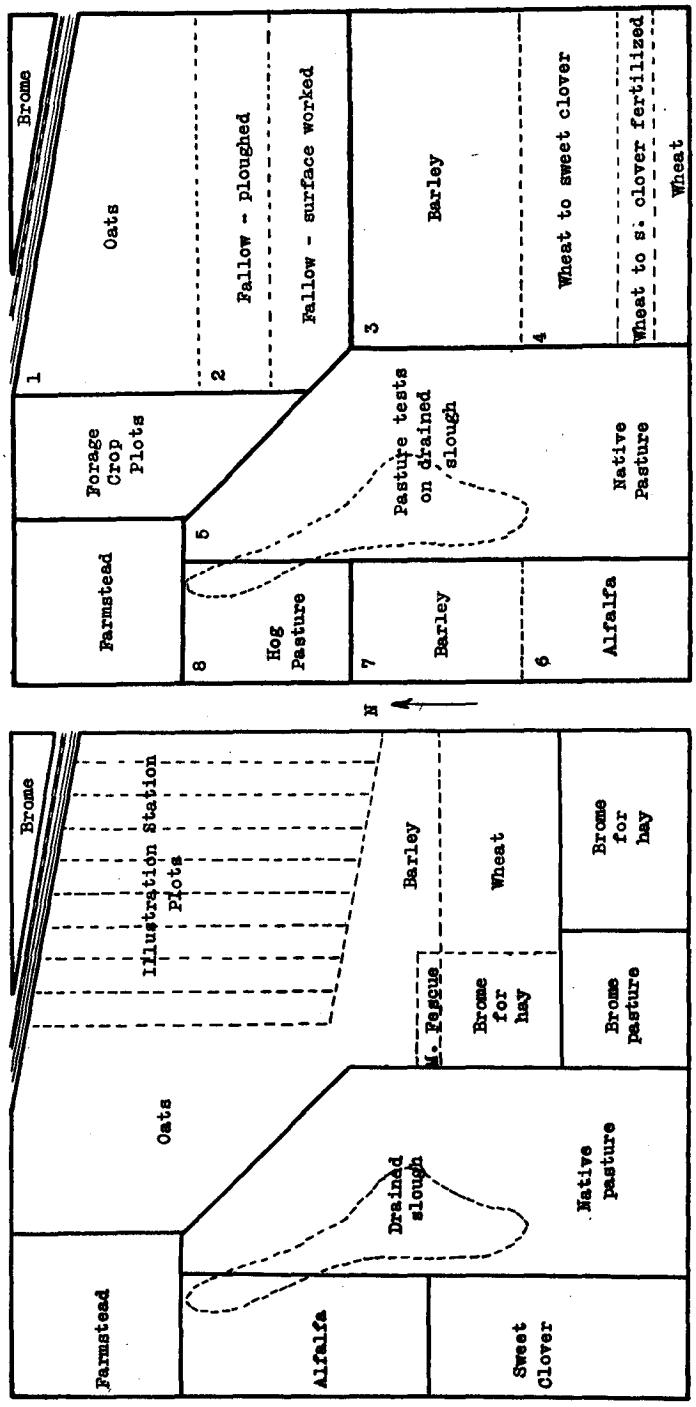


Illustration station, Stettler, Alta., operator Gus Green.

Original layout of farm. Reorganized farm plan.

The following is an outline of tests incorporated in the above rotation:-

1. Fallow half ploughed and half surface worked.
2. Wheat seeded down to sweet clover. Four acres fertilized and four acres left without sweet clover to check the value of clover as a soil builder.
3. Sweet clover pasture 16 acres. Four acres annual pasture.
4. Oats or barley, or part of each. Four acres on which no sweet clover was previously grown to check residual effect of sweet clover grown on balance of field.

An important feature of this rotational system is the limited amount of fencing required. Only one cross fence between fields two and three is necessary (*see* plan). This is made possible by having the pasture and fallow fields together and allowing the stock to graze over both. The two grain fields are together on the other side of the cross fence.

A fifteen-acre field on the west side was divided into two fields and laid down to a second rotation which is outlined below. One field is put down to alfalfa for four years.

The other field during the four-year period is cropped as follows:—

1st year—Barley.
2nd year—Fallow.
3rd year—Wheat.
4th year—Oats seeded down to alfalfa.

The two fields are rotated every four years.

In addition to the above, a large slough which has been drained recently was seeded down to various forage crops. These include brome, crested wheat and sweet clover near the edge and alsike, red clover, and timothy in the centre. Large shallow sloughs, often easily drained, are common in the district and it was thought that this work might give an indication as to their value for growing fodder crops. Various forage crop plots were also seeded on high ground. Of these, crested wheat grass and alfalfa both seeded in rows, are of particular interest. Crested wheat yielded at the rate of over 450 pounds of seed per acre in 1936, 300 pounds in 1937, and 350 pounds in 1938. Alfalfa seeded in the spring of 1937 made a fine heavy stand and gave a yield of over three tons of hay per acre in 1938.

The wheat crop in 1938 was seeded on a field which was ploughed back from brome the previous fall and was seeded when the land was extremely wet. This combination of factors produced an extremely ragged crop with a rather low net return. The field was so patchy that it was thought unwise to cut samples of the various treatments in the field and as a result no data regarding the value of fertilizer were obtained.

Live stock is important in the Stettler district and includes beef and dairy cattle, bacon hogs and poultry. A small but good quality dairy herd is maintained on the station as well as a high quality poultry flock of Experimental Farm breeding. Several good brood sows are kept as well as a pure-bred bacon-type boar. This boar has been used extensively by neighbouring farmers.

A good shelterbelt has been established on the station and protects the farm buildings and garden. An exceptionally fine garden is grown each year and peas, corn, beets, and other vegetables are canned for winter use.

Crop Yields

The following table gives yields of crops for 1938, and where stations have been established for more than one year, average yields are also given. The yields at Sangudo are lower than generally secured owing to the unusually

dry season. Hail damaged crops at Chedderville and completely destroyed those at Dickson.

Satisfactory yields were secured on the irrigated station at Iron Springs, and the average yield of sugar beets was about two tons more than that for the irrigation project as a whole.

YIELDS OF CROPS ON ILLUSTRATION STATIONS IN ALBERTA

Station	Wheat			Oats			Barley			Sugar beets		
	Number of years	Yield per acre		Number of years	Yield per acre		Number of years	Yield per acre		Number of years	Yield per acre	
		1938	Average		1938	Average		1938	Average		1938	Average
		bush.	bush.		bush.	bush.		bush.	bush.		tons	tons
Stettler	3	12·0	11·0	3	60·0	51·0	3	38·0	25·0	.....	.....	.....
Leslieville	.....	.....	.....	1	48·0	48·0	1	41·0	41·0	.....	.....	.....
Chedderville	.....	.....	.....	3	28·0	22·0	3	13·0	15·0	.....	.....	.....
Sangudo	1	27·0	27·0	1	41·0	41·0	1	38·0	38·0	.....	.....	.....
Jenner	12	10·0	12·3	.....	.....	.....	.....	.....	.....	.....	.....	.....
Iron Springs (Irrigated)	1	36·1	36·1	1	90·0	90·0	1	66·0	66·0	1	14·6	14·6

Fertilizer Trials

ON A THIN CLOVER STAND AT CHEDDERVILLE

In 1931 a plot on the Chedderville station was seeded to red clover and timothy without fertilizer treatment. The resulting catch was only fair. In 1932 various fertilizer tests were run across this plot with very good results in most cases and especially where the fertilizer contained sulphur. The crop in 1933 showed residual effect of fertilizer, but was again only a fair yield. During the years 1934, 1935, and 1936, the yield of clover was low and the plants were very weak and of a yellowish colour.

In the spring of 1936 two strips of a drill width each were fertilized across the plot using ammonium sulphate fertilizer at the rate of 100 pounds per acre. The result was remarkable. The stunted and discoloured clover which had merely persisted to the extent of a two or three-inch growth during the past three seasons, immediately took on a dark green colour and made a very fine growth. The fertilizer part yielded much higher than the unfertilized area in 1936, and the clover was of a fine healthy colour.

With these results in mind, the entire field was fertilized at the rate of 150 pounds of ammonium sulphate in the spring of 1937.

The fertilizer this time was drilled across the original fertilized strips of 1936 and checks left. In this way the following results were obtained:—

RESULTS OF FERTILIZERS ON A THIN STAND OF RED CLOVER—CHEDDERVILLE, 1937

Treatment	(Ammonium sulphate)	Yield per acre
		Approx. tons
1	100 lb. in 1936	1·50
2	150 lb. in 1937	1·75
3	100 lb. in 1936, 150 lb. in 1937	3·00
4	Check—No fertilizer 1936 or 1937	0·05

The year 1937 was dry in this area which possibly accounts for No. 2 yielding about the same as No. 1. It seems evident from the two years' results that it takes one season for the clover plants to develop a good root system, and the greatest yield from the fertilizer comes in the second year. This is also borne out by No. 3 where the clover was evidently in a position to utilize the second application of fertilizer to the best advantage.

FERTILIZER TRIALS ON OATS AT CHEDDERVILLE, 1937

Some interesting results from fertilizer trials on grain and clover were obtained in 1937. In the grain tests, oats were seeded at 2·5 bushels per acre on spring ploughing and strips fertilized at 50 pounds per acre with the following fertilizers: ammonium sulphate, ammonium phosphate, and potassium sulphate. The results obtained are shown in the following table:—

RESULTS OF FERTILIZER TRIALS ON OATS AT CHEDDERVILLE, 1937

Fertilizer	Yield per acre	Grade	Wt. per bushel
	bush.		lb.
Check	27·0	No. 1 feed	31·2
Ammonium sulphate	36·0	No. 3 C.W.	33·7
Ammonium phosphate 11-48	31·5	No. 3 C.W.	34·7
Potassium sulphate	32·0	No. 3 C.W.	36·0

In the above table it will be observed that all fertilizers gave increased returns. Ammonium sulphate gave the highest yield and potassium sulphate the second highest yield and the greatest weight per bushel. It might be well to mention that this crop was sown rather late and did not germinate uniformly. The rains which came later produced a second growth which was not at all ripe at harvest time. The percentage of green kernels present, however was noticeably less in the samples from the ammonium phosphate and potassium sulphate plots.

FERTILIZER TESTS ON GREY WOODED SOIL

SANGUDO—1938

Fertilizer trials with various fertilizers and combinations of fertilizers, were laid down on the transitional phase of grey wooded soil with the results as given in the following table.

Treatment	Yield of wheat per acre	Increase due to fertilizer
	bush.	bush.
Sodium nitrate 100 lb	26·8	3·8
Triple Super Phosphate (T.S.P.) 45 lb	25·3	2·3
Muriate of Potash (KCL) 40 lb	26·0	3·0
Sulphur (S) 20 lb	22·6	−0·4
Ammonium Sulphate (A.S.) 80 lb	30·5	7·5
Ammonium Phosphate (A.P.) 16-20 100 lb	31·5	8·5
Check	25·5	.....
A.P. (16-20) 100 lb. Lime 2,000 lb. S.6 lb	25·9	2·9
A.P. (16-20) 100 lb. Pot. Sulphate 40 lb	27·7	4·7
A.P. (16-20) 100 lb. Pot. Sul. 40 lb. S. 20 lb	25·5	2·5
T.S.P. 45 lb. KCL 40 lb	25·1	2·1
A.P. (11-48) 90 lb	25·7	2·7
Manure	19·0	4·0
Check	20·5	.....

No outstanding results due to fertilizers were obtained but as this area was very dry in 1938, it is possible that moisture rather than fertility was the limiting factor in crop growth. This test is to be carried on each year in the future and over a period of years should give some valuable information regarding the use of fertilizers on the transitional soil type.

FERTILIZER TRIALS ON PEAT SOIL

LESLIEVILLE—1938

Fertilizer experiments were laid down in an attempt to discover which elements would speed up the growth of the grain crop on peat soil. The following table gives the results in 1938.

Treatment	Yield of barley per acre	Increase due to fertilizer	Date of of maturity
	bush.	bush.	
Check	35·5	.....	Aug. 17
Ammonium Sulphate (A.S.) 50 lb	38·5	3·0	Aug. 17
Triple Super Phosphate (T.S.P.) 93 lb	46·0	10·5	Aug. 13
Muriate of Potash (KCL) 125 lb	32·8	−2·7	Aug. 20
A.S. 50 lb. T.S.P. 93 lb	51·7	16·2	Aug. 17
A.S. 50 lb. KCL 125 lb	49·1	13·6	Aug. 20
T.S.P. 93 lb. KCL 125 lb	48·0	12·5	Aug. 17
A.S. 50 lb. T.S.P. 93 lb. KCL 125 lb	50·6	15·1	Aug. 17
Manure 20 tons	42·6	7·1	Aug. 17
A.S. 50 lb. T.S.P. 93 KCL 125 lb. Manure 20 tons	53·6	18·3	Aug. 17
A.S. 50 lb. T.S.P. 93 lb. KCL 125 lb. Boron 2.27 lb	57·8	22·3	Aug. 8
A.S. 50 lb. T.S.P. 93 lb. KCL 125 lb. Lime 2,000 lb	64·3	28·8	Aug. 12

It will be noticed that all the fertilizers applied gave beneficial results with the exception of potassium and that lime and boron were outstanding both in regard to increasing yields and to hastening maturity. Potassium seemed to definitely retard maturity in all cases.

The results are only for one year and in view of this fact, it would be unwise to draw any definite conclusions.

Seed Improvement and Sales

The quality of grain in districts surrounding the illustration stations has been improved through the sale of good seed produced on the stations. Each year operators are supplied with a limited quantity of first generation registered grain which is multiplied on the station. The resulting crop is then available to farmers at a very small premium over commercial grades.

During the years 1934 to 1938, the following quantities of seed grain were sold to 189 farmers: 7,884 bushels of spring wheat, 606 bushels winter wheat, 5,149 bushels oats, 340 bushels barley, and 160 bushels of fall rye, making a total of 14,139 bushels of seed grain.

Poultry Improvement and Sales

Operators of all stations maintain flocks of Barred Plymouth Rocks of the Lethbridge Experimental Station strain. Flocks vary from 65 to 200 birds with an average for all stations of about 100. High quality poultry are kept on each station principally to supply the needs of the household and to provide a source from which farmers in the neighbourhood can easily procure hatching eggs and cockerels of good breeding. Farmers have taken advantage of the opportunity to improve their own poultry through buying 108 cockerels and 604 dozen hatching eggs during the past five years.

Farm Gardens and Home Beautification

In the southern part of the province moisture and protection from the winds are the most important factors in producing a good garden. In order to aid in supplying these, good shelterbelts have been planted around the prairie gardens. These provide good protection from the wind, and the snow trapped by the trees soaks the garden thoroughly as it melts.

On the grey wooded and peat soils of the northern stations, the application of barnyard manure and commercial fertilizers is necessary to get satisfactory yields.

Particular attention is paid to the farm garden and the results more than pay for the time and money expended. An abundance of vegetables was grown on all stations in 1938, while on several, good crops of sandcherries, crabapples and strawberries were produced in addition to the regular garden crops. Plantings of annual and perennial flowers and shrubs did much to improve the appearance of the farmstead.

Field Days and Publicity Work

The annual field day held on each illustration station affords an opportunity to acquaint the farming community with the work that is being done at the Experimental Farms and the illustration stations. More time and thought is being devoted each year to making the program both interesting and instructive. That field days are meeting with approval is borne out by the increasing attendance which reached an average of 160 in 1938. In 1936 and 1937 the average attendance was 51 and 100, respectively.

Previous to 1936 the field day program consisted of addresses by two or three speakers and an inspection of the work on the station. In 1936 and 1937 a large tent was erected and seating provided. A truck exhibit featuring large pictures and riker mounts was used to illustrate the talks given by the speakers. In 1938 lantern slides projected on a daylight screen were used instead of the truck exhibit. This proved to be a distinct advantage, since it permitted a greater variety of material and consequently a much better illustration of the subjects discussed.

The subjects discussed at field days in 1938 included insect control, soil drifting control, cereal varieties, poultry and live stock. Not more than four subjects were discussed at each field day and the choice was limited to those which would be of particular interest in each district. An illustrated talk by a domestic science graduate was given to the ladies while the men inspected the fields and plots.

Field days constitute the greater part of publicity work undertaken, but in addition the supervisors have addressed other agricultural meetings and written numerous articles for the press.

REPORT OF ILLUSTRATION STATIONS IN THE PEACE RIVER DISTRICT

Robert F. Gibson, B.Sc.

Directed through the Experimental Sub-station at Beaverlodge, Alta., are five illustration stations, three in Alberta and two in British Columbia. Four of these are scattered throughout the settlements in a drainage basin of 74 million acres, of which from 12 to 20 million have been variously estimated as fit for agriculture. The High Prairie station is just across the watershed dividing the Peace from the Athabaska basin.

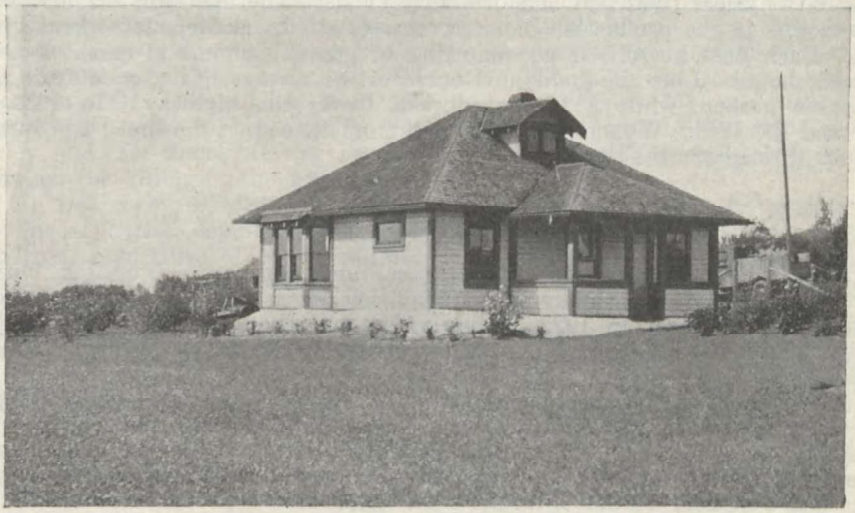
Serving such a large area, with widely varying types of soil, these stations necessarily carry a wide range of projects, some being common to all the stations, while others are designed to meet special local problems. Discussed in this report are crop rotations, cereal variety tests, forage crops, weed control, soil erosion, horticulture, seed distribution, live stock, poultry and field days.

The Stations and Their Operators

BALDONNEL, B.C.

J. W. Abbott, Operator

The first station in the Peace River inspectorate was established in 1924 on the farm of J. W. Abbott, a returned man who had filed soldier grant and homestead north of the Peace in the Fort St. John district. In this strictly pioneer region with a heavy transportation handicap he had engaged in mixed farming.



Residence in the Peace River District on the farm of J. W. Abbott.

Shortly after becoming an operator, Mr. Abbott, with misgivings based upon unsuccessful alfalfa experience elsewhere, undertook with the encouragement of the Beaverlodge Sub-station the culture of alfalfa for seed and hay, sowing

in 1927 five and one-half acres in rows for seed. The average yield of this field for eight years was 151·2 pounds of seed per acre, and it is still producing good hay crops. From another seeding on a five-acre block there was obtained in 1938 the amount of 1,900 pounds of first-class seed. The first crop-sequence work was commenced in 1927 when rotations introducing grass and legume mixtures were laid out for comparison with a fallow-grain rotation. From the large and well-tended garden are gathered heavy crops of saskatoons, raspberries, currants, strawberries and sandcherries, while plum and apple trees have been set out. The operator has been rather successfully growing winter wheat on a field scale and has been doing some selection work. A good herd of Yorkshire swine is kept and through the station work superior Barred Rock poultry have been introduced. The operator has been a successful exhibitor of grain and seed, among his winnings being 2nd for small yellow peas at Chicago in 1930; 4th in alfalfa at Chicago in 1932 and 3rd in 1938; 7th at Regina, 1933, in the hard red spring wheat 50-pound class, and 2nd for alfalfa at Vancouver in 1938.

FAIRVIEW, ALTA.

Alex. McKenzie, Operator

A native of Elgin county, Ontario, with extensive western experience, Alex. McKenzie came to the Peace in 1912, acquiring land on which part of the town of Fairview was later built. On a large area of smooth, black soil Mr McKenzie went in chiefly for grain farming with both horse and tractor power. One year on 50 acres of land he had 50 bushels per acre of Ruby wheat grading No. 1. While grain farming was his leading interest some good horses and a few swine were kept. A flock of poultry was also maintained. Prior to the undertaking of illustration station work he had provided himself with a neat set of farm buildings.

On land fallowed in 1930 rotation work was begun the next year. Even on this rich soil the grain-fallow rotation without manure shows a tendency to impaired physical condition and declining yields. The operator has met with real success in the production of sweet clover, alfalfa and crested wheat grass seed. Each year he sells large quantities of grass, legume and cereal seed to his neighbours. Like the Baldonnel operator, he always has a good fruit and vegetable garden, while a fine windbreak flanks the highway. In 1936 he procured 100 White Wyandotte chicks and from that start the breed has spread rapidly throughout the district.

DREAU, ALTA.

A. B. Bélanger, Operator

In 1916 A. B. Bélanger left Montreal and homesteaded on the burnt-over plain east of the Smoky river, acquiring seven quarter sections besides a second homestead. In 1928 he purchased the school section on which the railway station of Girouxville (afterwards changed to Dreau) was established.

Although farming with a good deal of power equipment, Mr. Bélanger became interested in experimental work. Operations in 1930 were chiefly preparatory. In 1931 six comparative rotations were laid out but these were abandoned four years later to make way for a special rotation to fight wild oats, which appear to have infested the land prior to breaking. Kharkov winter wheat has been fairly successful in this rotation, although winter-killing somewhat at times.

The operator has been growing sweet clover seed successfully on the station and on his commercial fields and while grass-hay crops have been only moderately successful alfalfa has done surprisingly well. A productive, well-

ordered garden is the rule. A small herd of grade Red Poll cattle supply cream for shipment and a flock of poultry is kept. For the past 20 years from one to two brood sows have helped to defray household expenses.

POUCE COUPE, B.C.

N. D. Dow, B.S.A., Operator

The fourth station was opened at Pouce Coupe in 1931. An agricultural graduate of Edinburgh (1911) and Toronto (1920) the operator is a war veteran who served for some years as a Soldier Settlement Board supervisor but for a while before taking up illustration station work had been depending exclusively on his own farm, delivering milk and cream in the town of Pouce Coupe. Naturally the farm enterprise revolves around the dairy herd, which was at first grade Shorthorns though for the past eight years Ayrshire bulls have been used. Some excellent pure-bred Yorkshire swine are kept. Turkeys and chickens have a place and in 1936 through the poultry improvement plan a start was made in bred-to-lay Barred Rocks.

The same rotations are featured here as at Fairview and run concurrently with those. The operator had made and continues to make extensive use of sweet clover, growing it in a grain and clover rotation of his own devising. This and other meadow crops have been grown on the station for both hay and seed production. Successful efforts have been made to prevent water erosion by scraping out straight, shallow runways and seeding them to meadow. A new cattle barn was erected in 1937 and year by year the order of the premises improves.

HIGH PRAIRIE, ALTA.

S. J. Fewang, Operator

During the latter part of 1932 S. J. Fewang, an old-time settler with a very fine farm adjoining the town of High Prairie, was chosen to be the operator of a fifth station, his son Soren taking active interest in the work.

Operations commenced in the spring of 1933, when eight comparative rotations were laid out. These had to be abandoned the next year in order to clear up a bad infestation of wild oats. The field was seeded to winter wheat in 1934. Developing from this, a new rotation (N) was planned to combat this weed. This rotation, involving winter wheat, an early-ripening barley and late-sown oats for green feed, has met with considerable success, although the killing of the wheat is a hazard.

In this region of deep soil and heavier precipitation than the average for the Peace district, comparatively good results have been reaped from timothy and from a mixture of brome, alfalfa and timothy. Brome grass has, however, come to be preferred as a straight grass hay, and brome and alfalfa as a mixed hay. Live stock have not seemed to relish crested wheat grass and must be starved before they will eat straight sweet clover hay. Cattle, swine and poultry have places in the farm economy and horses furnish all the power, but a new rubber-tired tractor was purchased in the fall of 1938. A luxuriant garden always appertains to the fine home on this steading.

The Seasons

The winter of 1933-34 began in October but relaxed in November and again in January. After a record-cold December spring work commenced exceptionally early and moisture storage was excellent. More rain than was needed fell in the growing season and growth was rank. Harvest weather was most unpropitious. Cutting was accomplished with difficulty, while threshing operations were interrupted by drizzling rains and much soft, wet snow.

Severe frosts in September wrought untold damage. The result of all these inclemencies was that although yields were high grades were low.

The winter of 1934-35 brought a heavy fall of snow averaging 69·6 inches throughout the Peace. Work on the land commenced the second week of May and frequent rains held up seeding operations. Due to drenching rains and cool weather the ground became saturated; cultivation and summer-fallowing were exceedingly difficult and weeds prolific. On August 14 a general snowstorm followed by frost on the 15th and 16th cut yields and grades disastrously. Difficulty was encountered in harvesting the lodged grain and the October weather harassed threshermen. At Pouce Coupe operations were delayed till the end of November.

No autumn cultivation was accomplished and the winter of 1935-36 was long and cold with, however, an early break-up in the spring. Growth was vigorous during a warm, dry May. With sufficient moisture falling during the growing season the crops came to successful maturity in August, and cutting commenced in the middle of the month. A snowstorm the second week of September made harvesting of any uncut grain difficult. A heavy frost on October 31 stopped work on the land but in the first week of November the weather warmed up and tillage continued till the end of the month, more fall work being accomplished than for years past.

The winter of 1936-37 was shortened considerably by the good autumn weather and the early spring of 1937, and cultivation commenced a week sooner than in 1936. The Peace river country received no general rains till cutting had commenced and the crops had to get along as best they could with local showers of brief duration and irregular occurrence. Thus maturity was hastened and yields cut except in the British Columbia Block. Baldonnel and Pouce Coupe received timely rains.

After the general rains in the middle of August the weather was settled and threshing went along without a hitch. Field work continued almost without interruption till stopped by heavy frosts the first week of November.

The winter of 1937-38 was open with but moderate snowfall and the country was visited by frequent Chinooks. For the first time in years automobiles ran all winter. After a cold snap the end of January and first part of February the weather moderated into an early spring. Work on the land

PRECIPITATION AT SIX POINTS FOR THE CROP YEAR 1937-38, THE CALENDAR YEAR 1938, AND AVERAGE FOR SEVEN CALENDAR YEARS, 1932-38

Station	Autumn	Winter	Summer, 1938				Total for crop year Aug. 1, 1937, July 31, 1938	Total for calendar year 1938	Average for calendar years 1932 to 1938 inclusive
	Aug. 1, to Oct. 31, 1937	Nov. 1, 1937 Mar. 31, 1938	April	May	June	July			
	in.	in.	in.	in.	in.	in.	in.	in.	in.
Baldonnel, B.C.	5·05	5·20	.....	0·11	2·73	0·54	13·63	10·85	17·46
Dreau, Alta.	4·05	3·05	0·30	.....	2·69	0·83	10·92	9·67	15·91
Fairview, Alta.	4·21	5·90	0·74	0·12	1·61	0·58	13·16	9·40	17·05
†High Prairie, Alta.	5·74	4·35	0·73	0·08	1·18	2·06	14·14	11·13	19·21
Pouce Coupe, B.C.	5·73	5·45	0·29	0·12	1·62	0·27	13·48	10·78	18·51
Beaverlodge, Alta.	6·29	5·12	0·43	0·34	1·41	0·49	14·08	13·61	19·02

† Recorded by Sam. Harris, High Prairie, near illustration station premises.

commenced the earliest in years, seeding in many districts being well under way the last week of April. Growth was slow due to the cool spring and dry weather. The crop was further retarded by a windstorm the second week of May, causing soil drifting in many fields, which continued to blow till August. From April to the end of July it was exceptionally dry. In the Peace River Block and the Grande Prairie district cutworms injured grain crops as well as gardens. Beet webworms attacked gardens at widely scattered points. Grain and hay yields were surprisingly light. Cutting was general by the middle of August. An exceptionally fine autumn favoured threshing and fall cultivation. It continued till snow fell the first week of November with the ground still unfrozen.

Crop Rotation

In a new northern zone where hoe crops have little place and where seeding down is a difficult problem, a suitable rotation is by no means easy to devise. In quest of needed data, trial rotations were laid out on each station as established. At two points it soon became necessary to supersede these with a cropping system designed especially to fight wild oats. At another it was realized that the comparisons would be meaningless because some rotations were on high land and others on low land and some on the slope between. As it would be too costly to overcome this site difference by adequate replication it was decided to reduce the number of rotations at this point to two, both presented in their full sequence every year and each laid out at right angles to the old plotting, thus giving each new plot some high and low land. At the other two stations meadow rotations are still compared with straight grain rotations, manuring with non-manuring, wheat—fallow sequence with wheat—fallow—oats—fallow sequence and nurse-crop with non-nurse-crop seedings of the meadow crops. None of these rotations have come to the stage where they can be either definitely rejected or recommended, but it has been indicated that the introduction of a meadow crop is a decided improvement over a straight fallow—grain rotation, both in increasing yields and maintaining the tilth of the soil.

KEY TO THE ROTATIONS

Rotation "A" is a seven-year crop sequence of:

1st year—fallow.
2nd year—wheat seeded down to brome and sweet clover.
3rd year—hay.
4th year—hay.
5th year—hay (broken immediately after haying).
6th year—oats (for seed).
7th year—oats (feed) or barley.

Rotation "B" uses brome and alfalfa for the meadow of the third to fifth years, otherwise it is similar to "A". Rotations "C" and "D" are similar to "A" and "B" except that "C" employs western rye grass plus alfalfa and "D" employs western rye grass plus sweet clover.

Rotation "E"—a seven-year crop sequence of:

1st year—fallow.
2nd year—wheat.
3rd year—oats.
4th year—oats.
5th year—fallow.
6th year—oats (for seed).
7th year—feed oats or barley.

Rotation "F" is a three-year crop sequence of:

1st year—fallow.
2nd year—wheat.
3rd year—wheat.

Rotation "J" is similar to "F" except that the fallow is treated with 10 tons of manure per acre.

Rotation "G" is a six-year crop sequence of:

1st year—fallow.
2nd year—wheat.
3rd year—wheat.
4th year—fallow.
5th year—oats.
6th year—oats.

Rotation "K" is similar to "G" save that the fallow is manured at the rate of 10 tons per acre.

Rotation "H" is a six-year crop sequence of:

1st year—fallow.
2nd year—wheat as a nurse crop to western rye grass.
3rd year—hay.
4th year—hay (broken immediately after haying).
5th year—oats.
6th year—oats.

Rotation "I" is the same as rotation "H" only that in the second year the meadow seeding is western rye grass and sweet clover.

Rotation "L" is an eight-year crop sequence of:

1st year—fallow.
2nd year—wheat.
3rd year—wheat.
4th year—part-season fallow seeded in June to western rye grass and sweet clover (no nurse crop).
5th year—hay.
6th year—hay (broken immediately after haying).
7th year—oats.
8th year—oats.

Rotation "M" follows the same sequence as "L" but the fallow in the first year and the meadow in the fall of the fifth year are manured at the rate of 10 tons to the acre.

Rotation "N", the wild-oat-control rotation, has an eight-year sequence of:

1st year—fallow seeded in August to winter wheat.
2nd year—winter wheat (seed to Garnet in case of winterkilling).
3rd year—Olli barley.
4th year—part-season fallow seeded to sweet clover and timothy.
5th year—hay.
6th year—spring wheat.
7th year—spring wheat (or oats for green feed).
8th year—oats for green feed.

All ploughing in Rotation "N" is to be as shallow as is consistent with good cultivation, the part-season fallows to be well worked to kill weed growth before seeding. This also applies to the land which is to be used for green feed.

The first-devised rotations, "A" to "E," which are on trial at Baldonnel only, suggest that a mixture of grasses and legumes will increase the yields of the cereals that follow them over cereals in a straight summer-fallow grain rotation. Care must be taken in selecting the grass used and preventing it from volunteering in the grain crops.

Rotations "F," "J," "G," "H," "I" and "L," on trial at Pouce Coupe and Fairview, likewise indicate the need for meadow mixtures, in order to keep the soil in good condition and to uphold yields of cereals. Here also has been demonstrated the superiority in certain respects of non-nurse-crop seedings over nurse-crop seedings of grasses and legumes, the former allowing the meadow crop to make a better stand the initial season and outyield the nurse-crop block in the first hay crop. At Baldonnel the two newly arranged rotations "GK" and "LM" give similar indications and both crop sequences have revealed considerable growth increases from the application of barnyard manure.

In rotation "N" at Dreau and High Prairie, winter wheat when it does not kill out has been very effective in fighting wild oats and in the next year Olli barley has forestalled to a considerable extent the ripening of the oats. Those that did mature have been mostly gathered and threshed with the barley. Oats sown late for green feed and cut when they head out have been effective in control of the weed when the seedling wild oats were thoroughly killed by cultivation just before the green-feed crop was sown. Meadow stands suppress the wild oats and the hay crop is cut before the oats mature.

Erosion Control

Until 1938 soil drifting was not generally considered a very grave problem in the Peace, but water erosion has come to be recognized as a serious menace in many parts of the territory. When the rotation plots were laid out at Pouce Coupe a natural spillway was excluded from the test areas and seeded to alfalfa in 1931, but it winterkilled in 1933-34. The spillway was ploughed up and reseeded in the spring of 1934 to Kentucky blue grass and alfalfa. Killing again occurred and in 1935 it was reseeded to blue grass, crested wheat and alfalfa, showing no signs as yet of further killing. Two other runways were seeded to crested wheat grass in 1936. One was through a hog paddock, but has never been rooted up. This accords with Beaverlodge experience where a strip of crested wheat grass was left alone by sows on pasture even when the rest of the area was bare. The three Pouce Coupe runways now carry off surplus water without gouging, and being laid out square with the fields, cause very slight interference with cultivation.

At Baldonnel where side hills are farmed all dead furrows are diverted at frequent intervals by up-grade furrows drawn with a walking plough in the spring to prevent destructive channels forming. To check wind erosion, stubble trash is left on the seed beds in the autumn by use of the spring-tooth harrow.

At Fairview a smooth field with a southern slope was being scoured by the wash from up-slope farms concentrated by a railroad culvert. Five terraces ten feet wide and two feet high were laid out to follow the contour of the land with a gentle slope towards the natural runway. The land was taken out of cultivation and laid down to five comparative meadows in one-acre bands across this drainage course, about one band to each terrace. After the terraces were made, drouth postponed the seeding of the grass–legume mixtures till June of 1938 and then cutworms ate off much of the seeding, which, however, came on again late in the summer. When the grass has become established especially in the old wash it is intended that this watercourse shall be dammed, the water being forced over the sodded field to soak in as much as possible and irrigate the meadow. How far this may prove feasible in periods of high flow remains to be seen, but there should be some data on the relative suitability of meadow species.

Weed Control

Weed control is being successfully carried out through cultural practices made possible by crop sequences which in most rotations alternate grain, hay and fallow. At High Prairie during the past few wet years horsetail, *Equisetum arvense* has become an obnoxious weed. A field known to be infested with it was set aside in the spring of 1937 for a study of cultural control. Half was summer-fallowed in the usual manner, while the other half was shallow-ploughed late in June and harrowed once. Later on this half was ploughed to a medium depth, care being taken to have sharp shares at all times. In late autumn the field was worked with a duckfoot cultivator.

In the spring of 1938 the whole area was seeded to oats and observations were made as to the growth of horsetail on each half. Owing to the extremely dry summer, growth of any kind was poor and the observations will be carried forward to next year.

Variety Tests of Cereals

During the years 1934, 1935 and 1936 the variety testing of cereals was confined to two or three varieties each of wheat and oats and one or two of barley in one-acre plots. A change was made in the system of testing in 1937 when, through the co-operation of the Cereal Division, randomized five-row replicated plots were introduced. This allows for testing of many varieties on less land than it took formerly to grow one variety. In 1937, eight varieties each of wheat, oats and barley were grown and in 1938 the same number of wheat and barley varieties but twelve of oats.

Wheat.—While the variety test has not revealed the wheat for the north, none of the new varieties tested combining the earliness of Garnet with the quality and merit of Marquis, the work helps on the great search. Marquis is too late except for the odd favoured district or farm and has never graded higher than No. 2 since first tested on the stations. Red Bobs 222 has been a consistently high yielder and is gaining favour throughout the Peace, but is not early enough for all districts and piebalds in some seasons, losing from one to two or more grades. Reward is not a high yielder, matures unevenly, is harsh to handle, tough to thresh and is heavily degraded for green kernels unless well matured. It loses favour with farmers. Garnet, while phenomenally high-yielding for such an early kind, is handicapped in grading. No need is felt for rust-resistant wheats. Most of those introduced are not quite early enough. Thatcher is a good yielder and seems to have quality, but the sample does not please and the plant is said to be subject to leaf rust.

Oats.—Although discounted by its long, slim kernel and somewhat ragged appearance, the Legacy oat yields and grades nearly as well on the average as the standard kinds, Victory and Banner, besides which it is a week or ten days earlier on the average—sometimes a fortnight in certain late, wet seasons. It is thus much safer for many zones. Early Miller is a broad-leafed, medium-early oat with a remarkably plump kernel and is capable of very high yields, but has thus far given an indifferent account of itself under drouth conditions. Eagle is the heaviest yielder in plot tests, but being later than Victory, may be unsafe for commercial cropping. Alaska and Vanguard were grown in 1938. At every station Alaska was lowest in yield. Vanguard was fourth, averaging 1·8 bushels more than Legacy, which was fifth.

Barley.—Until 1937 there had been no barley comparisons on the Peace River illustration stations, although plots of O.A.C. 21 had been grown at Pouce Coupe for three years up to 1934 and Olli barley was multiplied at Baldonnel in 1935 and 1936. In two years' testing Trebi has been the heaviest-yielding feed barley, with Newal and Regal close behind it and getting the preference because of their smooth awns. Olli barley has been known to out-

yield O.A.C. 21 when growing conditions were favourable, but has fallen short in years with a dry early summer. Its straw is inconveniently short under drouth. It is nevertheless a boon in frosty districts and has promise for fighting wild oats. Peatland is a rather low yielder.

As yet no one variety of wheat, oats or barley, has met with universal preference throughout the territory.

Forage Crops

As soon as possible after the establishment of an illustration station a number of grasses and legumes have been included in the demonstrational plots and are playing an important part in the program for seed, for hay and for soil improvement, although owing to variation in the duration of stands, to seasonal conditions and to other factors, observations are more valuable than the numerical data.

Of all the grasses and legumes tried, western rye grass, brome, alfalfa and sweet clover have proved most successful. Western rye grass has outyielded brome but the latter is preferred by the operators. Row seeding of alfalfa is advantageous in the Peace River district for seed production and most of the illustration station seed plots of sweet clover and alfalfa have been laid down in this way.

Alfalfa.—From the standpoint of both hay and seed production success with alfalfa has been particularly encouraging. The Baldonnel operator grows alfalfa in rows for both purposes, cutting the hay with a binder and curing in four-sheaf stooks, claiming this method makes better hay and that the cost of the twine is taken care of by the saving of leaves, the loss of which is almost negligible by this method of handling. For the past seven years one plot of alfalfa at Baldonnel has averaged 2·64 tons of hay per acre, and during the dry seasons of 1937 and 1938 Fairview has harvested an average crop of 2·03 tons per acre. High Prairie's four-year average of alfalfa-hay production stands at 1·44 tons per acre. Due to weed encroachment the plots at Dreau and Pouce Coupe were ploughed up, fallowed and reseeded in the summer of 1938. In seed production Fairview shows a six-year average of 131·7 pounds per acre and the Baldonnel operator has built up a seed store of over 3,300 pounds, after selling 1,684 pounds during the last five years.

Sweet Clover.—In the forage-crop demonstration plots sweet clover has been grown for seed only. In 1937 Baldonnel obtained a yield of 820 pounds per acre. Dreau has a three-year average of 509·7 pounds; Fairview a five-year average of 595 pounds and Pouce Coupe a three-year average of 492·8 pounds,

Brome.—A two-year average at Dreau gives brome a hay yield of 0·69 ton per acre. A 1937 seeding at High Prairie yielded in 1938 an even ton to the acre, and Pouce Coupe has a two-year average of 0·81 ton.

Western Rye Grass.—A three-year cropping of one stand at Dreau yielded 0·88 ton of hay per acre while a six-year average of 1·17 tons has been obtained at Pouce Coupe. The operators do not like this grass, however, for unless cut promptly when ready it makes a wiry hay and is never so palatable as brome. It does not suppress weeds as well as brome and on the Beaverlodge Sub-station during recent years wheat on western rye grass sod has often been affected with root-rot.

Crested Wheat Grass.—Crested wheat remains as almost entirely a seed specialty. Hay obtained from it is not very palatable while its yields are irregular and at Beaverlodge, this grass, like western rye, has often been followed by root-rot in the wheat. The plot at Fairview has an average of 778·7 pounds of seed in a three-year average and when cut for hay in 1938 it yielded 0·85 ton per acre. The yield of hay is better at High Prairie, where the rain-

fall is greater, being 1·65 tons over a three-year period, but Dreau's three-year average is only 0·61 ton and a new seeding at Pouce Coupe yielded but 0·31 ton per acre in 1938.

Reed Canary Grass has been tried at Dreau with little success, averaging 0·57 ton per acre.

Timothy.—Timothy has outyielded crested wheat grass at High Prairie by nine-tenths of a ton in the aggregate of three cuttings from two comparable stands, one cropped for two years and the other for one year after seeding.

Brome and Alsike.—A 1937 seeding of this mixture yielded 1·50 tons at High Prairie in 1938. Alsike stands have suffered from weed encroachment and winter killing.

Brome, Alfalfa and Timothy.—This mixture has been an outstanding success at High Prairie, where it has been harvested for five straight years from a given stand to average 1·97 tons of hay per acre. The timothy is disappearing but brome and alfalfa remain.

New Seedings.—In 1938 new seedings were made at Dreau on land that had been fallowed in 1937. Seven one-acre plots were sown, consisting of brome, western rye grass, timothy, alfalfa broadcast and in rows and a mixture of brome, timothy and alfalfa. Due to the dry season germination on these plots was poor. At High Prairie, where new seedings were made in 1937, four plots had to be replaced in 1938 due to poor germination, weed infestation and winter killing. These four were alsike, Altaswede, reed canary grass and sweet clover. A new seeding of alfalfa was made at Pouce Coupe.

Seed Sales

During the past few years the illustration stations have become more and more the sources of pure grain and meadow seeds for their districts. In the last five years the operators have sold seed to neighbouring farmers in increasing amounts and have also built up a good business for grass and legume seed with commercial firms. The amounts of seed sold are as follows: Wheat, 4,260 bushels; oats, 11,794 bushels; barley 2,112 bushels; peas, 8 bushels; potatoes, 290 bushels; Grimm alfalfa, 6,789 pounds; Arctic sweet clover, 12,970, and miscellaneous grasses, mainly brome, crested wheat and western rye grass, 14,245 pounds. A very incomplete list for the past five years shows that well over 300 farmers have drawn on the stations for seed.

Horticulture

It is advantageous, not only to the operator of an illustration station, but to the neighbourhood as a whole, to have and enjoy home surroundings of beauty and culture.

Each year vegetable and flower seeds are sent out from both Ottawa and Beaverlodge to all the operators. Small fruits have been distributed from time to time and excellent results are being obtained, chiefly with raspberries, strawberries, currants and saskatoons. Along with these the orchard at Baldonnel contains some hardy varieties of apples, plums and cherries though to date only the sandcherries have borne fruit. On field days the farm gardens are one of the centres of attraction, Baldonnel's plantation especially so.

The vegetable garden is planted in long rows far enough apart to enable the operator to keep the garden clean by horse cultivation.

Live Stock and Poultry

Little live stock work has been demonstrated though the operators at Pouce Coupe and Baldonnel have good strains of Yorkshire swine, and place both gilts and boars with their neighbours. Most of the Yorkshire breeding

swine in the northern part of the British Columbia Peace River Block has originated with the Lacombe Experimental Station stock brought in by or through the Baldonnel station operator. In the period covered by this report he has placed 55 gilts and 15 boars with his neighbours. During the summer of 1938 a young boar was obtained from Lacombe and promises to do much good in the district. The operator at Pouce Coupe has a commercial dairy herd and keeps a registered Ayrshire bull under the Dominion Live Stock Branch's Live Stock Improvement Centre.

No attempt was made to interest the operators in improving their poultry flocks until the spring of 1936, when the operators at Baldonnel and Pouce Coupe each procured 100 Barred Rock chicks and the Fairview operator 100 White Wyandottes. In 1937 the High Prairie station was brought into the scheme and Dreau will be added when the new chicken house is built. All flocks have probably returned dividends to their owners but the Fairview operator has been most successful in spreading good poultry throughout his district. Besides selling his oldest birds to neighbouring farmers he sold 83 dozen hatching eggs in 1937 and 100 dozen in 1938.

Publicity and Extension

In the past five years 18 meetings have been held at the five stations with an average attendance of 78 persons. At most stations the gathering has been getting larger and the people showing more interest in the topics under discussion.

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REPORT OF ILLUSTRATION STATIONS IN BRITISH COLUMBIA

R. M. Hall, B.S.A., Supervisor

Sixteen established farmers co-operate with the Division of Illustration Stations in carrying on the work covered by this report. Crop introductions, fertility and rotational problems received the most consideration when the work first started in this province in 1921. Farm organization as a whole has been given more attention beginning with 1934. The original small plots on the majority of stations have been extended to include the entire tillable acreage under one system of field management. Two rotations are followed on the remaining stations to meet local conditions of soil type and to extend the observations on the greater number of crops grown.

Location of Stations and Names of Operators

The following list gives the location and names of the operators completing the 1938 season.

Alberni	Vancouver Island	C. Chase
Courtenay	Vancouver Island	Halliday Bros.
Duncan	Vancouver Island	B. Young
Pemberton	Southern Interior	W. E. Blakeway
Salmon Arm	Southern Interior	Geo. Paterson
Revelstoke	Southern Interior	Thos. Griffiths
Lumby	Southern Interior	H. C. Catt
Armstrong	Southern Interior	Dr. W. B. McKechnie
Australian	Cariboo	Gordon Beath
Quesnel	Cariboo	W. A. Johnston
Strathnaver	Central, B.C.	R. Yardley
Prince George	Central, B.C.	J. S. Johnson
McBride	Central, B.C.	J. T. Oakley
Vanderhoof	Central, B.C.	D. Turcotte
Hatzic	Fraser Valley	A. S. Henry
Osoyoos	Southern Interior	Walter Graf

Stations at Hatzic and Osoyoos were established to study special problems in raspberry and vegetable production respectively. Progress made in this work is reported for Hatzic by J. J. Woods, Assistant Superintendent, Dominion Experimental Farm, Agassiz, and for Osoyoos by W. M. Fleming, Chief Assistant, Dominion Experimental Station, Summerland.

It is only through the co-operation of all operators that the Division of Illustration Stations is able to present the data and information that follows in this five-year summary. Reports are mailed weekly detailing manual and horse labour required to perform cultural and harvesting operations. Revenue derived from the sale of farm produce is likewise included in the weekly statement. Studying farm revenue is a new departure in which all operators co-operate. This feature was added in 1937, and shows by departments how the gross revenue is built up.

SUMMARY OF GROSS REVENUE BY DEPARTMENTS

Source	Number of stations		Revenue	
	1937	1938	1937	1938
			$	$
Live Stock—				
Horses	1	1	140 00	125 00
Cattle	14	13	5,852 79	4,311 70
Sheep	4	4	544 05	369 20
Dairy products	10	8	7,986 42	8,556 81
Hogs	11	11	3,647 24	3,289 56
Poultry	13	13	3,824 45	3,098 50
Average revenue	15	14	1,399 66	1,410 77
Per cent of total revenue	.....	.....	48·66	57·34
Field Crops—				
Hay and straw	9	5	5,649 18	4,960 37
Grain	12	10	6,805 06	3,990 90
Potatoes	7	8	3,706 70	2,197 13
Clover seed	4	3	4,400 05	1,803 49
Average revenue	15	14	1,370 73	925 13
Per cent of total revenue	.....	.....	47·65	37·61
Miscellaneous Revenue, Average	15	14	106 18	124 20
Per cent of total revenue	.....	.....	3·69	5·05
Average gross revenue	15	14	2,876 58	2,460 10

Reviewing the above figures emphasizes the stable average revenue derived from live stock as compared with the widely fluctuating returns from field crops. Lower yields generally in 1938 combined with a weakened price structure to force downwards the average revenue derived from field crops. Whereas in 1937 the income from live stock and field crops were on a par, in 1938 live stock revenue stepped out in front by a margin of approximately 20 per cent. It is agreed that a study of two years' results, while not conclusive, nevertheless is indicative of the stabilizing influence that live stock exerts in the farm economy. This phase of the work will be followed with increasing interest each year.

HATZIC ILLUSTRATION STATION

A. S. Henry, Operator

Progress Report by J. J. Woods, Senior Assistant, Agassiz Experimental Farm

In 1934 two acres on the property of A. S. Henry were rented for the express purpose of studying conditions in relation to raspberry decline. The A. S. Henry farm was the first commercial nursery and small-fruit ranch in the Hatzic district, on which farming was commenced in 1885. Since that time, while new land has been cleared, it has been under continuous cultivation, chiefly to raspberries. On the basis of methods practised in small-fruit growing sound cultural practices have been followed and excellent crops of Cuthbert red raspberries have been produced. Commencing in 1927 production started to go down and since that time it has been impossible to produce satisfactory crops from new plantings on old land and from some of the older plantings on this property. In the Mission-Hatzic district raspberry decline has been markedly under way since 1924, and at the present time threatens the extinction of raspberry growing in these districts. It was to study these conditions as a whole that the two-acre field was rented.

From 1934 to 1938 inclusive a large number of fertilizer tests have been carried out but only applications of nitrogen have proved beneficial and these were not sufficient to restore normal growth. The best results have been obtained

with calcium cyanamide, but this nitrogen carrier has been applied in larger amounts than any of the other kinds used. Barnyard manure applied to run-down areas for a period of three years has not restored normal growth either alone or in combination with clover crops. Lime has been of no value nor has there been any appreciable variation in growth amongst the different varieties tested. Pathological investigations have shown numerous diseases present but no one disease or combination of kinds which account for the poor growth. Areas have been set aside from which the berry plants have been taken out and these will be green manured for varying periods of time before being replanted to raspberries. A small area is being treated in a similar manner but barnyard manure is being used instead of cover crops. In 1938 straw mulch plus applications of nitrogen was used in both a young and an old-established planting. These plots are being compared with ones which receive applications of nitrogen and green manure cover crops. There was no apparent difference in crops in 1938. Detailed information was obtained from eight farms in 1938 as to the length of time the land had been cultivated, the crops grown, fertilizers and manures used, and present conditions of plantings. The conclusions drawn from these case histories was that if more rotation of crops was followed, heavier applications of manure given and more use made of green manure crops many of the more serious problems of production would be avoided or overcome.

The various phases of work being studied in connection with this problem are undertaken co-operatively through the B.C. Raspberry Committee. The different groups represented and those actively pursuing the work are officers of the Dominion Experimental Farm, Agassiz, the Provincial Department of Horticulture, the Dominion Laboratory of Plant Pathology, Saanichton, and the Department of Horticulture, University of British Columbia. Detailed summaries on the various phases of work have appeared in the annual reports of the B.C. Raspberry Committee during the years 1932 to 1938 inclusive.

OSOYOOS ILLUSTRATION STATION

Walter Graf, Operator

PROGRESS REPORT BY W. M. FLEMING, CHIEF ASSISTANT, SUMMERLAND EXPERIMENTAL STATION

This station was established in 1938. Active projects under way are (1) soil building by use of green manure crops and returning to the soil all crop residues (2) chemical fertilizer experiments with tomatoes and cantaloupes (3) tomato variety trials and (4) tomato irrigation experiment.

Rotation.—The two-year plan of tomatoes and sweet clover is being compared with a one-year program, tomatoes followed by fall rye and vetch. The object is to return as much organic matter to the soil as possible. Rye, 70 pounds and winter vetch 30 pounds per acre were sown September 23, 1938, after tomatoes, and developed excellent growth before winter had set in. If there is a good stand to plough under in April the land will again be planted in tomotoes. Should the green manure crop not be satisfactory sweet clover will be seeded.

Fertilizer Trials with Tomatoes.—This project has been under way for three years at Summerland in order to ascertain the relations between different fertilizer elements and quality in tomatoes. Trial plots are also conducted at seven other points in the Okanagan with established growers. A number of chemical fertilizers were applied to individual rows in single lots and in mixtures. A box of tomatoes from each plot was canned and the canned samples will be examined and scored for variation in quality.

Tomato Variety Trials.—Morse's Special Early 498 is the variety generally grown in the Osoyoos district. Nine varieties were supplied to Mr.

Graf for comparison with his main crop. His observations on these are as follows: Harkness Early and John Baer Small (Summerland) produce too small fruit for semi-ripe purposes. Early Shipper splits badly, likewise Success and Sugawara. Mattock (Earliana) was an improvement over the other early flat types, but nevertheless had some splitting. Penn State has a short vine with good set of fruit. There was little to choose between Summerland 8,040 and 498 strains.

Tomato Irrigation Trials.—A device for the accurate measurement of water applied to different plots was used. This had been developed at the Summerland Station. Results at Summerland indicated light applications in June followed by heavier applications in July and August were most satisfactory. The following rates of application were selected for trial in 1938, plots being replicated three times.

Rows	Amount of water applied per week		
	June	July	August
	in.	in.	in.
1, 4, 7	1·00	1·50	1·50
2, 5, 8	1·25	2·00	2·00
3, 6, 9	1·50	3·00	3·00

Each row was harvested separately and a record made showing date of harvest and the number of boxes picked. It will be noted that trial amounts of water used in 1938 varied from 4 to 12 inches per month. The tomato plants were inspected on July 22 when the temperature registered 101° F. in the shade and the temperatures for the seven preceding days were 102, 95, 94, 93, 95, 102 and 101 respectively. This date was the eleventh consecutive day with a maximum temperature over 90° F. No sign of wilting was observed in any row although the previous irrigation had been applied on July 17. This suggests that an application of 1·5 inches per week is sufficient to prevent wilting of tomatoes even in the hottest weather.

Plants were again examined on August 14. There was at this time a noticeable difference in the colour between plants in the light and heavy watered rows. Plants in rows 1, 4 and 7 were much darker green than in 3, 6 and 9, indicating a probable leaching of nitrates by the heavier applications. Soil samples were taken for analysis. This work is only partially completed to date. The available information, however, supports the observations of low nitrogen in the heavily watered plots. This experiment will be repeated in 1939 and extended to include cantaloupes.

Description and Organization of Station Farms

ALBERNI—VANCOUVER ISLAND

C. Chase, Operator

This station was established in 1925 with twelve acres managed in a four-year cycle. Land is cleared from heavy timber with an acre or two more being made available each year for cropping. Thirty acres are now managed in a five-year sequence of grain, hoed crops, grain and seeded and two years' hay. It has not been profitable to leave land in sod for the third year at this point.

Fertility studies with hoed crops plus a permanent pasture improvement program are two of the major field problems now receiving attention.

Poultry is strongly featured and over 50 per cent of the total farm revenue is derived from this source. One brooder house and two laying houses have been added in the past five years. Marketing is chiefly to private customers.

Eight per cent of the revenue was obtained (1938) from sales of turnips and potatoes. From five to seven good producing grade cows are milked, supplying customers with fresh dairy butter. Yards are tidy and the buildings kept in good repair.

COURTENAY—COMOX VALLEY, VANCOUVER ISLAND

Halliday Bros., Operators

From a four-year rotation in 1923 with eight acres the work has been advanced to a 40 acre block managed in five-year relays. The chief problem at the commencement was one of soil building, plus the control of charlock and couch grass. Fall-sown cover crops and generous applications of barnyard manure have steadily improved the percentage of organic matter to the point where, in spite of dry summers, the twelve-year average yield of potatoes is 12·04 tons per acre, field run.

The charlock problem is taken up under another section in this report dealing with chemical control of weeds. Couch no longer gives trouble on this station. A cleaning crop is grown, prior to the hoed crop year, of peas and oats. Harvesting is early and the month of August given over to thorough and frequent cultivation to expose and dry the running root stalk of couch. The dried roots are not burned but rather add to the humus content of the soil. Treated this way and followed by a clean hoed crop couch grass was entirely eradicated from the fields.

The principal source of revenue is from a herd of grade Jerseys. Skim-milk finds a ready outlet to the swine herd of pure-bred Yorkshires. Pasture improvement work is under way. Considerable cleaning up of old buildings has greatly improved the landscape in the past year or two. House and barns are in a fair state of repair, though both need painting.

DUNCAN—VANCOUVER ISLAND

B. Young, Operator

The first work conducted was implementing a three-year rotation involving six acres in 1928. The original site on the highway is now a demonstration plot and the main field work is now organized on a farm bought by Mr. Young in 1934. Fields have been squared out to the corners, old fences removed and the 50-acre farm is now laid out in fields varying in extent from four to six acres. An eight-year cropping sequence is proving satisfactory on this variable soil; grain, peas, hoed crop, grain and seeded to alfalfa. Alfalfa is down four years. Registered Victory oats, Dawson's Golden Chaff fall wheat and Trebi barley are heavy yielders. The latter is now sown in the fall with splendid results.

A grade herd of Jerseys (16 milking) supplies a retail milk route with 100 quarts daily. Surplus milk products are absorbed by the swine herd of registered Yorkshires. Two-thirds of the farm revenue is from the sale of live stock and dairy products. The sale of registered seed is heavy. Mr. Young also operates a rented farm of 100 acres which he has built up into a state of high fertility. The Farmers' Market, at which Mr. Young has a stall, affords a splendid contact with buyers. Dressed beef, pork and poultry products pass over the counter. Nearly half of the total farm income is derived from live stock products sold in this manner. Turkeys are a sideline that returned in excess of $300 for the Christmas trade of 1938. A farm situated in park-like surroundings makes this station one of the most picturesque in the province.

PEMBERTON—SOUTHERN INTERIOR

W. E. Blakeway, Operator

Work got under way on this station in 1932, studying the fertility needs of the sedimentary soils in the Lillooet river valley. Soil for the most part is a sandy loam with admixtures of clay in varying amounts. The humus content is generally low. Lack of water-holding capacity is offset by sub-irrigation resulting in very fair yields of hoed and forage crops. The main cash crops are turnips and potatoes. Cream from the grade Jersey herd is shipped to Vancouver. A very well bred bull from the Summerland Experimental Station herd is leaving heifers that promise to outdo their dams in butterfat production. Brown-heart was periodically appearing in the turnips grown in this area, resulting in a serious cash loss. Applications of borax, 10 to 15 pounds per acre, were found to give control in conformity with the findings of the Maritime and Central Committee that had been studying the problem for some time in the East.

A permanent pasture area is now seeded and commencing in 1939 fertilizer applications will be made to ascertain the response thereto.

Farm organization is not as yet complete. More land is gradually being brought into production which will within a year or two necessitate a re-alignment of the fields. The rotation is at present confined to five plots averaging three acres each along the highway. Considerable area is in rough pasture at the back of the farm, but the soil here is quite shallow with outcroppings of gravel.

An excellent vegetable garden in variety, plus flowers and a well kept lawn, gives the home on this station a very attractive appearance.

SALMON ARM—SOUTHERN INTERIOR

Geo. Paterson, Operator

Mr. Paterson bought a run-down farm badly infested with weeds and became an operator in 1928. Introduction of alfalfa in a six-year rotation successfully combated Canada thistle and provided excellent forage for the dairy herd. The land is level and for the most part is classified as a clay loam, though lighter soil is met with towards the back of the farm which is seeded down to permanent pasture. The rotation was extended in 1935 to eight years and includes all tillable land on the farm. Alfalfa is seeded with a nurse crop of grain, usually wheat, and is left down four years. Seeding down to afalfa with a nurse crop is not recommended, however, for upland conditions where competition for moisture is more exacting. Corn was grown successfully for a number of years though considerable trouble was experienced with volunteer alfalfa. It was thought that substituting barley for corn and practising cultivation before sowing and after harvest would lessen the wild oat problem. The plan is not working out satisfactorily. Here, as elsewhere, a hoed crop is necessary in the rotation to most effectively combat weeds. Mr. Paterson also farms two rented properties adjacent to his home place. Cash crops are grain, peas and hay. Ninety per cent of the gross farm revenue is derived from field crops and the balance is from live stock, poultry and butterfat. The latter departments could if anything be developed more fully thus stabilizing what is at present a very fluctuating income. Splendid vegetable and fruit gardens combine to provide the heavy table demands. Field days are well attended to witness live stock and field demonstrations. The large house has recently been remodelled and painted.

REVELSTOKE—SOUTHERN INTERIOR

Thomas Griffiths, Operator

Station work first started on this farm in 1932. A light sandy loam representative of a large area makes up the greatest portion of the farm. The first problem was to establish a field plan to build up the soil in humus content. The four-year rotation of potatoes, oats seeded down, clover and mixed hay has proved to be very successful. Two cuttings of clover hay are now the general rule. Productiveness of the soil on this farm is no longer a matter of conjecture. Potatoes yielded 10 tons per acre in 1938, the summer of which was one of the driest on record. Farm organization is such as to include all but the permanent pasture in the rotation. Alfalfa trials have not been on the whole a success. Lime and chemical fertilizer trials on pasture have produced an excellent sward made up mainly of wild clover and blue grass. Approximately half the income is derived from live stock, chiefly hogs. Four Yorkshire sows form the breeding herd. Skim-milk and buttermilk give an excellent start to the weanlings. Barred Plymouth Rock poultry is kept. Sales of turnips, potatoes, and cord wood got out in the winter make up the gross revenue for the year.

This soil responds sharply to superphosphate. A test on turnips in 1938, manure 12 tons and 0-16-0 at 400 pounds, yielded 13·85 tons, manure alone 9·75 tons. A special problem is dealing with wireworms in the short rotation in which mixed hay is grown. It may be necessary to revert to a three-year program, seeding down with clover alone. Two root houses and one hen house have been erected since this station was started. All buildings and fences are kept in excellent repair. Attractive home grounds neatly kept contribute toward making this farm pleasing to the eye.

LUMBY—SOUTHERN INTERIOR

H. C. Catt, Operator

Mr. Catt first undertook the duties of an operator in 1930, about the time he became interested in breeding better Shorthorns and Percheron horses. The bottom land had for years been down to hay and was pretty well run out. A rotation similar to the one at Armstrong was adopted with the exception of potatoes being substituted for corn. Potatoes gave way to oats and peas and finally a bare fallow practice was introduced. The station site is 40 acres in extent flanked by a running stream on the east and the highway on the west. Back fields are operated on a short rotation with clover and timothy forming the bulk of the forage therefrom. Victory oats and Trebi barley are home-grown concentrates all of which are fed to develop the fifty-odd head of registered Shorthorns. The principal soil problem was one of depleted fertility. Nitrogenous fertilizer applied to meadows and the generous application of manure are gradually increasing the yields of grain and forage. Bulls are fitted for the Kamloops Bull Sale. Foundation stock is the best obtainable from western herds. Mr. Catt made another trip to the prairies in the fall of 1938, bringing back four more outstanding individuals to further augment his growing herd. Improvement in the past ten years is remarkable and the blocky low-set type that butchers want is fixed in the herd.

The lawn was seeded since the station was established, flower borders and a lilac hedge setting off the attractive grounds. A spacious vegetable garden and small-fruit belt contribute their share to the family enjoyment.

ARMSTRONG—SOUTHERN INTERIOR

Dr. W. B. McKechnie, Operator

Dr. McKechnie took up farming at Armstrong after retiring from medical practice at the Coast. His farm was selected for the illustration station in 1925.

Initial studies of crop introduction and field management were made. The ten-year rotation first started is still followed with scarcely a break in the sequence. The station site is a heavy clay loam with some of the back fields quite light in character. Alfalfa is sown alone after corn and is left down for six years. Manure is added in the corn year at 16 tons per acre. Applications of chemical fertilizers have not given the response expected. Fall wheat is sown in September on prepared alfalfa sod tractor ploughed. Either oats or barley follow and then back to corn. A pure-bred Jersey herd with an average of 16 milking consumes most of the grain and roughage grown. Ninety-nine per cent of the revenue in 1938 was from live stock and butterfat, one per cent was from the sale of seed grain. There is no fertility problem with a set up such as this. A new home was finished in 1936. Barns were recently painted and the silo repaired. A separate barn was completed in 1938 for the dry stock. Tidy yards and a well-kept lawn flanked by shrubs add to the attractiveness of this farm.

AUSTRALIAN—CARIBOO DISTRICT

Gordon Beath, Operator

Co-operative work on this farm first started in 1931. Farm organization, crop introduction and weed control were problems undertaken. The land is level and is mostly a good loam type with the south end of the farm becoming quite light in character. The farm is now organized into ten fields of ten acres each, plus two five-acre fields devoted to pasture studies. Mustard is still a problem, though less so than at first. The practice is to encourage germination and not allow seeds to ripen. It has been necessary on several occasions to cut a promising grain crop for hay. Trebi barley sown at 150 pounds per acre has also proved to be an effective smother crop. A bare fallow has now replaced the hoed crop of potatoes. Seeding down is with wheat or oats using a mixture of alfalfa 8, timothy 4 and alsike 2 pounds per acre. This makes an excellent hay mixture and remains productive throughout the six years left down. It has been ascertained that alfalfa thrives best in a grass mixture in this particular district.

Keeping grade Shorthorns of milking qualities has given place to a policy of cross-breeding for beef production by using a sire of another breed. Local demands for dressed beef fortunately relieve the necessity of shipping and meeting the stringent grades of an outside market. Ninety per cent of the gross revenue is obtained from live stock and poultry.

Permanent pasture seeded down in 1937 will be given chemical fertilizer treatment in 1939. Red and black currants, raspberries and strawberries make up the fruit section of the garden. The caragana hedge set out in 1936 has made rapid growth. Two attempts to establish a lawn have been unsuccessful, due primarily to weeds. The house was painted in 1935 and a water pressure system installed.

QUESNEL—CARIBOO DISTRICT

W. A. Johnston, Operator

Mr. Johnston first undertook the duties of an operator in 1931. Most of the 60 acre farm is on the flat, which is divided in half by a natural water course which is dry during the summer. Ten two-acre plots form the station, on soil of sandy loam underlaid with gravel. The land on the other side of the water course is lower and is farmed in a five-year rotation of potatoes, oats and mixed hay. The longer rotation is similar to the one followed at Armstrong with the exception that potatoes replace corn. Alfalfa is seeded alone after the hoed crop, though a small test seeded with oats in 1938 proved satisfactory. Fertility trials, using manure and chemical fertilizers, indicate that here, too, light soils respond to phosphates. Permanent pasture (three acres) was seeded in 1937 to alfalfa and crested wheat grass.

Two-thirds of the 1938 revenue were derived from live stock sources, chiefly fluid milk retailed in Quesnel. Certified seed potatoes and table stock turnips make up the total income. A large garden and a small fruit plantation indicate the possibilities in this line. Testing tree fruits for hardiness is now one of the projects given consideration.

A dairy building was erected in 1937 and the large house that had been the family residence for two generations was scaled down and modernized. These improvements and a newly seeded lawn flanked with perennial borders make the surroundings very attractive. Mr. Johnston next intends improving the dairy barn and hen house.

STRATHNAVER—CENTRAL B.C.

R. Yardley—Operator

This station was established in 1933. Most of the 160 acres is fairly level, varying from a clay to a good loam high in humus. Farm organization and drainage problems are being overcome. Twenty-five acres have been cleared and brought into production during the past five years. Corners have been brushed out and small fields consolidated into workable units for tractor power. Crop introduction, alsike seed production and the use of chemical fertilizers on sod have all received attention. An application of 100 pounds of sulphate of ammonia per acre increased the yield of alsike seed from 150 to 225 pounds per acre. Similar applications on sod gave an increased yield of hay amounting to 0.50 ton per acre. Three varieties of fall wheat have proved hardy—Dawson's Golden Chaff, Ridit and Jones Fife. Yields in 1937 and 1938 averaged 28 bushels per acre. Hardy tree and small fruits are on trial. Half the farm revenue is from the sale of alsike clover seed. Seed grain and Yorkshire hogs are also heavy contributors to the gross income. The house was painted in 1938. Shrubs, a caragana hedge and a lawn seeded to Kentucky Blue grass have been improvements effected since the station was established.

PRINCE GEORGE—CENTRAL B.C.

J. S. Johnson—Operator

From six three-acre plots laid down in 1923 the work has expanded to six fields of 20 acres each, three lying on each side of the highway. The land is gently rolling and may be classified as a clay loam with varying humus content. Mr. Johnson and his brother own, all told, one and one-half sections of which over 300 acres are cropped. Fertility studies with manure and chemical fertilizers are closely followed. The soil generally responds to nitrogenous treatments. Alsike seed was increased 50 pounds per acre in 1936 with the application of 100 pounds of sulphate of ammonia. Hay increases up to one ton per acre have been obtained with similar treatment. Manure is added to both grain and sod land in the six-year rotation followed, which is grain, summer fallow, grain seeded to alsike, clover for seed, fifth and sixth year in sod. Volunteer timothy is troublesome and grain may replace third-year hay. Mixed hay for feed should be seeded down in a field separate from the rotation when straight alsike is desired. Admixtures of other seeds only send up the cost of production and lower the grade.

The Johnson brothers are breeding up a beef herd, using Hereford sires. One car of finished stock is turned off each year. Hay, clover straw and home-grown oats and barley are marketed through the live stock department. Alsike seed is the largest source of revenue, a car being shipped from this farm in 1937. Leghorns contributed eight per cent of the revenue in 1938. A splendid modern home was completed in 1937; a new barn and poultry house were erected in 1933. Two large hay barns also contribute to the improvements made in recent years.

McBRIDE—CENTRAL B.C.

J. T. Oakley—Operator

This is one of the oldest stations, being started in 1922 with small plots for variety testing. The original six-year rotation is largely followed; grain, oats and peas cut for hay (or bare fallow), grain seeded and three years' hay. Alfalfa does well in a grass mixture on this farm. Timothy 4, red clover 6 and alfalfa 8 pounds is the mixture most generally used. Alsike seed production is now to the fore in this district. Timothy thrives on the clay loam which is predominant. Chemical fertilizers have proved beneficial and profitable in application to sod land; both ammonium phosphate and ammonium sulphate have increased yields of hay from one-half to three-quarters of a ton per acre at a cost of $2.50. Mr. Oakley is breeding up a beef herd from grade Shorthorns, using a registered sire. Revenue is now mostly from the sale of field crops, but more and more of the latter will be fed as the herd is increased. More attention is now given to the garden, including variety testing of bush and tree fruits. The showing of flowers is always attractive. A new machine shop and hay barn have been erected in recent years. Clearing away several outmoded buildings in the yard has improved the general appearance. Fences were renewed in 1936. A dried up watercourse cuts through the fields. One of the improvements is filling this in with debris and straw and ploughing in the sides to enable better field management. Only a few rods more remain to be filled.

VANDERHOOF—CENTRAL B.C.

D. Turcotte, Operator

The first contract with Mr. Turcotte was signed in 1921, making this one of the oldest stations in the province. Crop introduction was the first problem taken up here. Variety testing of grasses and legumes still continues. Alfalfa and sweet clover are two forage crops giving splendid results. The ten-year average yield of first year alfalfa is 1·58 tons per acre and the seven-year average for sweet clover is 1·24 tons per acre. Crested wheat grass is being tested, both in a mixture with alfalfa and seeded alone. Two rotations are followed, one a nine-year rotation, alfalfa seeded alone on summer-fallow and left down five years followed by two years grain. Back fields are operated on a four-year plan, summer-fallow, wheat, sweet clover and oats. Soil is a very retentive silt loam, low in humus. The objective has been always to return as much crop residue as possible to improve the physical properties of the soil, thereby permitting a higher concentration of nitrifying bacteria.

An average of one car per year of finished Shorthorn cattle has been sold from this farm for the past several years. Eighty per cent of the total income is from live stock and poultry products.

A lawn is seeded to Chewing's fescue. A small plot of reed canary grass is a heavy seed producer. The caragana hedge planted five years ago is thriving, flowers are attractive in season. Fruit trees set out in 1936 are not developing satisfactorily due to the stiff soil condition. Currants, however, thrive. Strawberries, too, were a heavy crop in 1938. Both Senator Dunlap and Gem Everbearing are hardy.

Projects and Presentation of Data.

This summary report has been prepared with the primary object of presenting fact-finding material in concise form. Separate tables are set up only for the major projects under review. A descriptive paragraph is given showing yields and cost of production of those projects concerning but a few of the farms. Farm organization as already pointed out has been since 1934

of foremost consideration. A more economic use of labour and machinery is thus made possible through tilling larger fields. Manurial and chemical fertilizer treatments, too, are more evenly distributed over the entire area cropped. In all, a step forward has been made in progressive farm management bringing about a more equable adjustment of effort than heretofore was possible.

Field Days and Publicity

Fifty-four field days were organized during the period covered by this report. Live stock demonstrations, field crop problems and horticultural discussions were phases stressed. Representatives of the federal and provincial Departments of Agricultural have co-operated to make these events both interesting and informative. The oat variety test plots were of particular interest in 1938. The attendance at these meetings is on the up grade. The 1937 average turnout of 58 was eclipsed by the 1938 mark of 96. The five-year average attendance was 72.

A number of operators exhibit stock and field produce at the Provincial and Toronto Royal Fairs. Mr. Young, Duncan, won three firsts with four exhibits of grain and peas at Toronto in 1935 and a second on registered fall wheat at the same show in 1938. Mr. Catt, Lumby, has shown Shorthorns consistently at the Interior Provincial Fair, Armstrong. Improvement in type in recent years has put him in the money awards.

Sales of Seed and Breeding Stock

One of the objectives of a farmer operating an illustration station is to have available for sale seed and breeding stock. Several operators are making an enviable record in this respect, establishing themselves firmly in the registered seed class of growers. The following table shows to what extent this project has expanded. An average of 90 farmers annually have obtained seed grain from operators during the five-year period.

Class	1934	1935	1936	1937	1938
Potatoes.....tons	30·00	20·00	22·50	18·25	18·18
Grain.....bush.	1,512	1,617	1,735	2,252	447
Timothy-clover.....lb.	2,100	9,200	3,600	40,440	14,259
Cattle.....	20	19	20	22	31
Hogs.....	18	13	11	14	49
Pullets and cockerels.....	117	115	189	98	134
Hatching eggs.....doz.	18	81	69	71	28

Live Stock

Cattle.—Ten operators have acquired new herd sires within the past three years. Mr. H. C. Catt, Lumby, has for his objective type improvement of his already excellent Shorthorns. With the dairy breeds, Mr. W. E. Blakeway, Pemberton, has made a notable addition to his Jerseys by securing one of the best bulls from the Dominion Experimental Station, Summerland. Operators who have herd improvement in mind never hesitate to obtain a better sire with each change. A sire must effect some improvement in order to merit esteem, whether of dairy or beef breeding. The dual role of the dairy sire necessities that he not only meet required standards in conformation but also possess the ability to transmit higher production to his daughters than was obtained from their dams.

The following table is a summary of milk and butterfat production of dairy herds, 1934-1938.

Station	Breed	Number cows milked	Average milk production	Average per cent fat	Highest cow fat	Lowest cow fat
			lb.		lb.	lb.
Armstrong	Jersey Pure-bred	15	7,040	4·89	497	234
Duncan	Holsteins—Jerseys	14	8,107	4·45	441	249
Alberni	Grades—mixed	5	8,537	4·11	514	189
Courtenay	Jersey—grades	11	6,406	4·88	480	183
Smithers	Guernsey grades	5	7,099	4·70	434	229
Salmon Arm	Ayrshires—pure-bred	10	6,974	3·96	381	194
Pemberton	Jersey—grades	7	6,052	4·30	384	237

NOTE.—Tabulated results for the last three stations are for three years only. The average lactation period was 305 days for all herds.

Swine.—Seven operators have swine herds of pure-bred Yorkshires. The main market is to local trade, either as weanlings or dressed pork. Breeding stock is kept up to standard through operators obtaining both sows and boars of Advanced Registry breeding from the Dominion Experimental Farm, Agassiz. Six operators took advantage of this service within the past four years.

Sheep.—Operators at Duncan, Lumby and Australian run flocks of Suffolks, Hampshires and Oxfords respectively. Pure-bred rams in each caes have been used to build up a flock of excellent type. The dressed lamb trade is usually brisk for the well finished carcass. Mr. Catt, Lumby, has consistently turned off lambs dressing upwards of 50 pounds the first week in June, at an average price of 16 cents per pound. These operators feed only home-grown grain and keep an eye to quality to meet the demands of the consumer. Average size flocks of 25 ewes are maintained that materially boost the total farm income.

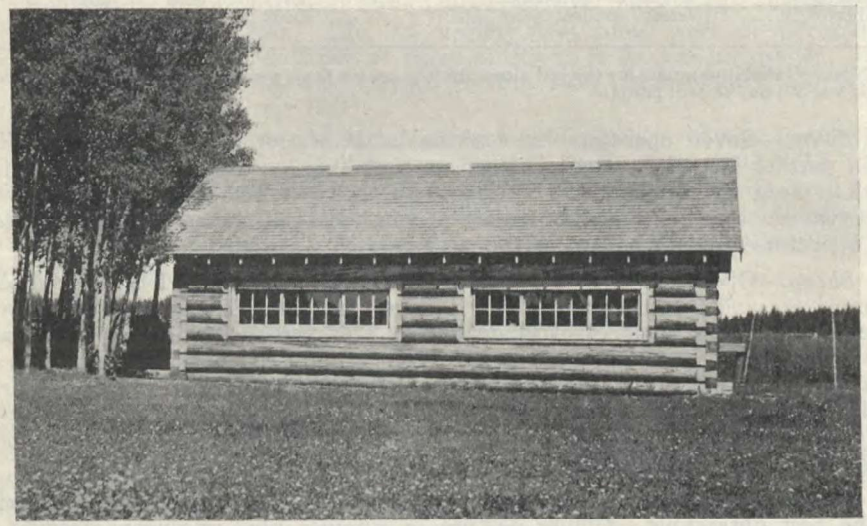
Winter Feeding.—Three operators in Central B.C. run beef herds. Grazing is the best obtainable. Clover pasture in summer plus intelligent feeding of home-grown roughage and coarse grains in winter makes for rapid and profitable gains. J. S. Johnson, Prince George, and D. Turcotte, Vanderhoof, each ship one car annually to outside markets.

Much of the frozen wheat crop of 1935 was fed in the grain ration. Up to 25 per cent of the ration may safely be wheat, with barley in equal amount and the balance oats, all ground to make a meal mixture. The percentages of barley and oats may be gradually reversed as the graining period advances. Good clover and alfalfa roughage when cut in the initial bloom stage carries more food value per acre than when cut in the half bloom stage or later. Hay cut at maturity is but little better than good oat straw.

Unfortunately sufficient grain has not always been available to feed for rapid gains. Work in feeding, however, has progressed to the point of showing quite clearly that no other avenue for marketing coarse grains offers the same profit as putting it through feeders of the proper type. The latter is of first importance. Average quality is not good enough. The slab-sided steer with cat-like quarters has been found to eat the same quantity of feed as the steer making good gains and grading choice. The difference of two cents spread in price for equal cost of feeding should be a strong incentive for all to adopt improved breeding practices. The operators have made notable progress since first shipments were made. Car lots now grade over 50 per cent choice, which is very fair for a shipment of mixed ages and sex. Finishing beef cattle will pay dividends to the wise stockman for the consumer is invariably swayed by both the eye and the palate.

Poultry

Twelve settings of eggs and 1,400 baby chicks have been procured by operators from Experimental Farm sources during the past three years. The longest shipment required three days from incubator to the first feed. All survived to maturity but one. Six poultry houses have gone up since 1934 and five others have been overhauled and remodelled. Average egg production for all flocks fell from 47·5 per cent for 1937 to 43·0 per cent in 1938. This lapse from the general upward trend since 1934 was brought about by seasonal conditions that adversely affected not only egg production but yields of field crops as well. A cold spring followed by an extremely hot, dry summer had its effect.



A modern poultry house constructed with a minimum of cash outlay. Salmon Valley, B.C.

Turkey raising warrants more consideration than it is receiving. Heavy imports to meet Christmas demands could largely be supplied locally. Mr. Young, Duncan, never misses raising from 80 to 100 every year. The average return per bird was $4 in 1938. They range in alfalfa and stubble after harvest and are finished on home-grown grains. It is a profitable sideline that others could readily adopt to advantage.

The Farm Garden

Planning the vegetable garden on a scale larger than usual is encouraged. Rows are made longer and are spaced wider apart to permit of horse cultivation. Hoeing is thus considerably reduced and personal attention is spread over other sections within the garden area. The spring of 1935 was notably cold, resulting in poor germination and necessitating considerable reseeding. Most operators now follow succession planting. Three operators on clay loam followed a two-year rotation of the vegetable growing area, summer-fallow and garden. Manurial treatment and weed control takes place in the fallow year. This plan allows for the best management of heavy soils for garden purposes. All vegetable gardens produced abundantly in 1937. Cucumber, marrow and corn matured even in districts where frost sometimes occurs during the growing season. The past season (1938) was very dry and in some cases germination was delayed until June. Gardens planted on fallow land were the best.

Flowers.—A wide range of colourful annuals have proved satisfactory even under trying seasonal conditions. Varieties grown successfully are portulaca, godetia, cosmos, calendula, zinnia and nasturtium. Herbaceous perennials include iris, peony, delphinium and veronica. Shasta daisy, phlox in variety and golden glow are useful to give background and colour. Flowers on the stations at McBride, Pemberton and Courtenay are given every care to improve the landscape and home surroundings. Tulips, daffodils and dahlia have developed readily into healthy blooms where tried.

Lawns and Ornamentals.—Seven lawns were seeded during the past four years. Careful preparation is essential. A level, firm seed bed, free from the possibility of weed growth, ensures a good catch. Kentucky blue grass and Chewings' fescue have both been used for lawns. The former is quite hardy at Quesnel and has the advantage of being a sod grass, whereas Chewings' fescue is of the bunch grass type. It has been found best not to seed down too large an area. A small lawn well kept with borders neatly trimmed is more attractive than a field for a lawn that is only cut for hay. Hedges and shrubs have been employed on four stations to flank lawns newly seeded. One of the objects of gardening is to offer relaxation in varied form without any one phase becoming burdensome. Both caragana and lilac are hardy for planting as a hedge or as shrubs. The former makes the more rapid growth and is most commonly used for hedge purposes.

Billiardi spiraea, Virginia creeper, Tartarian honeysuckle and native elm have been tried on several stations in Central British Columbia, with success. Three operators have made transplantings from neighbouring woods to further improve their home surroundings. The highbush cranberry is colourful and doubles in size after moving. Native evergreens, too, have been successfully transplanted for windbreaks and group effects. These various improvements add to the joy of living for both those concerned and the community served by the farm.

Small Fruits.—Small fruits have proved of valuable service in giving both substance and variety to the table. Raspberries, currants, strawberries and gooseberries are all being grown successfully on most stations. Difficulty is experienced only on heavy soil low in humus. Raspberries, gooseberries and tree fruits have not become established under such soil conditions. Currants and strawberries, however, thrive not only on heavy soils but also on soils of lighter type and offering better drainage. Most of the work with fruit is done on stations situated outside the recognized fruit belts. Varieties that are hardy and productive in Central B. C. include:

Raspberries—Viking, Herbert.
Currants—Red Cross, White Grape and Crandall.
Gooseberries—Oregon, Josselyn, Mataga.
Strawberries—Senator Dunlap (June bearing) and Gem (Everbearing).

Initial trials with blueberries at Pemberton are proving successful.

Tree Fruits.—Plantings first made in 1935 have been extended and replacements made where necessary. Not all losses are from winter injury in Central British Columbia, but rather occur in the early spring when the first warm days cause sun scald. Pruning is done in such a way as to induce low scaffold branches. A short trunk with branches shadowing the trunk goes a long way to retard the early movement of sap. Observations are also being made with clean cultivations and cover crops to determine the effect that each has on tree injury.

Trees set out in 1935 at Pemberton made the most rapid growth of any. Duchess and Hibernal bore fruit in 1938. Over 150 trees of hardy apples and

plums have been set out at different points. Cherries and pears from Morden Experimental Station are on trial. Varieties of tree fruits under test are:

Apples—Duchess, Hibernal, Florence crab, Wealthy, Breakey and Manlet.
Plums—Pembina, Assiniboine and Red Wing.
Pears—Tait Dropmore.
Sandcherry—Sioux.

The area that is to be set out with nursery stock is prepared the previous season. A good loam with plenty of sand and humus, with either an eastern or western exposure, provides a good start in growing tree fruits successfully. Hardy stock from prairie sources and care in transplanting will further ensure a start towards production of home grown tree fruits in Central British Columbia.

Precipitation

Rain and snowfall are recorded by each operator or the data is supplied for this report by the Dominion Meteorological Service for the district concerned. Snowfall is expressed in terms of rain, ten inches of snow being equivalent to one inch of rain. The table that follows indicates the wide variation between districts and the relatively dry summers. It will also serve as a useful reference when reviewing the yields of field crops given later. The summer of 1938 was the driest on record at several points, but yields nevertheless were very fair, due to a good supply of soil moisture stored from the fall rains of 1937 and a moderate fall of snow during the winter months.

TABLE SHOWING AVERAGE PRECIPITATION BY CROP AND CALENDAR YEARS FOR FIVE YEARS, 1934-1938

Station	Fall 5-year average Aug. 1, to Nov. 30	Winter 5-year average Dec. 1, to Mar. 31	Average 5 years 1934-1938				Average five crop years Aug. 1, 1933 to July, 31, 1938	Average five calendar years 1934 to 1938
			April	May	June	July		
	in.	in.	in.	in.	in.	in.	in.	in.
Vancouver Island—								
Alberni	14·27	28·25	3·42	2·41	1·95	1·21	55·51	51·55
Courtenay	15·47	26·21	1·16	1·87	1·51	1·78	48·00	49·45
Duncan	11·20	25·08	2·03	1·59	1·40	0·89	42·19	41·14
Southern Interior—								
Pemberton	12·72	16·65	0·98	1·54	0·84	1·07	33·80	31·98
Armstrong	5·48	6·21	0·76	0·91	1·15	1·37	15·88	15·95
Lumby	4·93	5·84	0·84	0·77	1·00	1·08	14·46	12·90
Revelstoke	10·65	19·57	1·94	1·36	2·36	2·09	37·97	38·45
Salmon Arm	6·59	10·26	1·09	1·07	1·61	1·67	22·29	22·00
Central Interior—								
Australian	5·25	4·69	0·46	1·24	1·73	1·77	15·14	14·88
Quesnel	7·39	5·54	0·65	1·44	2·16	1·87	19·05	18·59
Strathnaver	6·88	4·76	0·76	1·62	2·15	1·65	17·82	19·04
Prince George	8·28	5·34	0·89	1·43	1·94	2·01	19·89	19·31
McBride	9·33	8·45	1·22	0·92	1·26	2·32	23·50	22·81
Vanderhoof	6·15	4·63	0·51	0·98	2·08	1·84	16·19	16·17
*Smithers	5·93	4·42	0·71	0·69	2·07	1·55	15·37	15·79

* 4 year average only, 1934-1937.

Weed Control

Weeds are robbers. They collect excessive tolls from growing crops, causing lower yields and higher costs of production. Control is being exercised

through: (1) cultural methods, hoed crops, after-harvest and before-seeding cultivation; (2) by roguing; and (3) by use of chemicals in several forms.

The policy found most effective with annuals is to induce germination and then prevent reseeding. One of the most troublesome is charlock, a member of the mustard family. This weed is giving trouble at Courtenay, Australian and Quesnel. Clean cultivation with frequent stirring up of the soil retards germination and control is thwarted. Such treatment, however, is desirable for eradicating couch grass, a perennial that smothers both hay and grain. Couch has been entirely eradicated in one season's efforts at Courtenay. One field was given extra cultivation each year after grain cut in July for ensilage. Shallow ploughing and spring-tooth harrowing alternated weekly for ten weeks resulted in a perfect kill. Half-hearted measures have not proved successful.

Solutions of sulphuric acid three and five per cent by volume have been used on mustard in grain crops. Copper sulphate three and five per cent solutions have given equal satisfaction. The stronger concentration is recommended in view of the small extra cost entailed and the better results obtained therefrom. Applications were made when the grain was up five to six inches and all foliage was thoroughly wetted, necessitating 150 gallons per acre of both the sulphuric acid and copper sulphate. Dry warm weather is essential before and after application. Cost of materials approximated $5.00 per acre, giving upwards of 90 per cent control and increasing the yield of oats 40 per cent.

Powdered aero-cyanamid carrying in excess of 20 per cent available nitrogen was broadcast on grain for mustard control in 1937 with encouraging results. Upwards of 90 per cent control was obtained using 125 pounds per acre, at a cost of $3.00 for material. The fertilizing value of aero-cyanamid must also be a factor in its favour, plus its ease of handling. Results in 1938 with this material were not so good due to seasonal variations. Foliage must be thoroughly wet to permit the dust to adhere and do its work. This favourable and necessary condition did not in the latter year coincide with the stage of growth when applications would be most effective for mustard control. Grain should not be over the six-inch stage. Recovery of the grain is quicker at this stage of growth and the young mustard plants are not too firmly established. Aero-cyanamid is put up in two forms, powdered and granular. It is the powdered form that is used because of its adhering qualities.

Manurial and Chemical Fertilizer Treatments

The cropping program is not complete without the systematic and adequate return to the soil of plant food removed by the crops grown. To manure must be accorded the principal part of maintaining soil fertility, supplemented with chemical fertilizers. These two are applied in the hoed crop year. Green manuring plays a minor role in illustration station work to date. Second growth clover is, however, ploughed down when not required for forage. The rate of applying manure is 16 tons per acre in a systematic way throughout the cycle of the rotation. This amount may be all or in part applied in one year. Applications of 8 and 16 tons per acre have been made for several years on potatoes with and without chemical fertilizer. The latter when used has been a 3-10-8 mixture applied at the rate of 1,000 pounds per acre.

Trials at Salmon Arm with corn on clay loam indicate a preference in yield from using manure at 8 instead of 16 tons per acre. The average increased yield amounted to 4.50 tons per acre. An open seed bed resulted from the heavier rate, a soil condition that was not remedied by cultural methods nor was

it helped by additional rainfall. It is not suggested that half the manure was a loss or that it would not be utilized by succeeding crops, but it rather shows that manure can be more efficiently used and increased yields obtained.

AVERAGE YIELD POTATOES—MANURIAL AND CHEMICAL FERTILIZER
1935–1938

Station	8 tons manure 1,000 lb. 3–10–8 per acre	8 tons manure no chemical fertilizer	16 tons manure 1,000 lb. 3–10–8 per acre	16 tons manure no chemical fertilizer
	tons	tons	tons	tons
Alberni	9·54*	.....	7·45	6·03
Revelstoke	12·25	12·00	12·70*	12·10
Duncan	7·00	5·00	7·55*	4·83*
Courtenay	11·76	9·60*	12·47	8·53
Pemberton	14·91	9·32*	17·00	12·64
Treatment cost per acre	$15 50	$4 80	$20 35	$9 60

* Two year average only.

Dry summers generally prevail at the first two points and the very narrow range of variation in yield between treatments is especially marked at Revelstoke. Only at Pemberton do yields from manure alone at 16 tons exceed manure alone at 8 tons with the exception of Revelstoke, where the difference is not significant. With chemical fertilizer supplementing manure at both rates of application results in the majority of cases favour 16 tons of manure and 1,000 pounds of 3-10-8. Only at Pemberton, though, is the increased yield sufficiently great, 2.09 tons, to make it profitable. Sub-irrigation on this farm allows for the generous response made to extra supplies of available plant food.

One year's trial (1938) growing potatoes at Pemberton on duplicate plots after grain and clover gave yields of 12.35 and 16.20 tons per acre, respectively. The difference in yield, amounting to 3.89 tons per acre, shows the beneficial effect clover has on crop production through the action of nitrifying bacteria.

Cost of treatment per acre.—Manure is given a value of $1.50 per ton spread, of which 40 per cent is charged against the first crop. Chemical fertilizers are valued at local prices, of which 55 per cent is charged against the first crop. These charges prevail in all tables in the report.

Time of Applying Chemical Fertilizer.—A project was started in 1931 and concluded in 1934, the object of which was to observe the most opportune time of applying chemical fertilizers to the potato crop. Trials were run on the Vancouver Island stations at Alberni, Duncan and Courtenay. Manure was applied at the rate of 16 tons per acre and at times most convenient to haul. A mixture of 3-10-8 at the rate of 1,000 pounds per acre was applied broadcast at one and two months before planting and at time of planting. Trials also included fertilizer in drills at planting time. Plots were replicated four times.

The average yield for four years from the three points shows but little preference in the time of applying the fertilizer or method employed. The main point was to get it on. Two months before planting gave 10·39 tons of potatoes per acre, one month before 10·50 tons, broadcast at time of planting 10·40 tons, and applied in the drill 10·41 tons per acre. Check plot, manure at 16 tons and no chemical fertilizer, yielded 7·33 tons per acre. Studying the results for Alberni alone gives a different slant. A decided increase in average yield, 3·34 tons, was obtained on this farm from applying chemical fertilizer one to two months before planting. The cost of manure and fertilizer was $20.14 per acre.

Where repeatedly dry summers occur it has been found that greater yields of potatoes were obtained when chemical fertilizers were applied broadcast

from four to eight weeks before planting. Applying broadcast at time of planting, or in the drill, has not in these trials materially affected the yields.

Potassic Fertilizers.—Trials were commenced in 1937 using sulphate and muriate forms of potash, making up the 3-10-8 mixture used for potatoes. Two years' average results from five stations show no significant preference for either form. Muriate returned 14·31 tons and sulphate 14·71 tons per acre. The latter costs 50 cents more per acre to use. Taking Pemberton by itself, the difference in yield amounts to 0·90 ton per acre in favour of sulphate of potash, and at Courtenay 0·74 ton per acre. At no station has muriate given higher average yields than the sulphate form. Plots were replicated two and four times, depending on the area available for the hoed crop. A decidedly richer coloured foliage was observed in the potato plots receiving sulphate of potash at the two points mentioned.

Potatoes

Main crop varieties are chiefly grown, with Netted Gem the favourite. Columbia Russet has consistently out-yielded the Gem under dry conditions, but it is a variety that is not sold so readily in the larger markets such as Vancouver. Potatoes are an important cash crop on six stations and are generally grown after clover sod, fall or winter ploughed as climatic conditions will allow. Some operators plough the second time to obtain a deep seed bed for maximum yield. Manure is applied previous to the second ploughing. Chemical fertilizers are applied either by hand or through the planter attachment for this purpose. Even when possible to do so, as on Vancouver Island, planting is very seldom before May 15 for the main crop.

Planting on the flat permits harrowing to control annual weeds until the potatoes are up several inches. Cultivation costs have been lowered by following this method on several stations.

POTATOES—COST AND YIELD PER ACRE

Station	Average 1934–1938		Average itemized cost per acre 1934–1938						Summary and years grown		
	Yield per acre	Cost per ton	Prepare and plant	Seed	Cultivate	Harvest	Manure fertilizer	Taxes, rent, machinery	Years	Yield per acre	Cost per ton
	tons	$	$	$	$	$	$	$		tons	$
Alberni	7·16	10 08	9 17	14 40	3 71	16 68	15 73	12 48	13	8·43	12 69
Courtenay	11·96	7 70	11 92	14 00	8 57	28 42	16 74	12 48	15	11·99	10 27
Duncan	7·72	11 12	10 69	16 80	8 12	20 05	17 71	12 48	10	7·79	14 72
Pemberton	14·97	6 12	17 75	15 00	7 07	31 49	15 01	5 32	6	13·97	6 96
Quesnel	5·99	10 07	11 08	11 33	7 50	19 10	6 00	5 35	6	6·11	10 16
Revelstoke	12·94	5 63	11 01	11 80	3 36	25 21	14 94	6 60	7	13·15	5 70

Yields in 1938 were generally 25 per cent lower than in 1937 and at Alberni the yield was cut in half for an all-time low of 3·50 tons per acre. The five-year average, however, with one or two exceptions, is about on a par with the returns given in the summary column of the table.

Turnips

This crop is grown mainly for table stock with culls fed to live stock for succulent feed. Bangholm and U. B. C. are the two varieties most commonly grown. Other varieties tested have been Laurentian, Corning, Acadia, Ditmar's,

Wilhelmsburger, Cannels Purple King and Hall's Westbury. These were grown in test plots and yields were not ascertained. Eating qualities after one year's test favour Acadia, U. B. C., Bangholm, Cannels Purple King and Hall's Westbury.

Main crop on three stations has been U. B. C. and Bangholm. Forty-five fields covered by this report gave an average yield of 21·15 tons at a cost of $3.90 per ton. Sowing late in June prevents ravages from flea hoppers. Manure is applied at 12 tons per acre. Superphosphate 16 per cent was applied at a rate of 400 pounds at Revelstoke, 1938, in addition to the manure, giving a remarkable response in both yield and quality of turnip; manure alone, yielding 9·75 tons, manure plus fertilizer 13·88 tons. The increased yield of 4·13 tons was obtained for an extra cost of $4.40 per acre.

Borax is now used on three station farms as a precaution against brown-heart. It was first used at Pemberton in 1934. Applications are made at 10 to 15 pounds per acre applied either broadcast or in the drill, or as a side dressing. The smaller amount is used in the latter two methods. A toxic soil condition is easily created by excessive applications. Very adverse effects were had on yield and quality from a small test plot using 40 pounds of borax per acre.

Corn

Golden Glow and Northwestern Dent are chiefly grown on station farms. A late maturing corn is required to take full advantage of fall rains. Operators with dairy herds find that corn is indispensable to maintain flow of milk when the pastures get short. The entire crop is soiled at the Courtenay station. The five-year average, with cost per ton in brackets, is as follows: Armstrong 11·40 tons ($3.91); Courtenay 13·40 tons ($3.71); and Salmon Arm 14·00 tons ($3.89). Manure at from 12 to 16 tons per acre is the chief source of added plant food. Superphosphate 16 per cent gave an increased yield of 3·00 tons per acre at Courtenay in 1938. The rate of application was 500 pounds and manure 12 tons per acre. An investment of $5.50 per acre in superphosphate reduced the cost of production from $4.10 to $3.40 per ton. The lighter soils have in all cases responded to phosphates.

Alsike Clover Seed

This has become the main cash crop on many farms in the Prince George area. Alsike dominates roadsides, pastures and gardens. It has in the latter respect become a difficult "weed" to control. Red clover also produces well, 366 pounds per acre in 1938 at Prince George.

Rotations best adapted for growing pure alsike are under review on the station farms in Central British Columbia. The work now largely revolves around a six-year cropping plan; grain, fallow, grain seeded to clover, two years' seed, and hay or grain. Timothy is one of the worst weeds met with by the alsike seed grower. Clipping the heads with the binder table raised was tried on the Strathnaver farm. Timothy was considerably reduced in the clover seed and the stand did not apparently sustain any permanent injury from tramping. The biggest problem was to keep the short timothy stalks from loading up on the cutting bar.

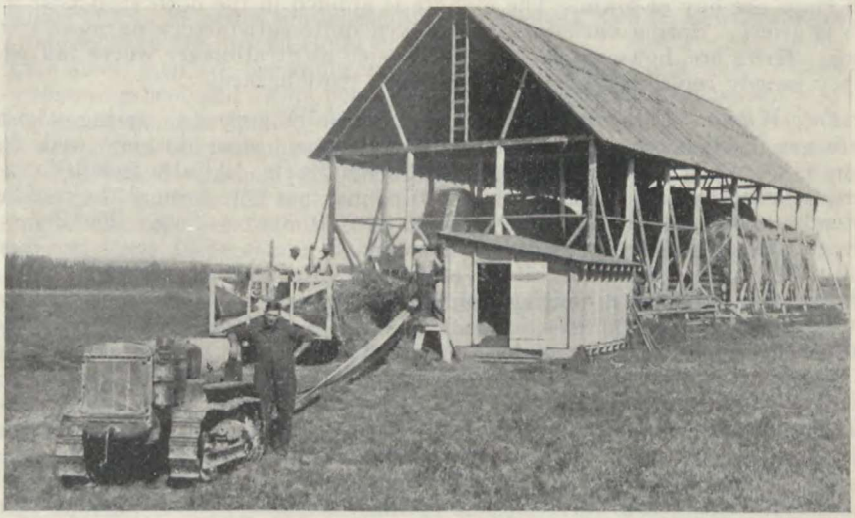
Sowing 6, 8 and 10 pounds of alsike per acre produces about the same density of growth due to the volunteer seeding from previous crops. Heavy growth of forage and abundance of bloom do not necessarily assure a high yield of seed. Pollination is now known to be effected only by insect life, chiefly bees. A dense and lodged growth, therefore, lessens the chance of blooms being visited.

Clovers have responded to nitrogenous fertilizer where applied. Selected portions of the station farm at Strathnaver low in organic matter treated with sulphate of ammonia at 100 pounds per acre gave an increase of 75 pounds of seed per acre over check plot. The fertilizer cost $2 and the

increased value of the crop was $15 per acre (1937). An even more remarkable response was obtained at Prince George on three acres of red clover. Sulphate of ammonia broadcast in 1937 gave a seed yield in 1938 of 366 pounds, yield of check plot 150 pounds per acre.

Alsike clover, an important crop in the Prince George and adjoining districts.

Conclusions.—It is necessary with clover seed as with other cash crops to sow pure seed on land carefully prepared and reasonably free from weeds and in particular timothy. Severe dockage can be eliminated at the commencement if good field management is exercised. A mixed hay plot should be seeded down separately for forage purposes and care taken to harvest same before the bloom period. These precautions will at least greatly reduce contamination of the clover seed area by adventitious plants.



Threshing alsike clover on the illustration station farm operated by J. S. Johnson, Salmon Valley, B.C.

Permanent Pastures

A definite area is set aside on several stations for this important work. Two pastures were laid down in 1937, at Australian and Quesnel, one in 1938 at Alberni. There are in addition chemical fertilizer trials on selected pasture areas that have been in sod for some few years. The dry matter produced under the several treatments will be determined, starting 1939. The main treatment is sulphate of ammonia applied annually at 100 pounds, muriate of potash every three years at 100 pounds and superphosphate every three years at 600 pounds per acre.

Rough pasture at Duncan was treated with ammonium phosphate in 1937 at a rate of 200 pounds per acre. Clover was stimulated and the bracken was greatly reduced. The boundaries of the one-acre plot thus treated were clearly defined through grazing and density of turf in favour of the fertilized plot.

Cereal Variety Tests

Spring Wheat.—Hard wheat of excellent milling quality is raised in most years on the ten station farms concerned with this crop. It is largely used for seed and feed purposes. Recurring frosts in the month of August make spring wheat growing hazardous in Central British Columbia. Frosts in 1934, 1935 and 1938 reduced the yield and lowered the quality considerably. There is within Central British Columbia a great variation between districts in the time required to mature wheat. The average number of days for Reward at Vanderhoof is 105, whereas Garnet at Strathnaver requires 124 days. Garnet at Australian, 60 miles south, only requires 105 days.

These two varieties are the principal ones grown. Yields for five years vary from 19·3 bushels at Strathnaver to 52·0 bushels at Salmon Arm, with respective costs per bushel of 82 and 53 cents. The highest yield recorded was at Salmon Arm in 1935 when a crop of Marquis yielded 65 bushels per acre, maturing in 126 days.

Wheat follows the hoed crop or fallow in the rotation. Rate of seeding varies from 75 to 100 pounds per acre. Manure only is used on the great majority of station farms to maintain fertility. It is found preferable to apply the manure to the second and last crops previous to the fallow whether or not such crops are hay or grain. The manure is applied in the hoed crop year when such is grown. Spring varieties have proved quite satisfactory on most station farms. There are, however, several points such as Strathnaver where fall wheat is very largely replacing spring wheat due to frost hazards.

Fall Wheat.—Fall wheat is not so universally grown as spring varieties. There are districts, though, where varieties of the former do very well. Armstrong is a case in point. The soil is a stiff clay loam. Alfalfa is left down six years followed by fall wheat sown at 100 pounds per acre around the middle of September. Breaking is done by tractor 8 to 10 inches deep. The five-year average for Armstrong is 32 bushels per acre at a cost of 61 cents per bushel. Crail Fife, Jones Fife, Albit, Ridit and Yogo have all been tried. Albit and Ridit are the two most promising smut-resistant varieties at the present time.

Dawson's Golden Chaff is grown on the Duncan station. The average yield is 30 bushels at a cost of 99 cents per bushel. Fall wheat at Strathnaver has outyielded spring varieties by 9 bushels per acre for two years and matured one week to ten days earlier. All varieties mentioned thus far have been tested in Central British Columbia with the exception of Yogo. All were winter hardy. It is advisable in the latter area to sow by the middle of August to ensure a stand of several inches before freeze-up. Trials are being conducted at Australian sowing fall wheat with barley in the spring. Results to date warrant further tests being made. The first trial crop was double disked by mistake but yielded

18 bushels per acre. The second trial was seeded in 1938. The practice at least offers reduced costs for preparation and planting. It may be said that fall wheat supplements spring varieties in those areas threatened by summer drought or August frosts. Yields are comparable to those obtained from spring wheats and the feeding value is practically the same.

Variety Trials with Fall Wheat for Smut Resistance.—The work is being conducted at Armstrong on the station farm operated by Dr. W. B. McKechnie and is a co-operative effort with the provincial Department of Agriculture, represented by W. R. Foster and H. H. Evans. The North Okanagan had for years pinned its faith on Crail and Jones Fife but a succession of bad smut years made it imperative that a thorough canvass of the situation be made. A test plot of standard varieties and new introductions was first sown in 1932.

A severe freeze-up in mid-December 1932 wrought havoc with the plot, only seven out of sixteen varieties surviving. This condition, however, afforded an excellent study in winter hardiness. The varieties surviving were Hussar, Oro, Martin, Albit, Kharkov, Yeoman and Minhardi. Of these seven, the first four were very smut resistant, but the last three were infected to varying degrees.

The number of varieties was reduced to nine in 1934 and in 1935 only the most promising varieties were sown. Seeding was in rod rows, replicated four times. All seed was inoculated with smut in the laboratory before sowing.

RESULTS

Hussar	H.R.	Bearded	Smut free	Yield high
Oro	H.R.	Short Beard	Smut free	Yield good
Ridit	H.R.	Smooth head	Smut free	Yield high
Ridit x Jenkins	H.R.	Smooth head	Almost free	Yield good
Jones Fife	S.R.	Smooth head	Smut heavy	Yield poor
White Odessa	S.W.	Smooth head	Smut free	Yield high
Martin	S.W.	Mixed type	Almost free	Yield good

H.R.—Hard Red; S.R.—Soft Red; S.W.—Soft White.

Albit and Ridit have been multiplied and distributed to those desiring seed. The preference with growers is for a smooth head, hard red variety such as Ridit which by test has proved to be very resistant to smut.

Barley.—This crop is being raised on more stations every year. Trebi has outyielded O.A.C. 21 under similar conditions. Smooth awned varieties as Velvet and Glabron have not proved equal to Trebi.

Live stock men are becoming more barley conscious every day. Operators with expanding beef and swine herds realize the large part that barley plays in putting on economical gains. Average yields and cost per bushel for several points are submitted, cost per bushel in brackets: Australian 42 bushels (36 cents); Duncan 54 bushels (90 cents); Salmon Arm 42 bushels (63 cents); Strathnaver 30 bushels (52 cents). Two dollars per acre is allowed for straw in arriving at the cost per bushel. The first two station farms represent the two extremes in fixed charges and labour costs, both of which are reflected in the cost of production figure.

Barley is usually sown around the middle of May. It is shallow rooted and thrives best at warm soil temperatures. Rate of seeding at most farms is two bushels per acre. At Australian up to four bushels has effectively smothered mustard and threshed 50 bushels per acre (1937).

Trebi has given the highest yield of any variety tested to date. Further tests, however, will be made of new introductions to see whether or not a smooth awned variety will not give comparable yields to Trebi.

Peas.—A considerable acreage was grown under contract at Salmon Arm in 1936 and extended in 1937 and 1938. The variety most in demand is the Large Yellow. Peas like the heavy soils though excellent yields are obtained from sandy

loams provided moisture conditions are right. Sowing is after either alfalfa or grain at 200 pounds per acre. Manure is applied at 12 tons per acre.

The three-year average yield for Salmon Arm is 34 bushels at a cost of 97 cents per bushel. Taking 1937 alone, the yield was 48 bushels and the cost per bushel 82 cents. Heaviest yields have been obtained from sowing early. This is especially true at Duncan where registered Chancellor is the variety grown. A three-year average of 39 bushels at this point, costing 85 cents per bushel, shows that with good management of light soils excellent yields can be maintained. Seeding was on March 3 at Duncan in 1938, harvesting on July 22. Chancellor is a small pea and the rate of sowing is 100 pounds. Oats at 20 pounds per acre are sown with the peas at Duncan to carry the crop.

Oats.—Oats are a dependable crop in the many cropping programs followed on station farms. Like barley, oats are grown to provide concentrates for live stock consumption. Victory is the most commonly grown variety. Alaska, Legacy and Gopher mature a week to ten days earlier than Victory, a consideration of major importance in Central British Columbia. Sowing is after hoed crop, sod or stubble, depending on the rotation followed. Rate of seeding is from 75 to 100 pounds per acre, depending on location and whether or not a grass and clover mixture is seeded at the same time.

The oat table gives both the short time and summary averages of yield and cost of growing oats on the several farms. Variation in cost to prepare and plant is due to working two-or four-horse outfits, also at Pemberton and Alberni sowing is after potatoes without ploughing costs added. Better clover stands are obtained when fields in potatoes the previous year are not ploughed. Cost per bushel is inversely proportional to the yield with other factors, such as fixed charges, equal. The column headed taxes, rent and machinery shows the extreme variation in fixed charges from one district to another. With market prices prevailing for the 1938 crop an outside cost of 40 cents per bushel is the limit of economical production in the Southern Interior and 50 cents for Vancouver Island points.

OATS—1934-1938

Station	Average cost and yield per acre and average cost per bushel							Summary		
	Yield per acre	Cost per bushel	Prepare and plant	Seed	Harvest	Manure, chemical fertilizer	Taxes, rent, machinery	Years	Average yield per acre	Average cost per bushel
	bush.	$	$	$	$	$	$		bush.	$
Alberni	57·0	0 46	3 53	1 55	5 58	5 59	12 85	10	60·0	0 60
Courtenay	70·0	0 45	4 15	1 50	5 50	10 65	12 85	8	62·0	0 64
Pemberton	51·0	0 38	3 07	1 75	7 63	4 80	4 97	3	52·3	0 33
Armstrong	33·5	0 54	5 88	1 85	3 32	0 90	8 12	5	36·2	0 47
Australian	57·0	0 27	3 87	1 87	5 81	0 80	4 98	4	57·0	0 27
Lumby	38·5	0 43	6 05	1 55	5 74	.....	5 28	5	40·0	0 38
McBride	63·2	0 23	4 27	1 64	6 04	.....	4 88	15	61·2	0 29
*Prince George	70·0	0 29	3 68	1 50	7 32	6 30	5 10	13	66·0	0 29
†Prince George	30·0	0 43	4 48	1 83	3 26	0 52	4 83	9	35·2	0 40
Quesnel	52·0	0 35	5 15	1 20	5 99	3 00	4 80	2	52·0	0 35
Revelstoke	33·3	0 69	4 06	1 67	6 24	7 62	6 43	5	41·6	0 67
Salmon Arm	72·0	0 30	6 73	1 75	5 99	0 90	8 49	10	72·0	0 34
Smithers	54·7	0 27	3 57	1 67	6 13	0 50	5 20	6	50·0	0 27
Strathnaver	33·6	0 36	3 48	1 67	4 21	.....	4 73	4	35·0	0 35

* John Blackburn—owner. † J. S. Johnson—owner—Salmon Valley.

Oat variety Trials, 1938.—Twelve new introductions and standard varieties were grown in four replicate plots under varying soil and climatic conditions. The object of the test was to observe strength of straw, rust resistance and, for Central British Columbia, earliness. Yields obtained were such as not to cause lodging nor was 1938 a rust year. The unusually dry season tended to mature all varieties within a narrow range of time. Harvesting of all varieties was done on the same date at four points. The greatest variation in maturity was in Central British Columbia. Legacy 83, Gopher and Vanguard 7 had an edge of 16 days over Acton, Eagle and Victory.

Results show no significant difference in yield between varieties. Eagle did, however head the list in average yield (42·5 bushels) when Strathnaver, Prince George and Vanderhoof are grouped, also when all nine farms with plots are grouped (69·6 bushels). Victory came second at Prince George and Vanderhoof, but slumped to ninth place at Salmon Arm. Legacy 83 and Gopher matured 14 days ahead of Victory on the Central British Columbia stations.

The weight per bushel was very good for all twelve varieties, ranging at Prince George from 39 pounds for Vanguard 7 to 45 for Victory. At Revelstoke, Duncan and Vanderhoof where maturity was forced more rapidly weight per bushel was considerably decreased, ranging from 34 to 41 pounds.

Central British Columbia test plots gave a uniformly lower percentage of hull than was obtained at other points. Gopher and Legacy 83 rank among the best in this respect, with 25·5 and 25·0 per cent respectively. Victory was high with 32·3 and Superb next at 32·0 per cent hull.

These tests will be continued in 1939 with probably a change in respect to several of the crosses. Some will be dropped and others added for trial. The season of 1938 was not an average one for this province and the results obtained from the oat variety trials cannot be taken, by any means, as conclusive. Extreme heat and drought in some sections hastened maturity with adverse effects on both yield and quality.

Forage Crops

Clover and Mixed Hay.—The clover mixture is seeded in the rotation with a nurse crop of oats after the hoed crop, or whatever cleaning crop is employed. A firm seed bed is essential. Rollers are used more each year to crush and smooth difficult seed beds. A mixture up to 20 pounds per acre is seeded, red clover 8, alsike 4, timothy 4, meadow fescue 2 and perennial rye 2 pounds per acre respectively. White Dutch clover was included for several years but it made little or no headway with the strong competition. It is now used only in lawn and pasture mixtures.

Lime trials are under way at Courtenay. Clovers have not been making the progress expected of them on this station. Soil analysis indicates that lime may be helpful in this regard. Applications of ground limestone were made in the fall of 1935 at rates varying from one to five tons per acre. The pH value has been raised from 5·4 to 6·2 (7 is neutral) and the available lime per acre (surface six inches) has been increased from 200 to 1,100 pounds—900 to 1,200 pounds is normal. The field receiving these lime treatments was seeded down in 1936 with no apparent benefit from the lime so recently applied. Further observations will be made when this plot is again seeded down in the cropping cycle.

Mammoth, Altaswede, Early Red and Oxdrift Red clovers have been tested, in rod rows, on the stations in Central British Columbia. All are quite hardy. Mammoth red yields the most forage per acre and though coarse is proving very satisfactory in the hay mixture at Australian.

Timothy is still the most abundantly grown grass in this province. Meadow fescue, orchard grass and perennial rye have all been tested in mixtures. The most prevalent practice is to let the hay crop practically mature seed before commencing to cut. Palatability and food value rapidly diminish once the

bloom stage is over. Henry and Morrison in "Feeds and Feeding" give the following percentages of crude protein at different stages of maturity; timothy, before bloom 9·8; early bloom 6·3; late bloom 5·5; red clover, before bloom 18·7; in bloom 13·1; and after bloom 11·6.

These analyses strikingly show the loss in food value sustained by delay in harvesting the hay crop. A reduction in yield of only 10 per cent is given by some authorities between cutting "before bloom" and "late bloom" in the case of timothy. The total crude protein produced per acre is still largely in favour of early harvesting.

The following table gives the average yield and cost of production both for the five-year and summary period since the work was commenced on each station.

CLOVER AND MIXED HAY—YIELD AND COST OF PRODUCTION BY STATIONS

Station	Average cost and yield per acre—1934-38						Summary		
	Yield per acre	Cost per ton	Seed	Harvest	Manure, chemical fertilizer	Taxes, rent, machinery	Years	Average yield per acre	Average cost per ton
	tons	$	$	$	$	$		tons	$
Clover Hay—									
Alberni	2·70	8 53	1 89	4 59	4 09	12 48	11	2·67	10 00
Australian	1·65	5 78	0 91	2 68	0 90	5 05	4	2·15	5 78
Courtenay	2·67	8 69	2 11	2 64	5 98	12 48	14	2·53	11 45
Duncan	2·50	9 67	3 40	4 80	3 13	12 85	6	2·21	11 91
McBride	1·25	8 09	1 42	3 59	.....	5 10	10	1·49	8 77
Pemberton	2·75	4 89	1 88	4 28	1 75	5 55	3	2·80	5 20
*Prince George	1·43	8 67	1 25	3 35	2 70	5 10	13	1·81	8 75
†Prince George	1·19	8 45	1 34	1 70	1 92	5 10	12	1·58	7 62
Revelstoke	3·73	5 68	2 27	7 85	4 46	6 60	6	3·50	5 94
Strathnaver	0·92	8 75	2 00	0 95	.....	5 10	2	1·09	8 02
Mixed Hay—									
Alberni	2·06	9 93	1 74	3 90	2 35	12 48	10	2·62	9 75
Courtenay	1·91	10 72	1 91	2 28	3 80	12 48	11	2·36	10 61
McBride	1·92	5 30	1 40	3 65	.....	5 10	10	2·11	6 24
Pemberton	2·27	6 11	1 85	4 41	2 35	5 26	4	2·27	6 11
*Prince George	1·37	6 78	1 17	3 07	.....	5 05	12	1·79	7 28
Revelstoke	2·73	5 89	2 13	5 09	2 26	6 60	5	2·73	5 91
†Prince George	1·21	7 99	1 39	1 71	0 67	5 90	11	1·69	6 53
Strathnaver	1·24	7 48	1 58	2 60	.....	5 10	3	1·83	5 86

* John Blackburn—owner. † J. S. Johnson—owner—Salmon Valley.

Farms carrying live stock and with manure going back to the land produce heavier crops of hay than where such practices are not followed. The short rotation (four years) at Revelstoke is giving higher yields than the five-year plan followed at Alberni and Courtenay where an extra grain crop is introduced. Rent or use of land varies greatly between districts which makes it difficult to draw comparisons in the cost of production per ton. Taxes vary also between the several points. Machinery is a constant charge of $2.85 per acre.

Mixed hay sod top dressed with 100 pounds of sulphate of ammonia has given an average increase in yield of 0·60 ton per acre at McBride and Prince George. Eighty per cent of the fertilizer, or $1.60 per acre, is charged, which amounts to $2.66 per ton of increased yield.

First Year Alfalfa.—With exceptions at Duncan and Salmon Arm, alfalfa is seeded without a nurse crop on fallow or after a hoed crop. The two exceptions noted are favoured with plenty of soil moisture without either crop suffering. Strongest stands are established by sowing on a firm seed bed. Rate of seeding varies from 10 pounds at Quesnel to 14 pounds per acre at Duncan. The seed should not be buried. Covering from 1 to 1½ inches is sufficient. Corn stubble at Armstrong is disked only, not ploughed, likewise potato land at Quesnel. Not disturbing the soil by ploughing ensures a better seed bed for obtaining successful stands of alfalfa. The seed is drilled through the grain box or if an attachment is used, the seed is directed through the runs so as to get down to moisture.

Varieties tested have included Siberian, Cossack, Turkestan, Grimm, Ladak and Ontario Variegated. All have proved hardy, though Grimm is the variety that has given the best all around satisfaction. The last three named varieties were sown in duplicate rod rows at Prince George, Strathnaver, Quesnel and Australian in 1936. Very strong stands were obtained from this method of seeding, rows 18 inches apart, rate 4 pounds per acre. Seeding in rows has advantages when difficulty is experienced in obtaining a catch when seed is broadcast or drilled.

Alfalfa is sown in a mixture at Australian and is left down six years; alfalfa 8, timothy 4 and alsike 2 pounds per acre. Seeding alfalfa by itself at Australian was not a success. Stands thinned out rapidly, whereas a five-acre plot seeded with timothy in 1933 is still vigorous and yielded 1.75 tons of cured fodder per acre in 1938, one of the driest summers on record.

The following two tables present a statement of yield and cost of production for first year alfalfa and older stands respectively.

FIRST YEAR ALFALFA—YIELD AND COST OF PRODUCTION BY STATIONS

Station	Average Cost and Yield per Acre, 1934–1938						Summary		
	Yield per acre	Cost per ton	Seed or pro rata	Harvest	Manure fertilizer	Taxes, rent, machinery	No. of years grown	Average yield per acre	Average cost per ton
	tons	$	$	$	$	$		tons	$
Armstrong	2·50	6 28	3 53	3 62	.....	8 56	12	2·03	12 31
Duncan	3·86	6 97	0 65	8 32	5 47	12 48	5	3·86	8 70
Lumby	2·25	6 44	3 96	4 68	.....	5 85	5	2·39	6 94
Quesnel	2·87	5 16	3 88	5 80	.....	5 13	5	2·87	5 63
Salmon Arm	3·28	6 97	0 90	8 33	4 80	8 85	8	4·19	6 23
Smithers	1·80	7 90	5 03	4 00	.....	5 20	5	2·01	7 84
Vanderhoof	1·58	8 87	5 77	3 14	.....	5 10	10	1·58	11 72
Australian	2·49	5 09	1 31	5 71	0 54	5 13	4	2·72	5 95

ALFALFA—GENERAL

Station	1934–1938			Summary	
	Average yield per acre	Average cost per ton	Number of years grown	Average yield per acre	Average cost per ton
	tons	$		tons	$
Armstrong, 2nd year	2·70	6 51	11	2·23	10 40
Armstrong, 3rd year	2·41	7 37	9	2·16	9 57
Duncan, 2nd year	4·09	6 66	4	.....	.....
Duncan, 3rd year	3·52	6 81	2	.....	.....
Lumby, 2nd year	2·21	5 37	4	2·36	6 73
Lumby, 3rd year	2·02	8 62	5	.....	.....
Salmon Arm, 2nd year	3·70	5 96	8	4·64	5 44
Salmon Arm, 3rd year	3·99	4 95	6	4·79	4 41
Smithers, 2nd year	2·07	8 07	4	2·36	7 21
Smithers, 3rd year	1·84	8 04	5	1·80	7 42
Vanderhoof, 2nd year	1·59	8 29	8	1·60	10 08
Vanderhoof, 3rd year	1·77	7 62	9	1·64	9 85
Grand Forks, 2nd year	4·35	10 14	3	4·43	9 98
Grand Forks, 3rd year	4·62	9 67	.....	.....	.....

The greatest improvement is on the Armstrong station. Yields have steadily increased as the retentive clay loam has been opened up by the penetrating roots of vigorous alfalfa plants. Natural drainage is improved and soil temperatures are raised. Two cuttings a year are now common. In both first year and older stands the five-year average yield exceeds the summary average by nearly half a ton per acre. Results from a similar comparison at Salmon Arm show the reverse to be true. Dandelions have collected their toll from alfalfa in recent years on this station. Cultural methods, as double disking alfalfa stands or using the spring-tooth harrow, commencing the second year are helpful. A shorter rotation with alfalfa down only three to four years is now adopted for this point.

A clean firm seed bed combined with moisture and soil temperatures favourable for growth are optimum conditions to strive for in establishing alfalfa. All four are within the scope of good farm practices, as indicated by the results obtained from the ten-year rotation at Armstrong.

Under pro rata is grouped the cost of seeding down without a nurse crop, which includes manure, seed, labour, taxes, rent and machinery. It represents the total cost per acre spread over the number of years the alfalfa remains down.

It is not usual to top dress legumes with chemical fertilizers, but growing conditions are sometimes such that treatment with nitrogenous fertilizer is beneficial. Trials with sulphate of ammonia at 100 pounds per acre on sixth-year alfalfa at Salmon Arm gave an increased yield of 0·50 ton per acre. Similar trials in 1934, but on soil in better condition, made no difference in yield obtained from treated and untreated areas.

Annual Hays.—A mixture of oats 60 pounds and peas 60 pounds per acre is most generally sown on stations for this class of forage. Most farmers at some time in their experience find an annual hay crop necessary to meet feed requirements. Oats alone at 100 pounds per acre have at Pemberton outyielded the mixture and of course at a considerable saving on seed costs. The seven-year average yield and cost per ton for oats and peas is 2·36 tons at $11.30, and oat hay five-year average 2·60 tons at $8.38.

The cured fodder in either case is an excellent substitute for ensilage for dairy stock and it is relished by other stock to which it is fed. Oats and peas at Alberni in 1936 yielded 3·85 tons per acre at a cost of $7.50 per ton. Costs in excess of $10 per ton are not considered economical production.

Varieties of peas that have been tested are Prussian Blue, Golden Vine, Bluebell, Ida Bell, Sterling and Chancellor. Either Bluebell or Chancellor makes a good mixture with Victory oats. Harvesting should take place before the pods fill and when the oats are in milk stage. Time of cutting varies from the middle to the end of July. This allows for summer cultivation to control weeds and the preparation of the soil for the succeeding crop.

Japanese millet was tried at Revelstoke and Alberni in 1933 with very good results. It was sown early in July at 30 pounds per acre and gave a yield of 3·00 tons per acre. Millet grows rapidly during the warm summer months and has a place in the cropping program where failure results from an earlier sowing of grain.

Annual hays therefore offer several possibilities; as substitute hoed crops, to bolster the forage supply, and as a catch crop after one sown earlier has failed.

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