DOMINION OF CANADA

DEPARTMENT OF AGRICULTURE

DOMINION EXPERIMENTAL FARMS

REPORT OF THE CHIEF SUPERVISOR

J. C. MOYNAN, B.S.A.

ON

THE ILLUSTRATION STATIONS

IN

BRITISH COLUMBIA, ALBERTA, SASKATCHEWAN and MANITOBA

FOR THE YEAR 1929

Farmers assembled for a field day and picnic at the Illustration Station, Fort St. John, Peace River district. In the foreground is a field of Grimm alfalfa which yielded 202 pounds of seed per acre.

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CONTENTS

ILLUSTRATION STATIONS

IN

BRITISH COLUMBIA, ALBERTA, SASKATCHEWAN, AND MANITOBA

The past year has been marked by considerable expansion both with respect to the number of Illustration Stations and the program of demonstration work carried out in the different provinces. The number of new districts reached by such stations, were increased by thirty-three, there being one hundred and ninety-three Illustration Stations on which active work was carried out. Twelve of these stations are located in Prince Edward Island, sixteen in Nova Scotia, nineteen in New Brunswick, sixty-one in Quebec, fifteen in Ontario, thirteen in Manitoba, twenty-seven in Saskatchewan, sixteen in Alberta, and fourteen in British Columbia. In addition twelve new sites have been selected and work will be started on them in the spring of 1930. The yields and cost of growing the different crops on each station, as well as their average over a period of years, are summarized for publication and appear in two reports; one deals with the work in the East, where mixed farming is generally carried on, and the other with that in the western provinces.

For the collection of data and the recording of the results enumerated in this report the superintendents of the Experimental Farms and the supervisors of the Illustration Stations as named below are responsible: —

Superintendents	*Supervisors*
W. H. Hicks, Agassiz, B.C.	A. E. Richards, Agassiz, B.C.
W. H. Fairfield, Lethbridge, Alta.	R. E. Everest, Lethbridge, Alta.
J. G. Taggart, Swift Current, Sask.	E. C. Sackville, Swift Current, Sask.
D. Matthews, Scott, Sask.	N. F. Bell, Scott, Sask.
M. J. Tinline, Brandon, Man.	D. A. Brown, Brandon, Man.
W. D. Albright, Beaverlodge, Alta.	

CROP ROTATION AS A FACTOR IN WEED CONTROL IN GRAIN FARMING AREAS

The problem of the economic control of weeds is becoming one of vast proportions within the territory served by the Illustration Stations in Manitoba. In relation to this problem demonstrations have been undertaken dealing particularly with the economic control of perennial sowthistle and wild oats. On land foul with wild oats the three-year rotation of wheat, barley seeded down; sweet clover, hay and break, has afforded an opportunity for such cultural practices as have effectually reduced the prevalence of weeds and at the same time made possible the production of profitable crops each year. On Red River Valley stations the three-year rotation of barley, seeded down; sweet clover, hay

and break; corn, has efficiently controlled a combination of sowthistle and wild oats when the corn crop has been kept clean. Results, however, clearly demonstrate that when corn is not, or cannot be kept clean, it tends to increase rather than to reduce the intensity of these weeds. Cultural practices made possible within the course of a five-year rotation such as summer-fallow; wheat seeded down to clover and grass; hay and break; wheat; coarse grain, have maintained lands free from weeds on the stations where this type of rotation has been under operation from four to five years. In connection with this rotation the station at Plumas, central Manitoba has successfully demonstrated that sowthistle can be reduced by forty to seventy per cent in the oat field by after-harvest cultivation followed by deep spring tillage in preparation for this crop. The past year has convincingly demonstrated that on land severely infested with perennial sowthistle, control cannot be profitably expected by growing successive grain crops but rather by the alternating of grain and fodder crops with the systematic recurrence of a summer-fallow in a well planned rotation.

DEMONSTRATION WORK WITH CHEMICAL FERTILIZERS

The effect of chemical fertilizers in practical agriculture is now being demonstrated and studied on the Illustration Stations in each of the nine provinces. In the three Prairie Provinces, Alberta, Saskatchewan, and Manitoba, special attention has been directed, during the past year, to a study of the value of phosphatic fertilizer in grain farming practices. In addition quite a comprehensive series of experiments were undertaken on the "burn-out" soils at Radville. In the eastern provinces and British Columbia the fertility problem affects permanent pasture lands as well as all classes of cultivated crops. The problems considered and fertilizer projects under way this year, were as follows:—

The effect of ground lime on potatoes.

The influence of lime on crop growth.

Comparative demonstration with manure when used alone and when supplemented by chemical fertilizer.

The value of nitrogenous fertilizers for hay lands.

Ammo-phos in comparison with a complete standard potato mixture.

Nitrophoska compared with a fertilizer made up with standard ingredients.

The effect of superphosphate on turnips.

The effect of potash on the yield of potatoes.

The practical value of such demonstrations can be judged from the results obtained on the Illustration Station at Duncan, Vancouver island, B.C., where superphosphate was applied to old pasture land at the rate of 500 pounds per acre. The plots were replicated five times with five untreated plots as check. Where superphosphate was applied at the above rate, 11½ tons of green material were obtained; in comparison, the average of the untreated plots yielded a total of 3 tons 700 pounds per acre. The application of superphosphate not only increased the yield but also improved the general quality of hay due to the large proportion of clover in the mixture.

THE SUPERIORITY OF VARIETIES, THEIR MULTIPLICATION AND DISTRIBUTION

Varieties of grain such as wheat differ with respect to maturity, yield, and milling qualities; clovers and alfalfa differ in hardiness; grasses differ in their ability to produce and reproduce; all differ in their adaptability to natural conditions. Experimental evidence shows that some varieties are more suitable for a given locality than others. To determine, multiply and distribute such

amongst neighbouring farmers is one of the important services which the Illustration Stations are rendering within their respective communities. Although Marquis continues to be the standard and most generally grown wheat variety in Alberta and Saskatchewan, Garnet and Reward are filling a distinct need for an earlier variety in northerly districts. On the average of the stations in Northern Saskatchewan and Northern Alberta, Marquis ripened in 115 days this season, in comparison with 101 days for Garnet and Reward. Increased appreciation has been evidenced as to the value of hardy clover and alfalfa seed, and demands from merchants and agricultural societies have been received by the operators from outside provinces for home-grown red clover seed. Throughout Northern Ontario and Northern Quebec, the demand for Alaska oats, an early variety recently introduced into the district, was far in excess of the supply, with the result that all operators disposed of their surplus stock. Many farmers availed themselves of the opportunity of procuring disease-free seed potatoes at prices below normal, thus improving the quality of seed in general use on many farms. The sale of surplus seed by the operators shows an increase over former years, amounting to 42,387 bushels of seed grain, 10,739 bushels of seed potatoes, and 18,790 pounds of grass and clover seed.

MILK RECORDS, IMPROVEMENT AND SALE OF LIVE STOCK AND POULTRY FOR BREEDING PURPOSES

The keeping of individual milk records is now an accomplished fact on over 90 per cent of the Illustration Stations where dairy farming is being practised. Such work not only indicates the comparative producing powers of the different individuals but often demonstrates the need of giving greater attention to the growing of suitable crops as feed as well as the necessity for improved feeding practices. In 1927, an Illustration Station was started on which twenty milch cows were kept. That same year, the keeping of milk records was started and the average annual production was found to be 2,611 pounds of milk, with the highest individual giving 3,276. The first year's results indicated the need for the elimination of some low producers. With some of these disposed of and more attention given to feeding, the annual average production the next year was increased to 3,251 pounds of milk, with the highest producer giving 5,642 pounds. These results have been sufficient in the operator's mind to warrant a vigorous policy of improvement, such as is, or has been, undertaken on the other stations. While on a number of the more recently established stations preliminary improvement work is in progress, it is likewise true that a high percentage of the stations maintain high-producing, accredited, pure-bred herds and are now in a position to supply useful breeding stock to their neighbours. The sale of such stock by the operators during the past year included 282 head of cattle, 274 hogs, and 165 sheep. Attention has also been directed to the feeding, housing, and general quality of poultry kept at each station. Satisfactory foundation stock having been established, each fall well-bred cockerels from dams producing over 200 eggs are procured in order to maintain a high standard of quality and production, within these flocks and thus be in a position to meet the demand within the district for hatching eggs and breeding stock. This year, 1,526 settings of eggs, 673 cockerels, and 818 pullets were sold by the different Illustration Station operators.

FIELD DAYS AND AGRICULTURAL MEETINGS

During the year an effort has been made to increase the usefulness of the Illustration Stations as institutions for the encouragement and promotion of the various aspects of practical agriculture in the communities served. Field days were held on the Illustration Station fields, to which those in the surround-

ing community were invited. Those in attendance were taken over the fields, the different crops discussed and the results of the different projects over a period of years given. The attendance at such meetings averaged about forty with one hundred and fifty present at some points. Dry weather and rather unsatisfactory crop conditions necessitated the withdrawal of a number of meetings which had been planned particularly in the western provinces. The supervisors organized and held one hundred and fifteen field and public meetings; in addition they acted as judges at twenty-seven exhibitions and assisted with the program at ten short courses.

REPORT OF THE ILLUSTRATION STATIONS IN BRITISH COLUMBIA

A. E. Richards, B.S.A., M.A., Supervisor

During the year thirteen Illustration Stations were supervised from the Experimental Farm at Agassiz. Five stations are located in central British Columbia along the line of the Canadian National railway serving the Upper Fraser, Nechako and Bulkley valleys. Four are located on Vancouver island and four in the southern interior of the province.

THE SEASON

The eastern section of central British Columbia experienced one of its best seasons. Sufficient rain, well distributed through the growing period, stimulated growth and lifted yields well above the average. The Bulkley again suffered from lack of moisture in the spring for the hay crop. Good rains in this district in July greatly benefited the grain crop, which returned an average yield. Kamloops and Armstrong experienced one of their driest seasons. A late spring and dull cool weather on Vancouver island retarded warm season crops such as corn but grains and hay returned a higher than average yield. In general the season was favourable for crop growth throughout the province.

PRECIPITATION FOR 1929 AT THE ILLUSTRATION STATIONS IN BRITISH COLUMBIA

Month	Alberni	Armstrong	Courtenay	Duncan	Fernie	Kamloops	McBride	Prince George	Salmon Arm	Salmon Valley	Telkwa	Vanderhoof
	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.
January	3·34	1·45	2·15	2·44	1·28	1·2	2·10	2·67	1·20	1·80	1·3	1·90
February	1·44	0·5	0·41	0·72	1·23	0·15	1·55	0·57	0·20	0·70	0·15	0·67
March	6·68	0·63	3·43	2·70	4·0	1·18	2·35	0·55	1·04	0·01	1·46	1·65
April	6·30	0·47	4·95	2·42	2·45	1·37	0·95	1·99	0·84	1·52	0·88	0·95
May	1·76	0·79	2·24	1·28	2·95	1·89	1·20	0·76	0·83	0·92	0·73	1·75
June	2·57	2·00	2·92	1·45	3·65	1·08	2·85	3·83	3·36	1·69	1·42	3·19
July	1·12	0·08	1·29	0·13	1·28	1·35	2·58	2·74	0·08	1·08	3·99	2·10
August	0·83	1·78	0·50	0·57	0·60	0·37	1·72	2·14	0·89	1·11	1·08	1·43
September	0·96	1·19	0·29	0·18	2·47	0·74	2·13	0·60	1·05	0·05	0·0	0·86
October	5·83	1·47	2·79	1·31	1·22	0·74	2·09	0·96	1·37	0·78	0·95	1·61
November	2·88	0·10	0·92	1·63	0·91	0·99	2·22	2·16	0·33	0·61	2·00	1·09
December	10·63	2·40	.....	5·27	8·11	0·92	3·80	0·82	0·32	1·30	1·26	0·65
	44·34	12·86	.....	20·00	30·15	11·98	25·54	19·79	11·51	11·57	15·22	17·85

MAXIMUM AND MINIMUM TEMPERATURES AT ILLUSTRATION STATIONS IN BRITISH COLUMBIA, 1929

(In Degrees Fahrenheit)

Month	Alberni		Armstrong		Duncan		Fernie		Kamloops		McBride		Prince George		Salmon Arm		Telkwa	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
January	43	4	45	−25	49	−2	39	−31	34	−31	32	−43	40	−50	34	−18	42	−27
February	51	3	58	−18	53	2	41	26	44	−22	45	−32	46	−32	45	−10	43	−25
March	65	25	68	18	60	23	51	2	56	12	50	2	55	4	58	21	48	7
April	76	23	84	21	72	22	66	15	70	6	60	2	72	2	74	20	66	− 5
May	83	34	92	27	79	35	81	27	82	25	75	28	81	21	86	32	68	25
June	84	33	91	39	82	35	78	31	82	30	84	29	82	35	85	42	78	30
July	90	40	101	38	86	34	91	37	90	32	85	34	84	32	98	42	78	33
August	91	40	98	38	87	42	90	31	92	44	78	30	84	34	94	41	78	29
September	94	29	84	27	90	30	84	23	86	35	75	18	76	20	82	33	81	23
October	74	27	70	20	71	26	68	17	75	25	64	16	74	21	74	25	62	22
November	57	26	55	13	57	20	52	−6	52	15	54	2	48	12	50	15	48	16
December	51	26	42	1	55	23	46	− 1	54	− 4	39	−24	40	−16	46	0	40	−17
Range	94	3	101	−25	90	− 2	91	−31	92	−22	85	−43	84	−50	98	−18	81	−27

OBJECTIVES AND PROGRESS

Demonstration and encouragement in the growing of clover and alfalfa has been the main objective of the Illustration Stations in central British Columbia since work was undertaken in 1922. On Vancouver island commercial fertilizer work forms the main project on the stations. At Kamloops in the dry-farming area special work has been undertaken in cereal testing. Other parts of the province where Illustration Stations are located have problems peculiar to the district and to these problems the stations are giving their attention.

CO-OPERATION AND EXTENSION

Assistance is being given to the University of British Columbia in conducting an economic farm survey in districts where the Illustration Stations are located.

In co-operation with the Cereal Division test plots of six barley varieties for malting purposes were grown on three of the Illustration Stations located in different parts of the province.

The co-operative extension work with farmers in districts served by the Illustration Stations was continued this year. Fifty-five, one-acre plots of alfalfa were established under the direction of the supervisor in central British Columbia.

SEED AND LIVE STOCK SALES

The Illustration Station renders an important service to the community through the distribution of better seed and better live stock. During the past year, British Columbia operators sold 1,974 bushels of seed grain and 10·2 tons of seed potatoes. Eggs for hatching totalled 77 settings. Poultry sales amounted to 62 pullets, 78 cockerels and 8 turkeys. Live stock sales for breeding purposes included 15 head of cattle, 10 of swine and 14 sheep.

NEW STATIONS

Work of a preliminary nature was undertaken this year at Lumby in the North Okanagan valley and at Grand Forks in the Boundary district. In response to requests, several new districts were visited and the possibilities for work investigated.

PRICES CHARGED IN CALCULATING COSTS

Rent and taxes—Based on value of land at prevailing rate of interest plus taxes.

Horse and manual labour—Based on prices in the district.

Cost of twine and threshing—Based on prices in the district.

Use of machinery—$2.85 per acre.

Manure—$1.50 per ton.

COST OF SEED

(British Columbia)		$ cts.
Oats, Victory	per bushel	1 02
Oats, Banner	"	1 02
Wheat, spring	"	2 40
Wheat, fall	"	1 80
Barley	"	1 20
Field peas	"	3 60
Spring vetch	"	4 20
Fall vetch	"	9 60
Field corn	"	0 08
Sunflowers	"	0 12
Potatoes, certified seed	per ton	60 00
Timothy	per pound	0 10
Meadow fescue	"	0 26
Italian rye	"	0 14
Tall oat grass	"	0 37
Clover, common red	"	0 32
Clover, alsike	"	0 33
Clover, white sweet	"	0 13
Alfalfa, Ontario variegated	"	0 33

RETURN VALUES

(British Columbia)

—		Vancouver Island	Southern Interior	Central British Columbia
		$	$	$
Clover and timothy hay	per ton	20 00	.....	18 00
Alfalfa hay	"	.....	16 00	20 00
White sweet clover hay	"	.....	14 00	15 00
Peas and oat hay	"	.....	.....	19 00
Oat and barley straw	"	8 00	.....	6 80
Wheat straw	"	4 00	.....	3 40
Sunflower ensilage	"	.....	.....	6 00
Corn ensilage	"	7 00	7 00	.....
Oats and peas ensilage	"	8 00	8 00	8 00
Potatoes, commercial	"	40 00	40 00	.....
Oats	per bushel	0 90	0 90	0 90
Wheat	"	1 50	1 50	1 50
Barley	"	.....	.....	1 10
Field peas	"	.....	3 50	3 50

NOTE.—Vancouver island stations include: Alberni, Comox, Courtenay, and Duncan. Southern Interior Stations: Salmon Arm, Fernie, Armstrong, and Kamloops. Central British Columbia Stations: McBride, Prince George, Salmon Valley, Telkwa and Vanderhoof.

The cost of farm manure is distributed over the crops in the rotation in the following proportions:—

Four-year rotation: first-year crop, 40 per cent; second-year crop, 30 per cent; third-year crop, 20 per cent; fourth-year crop, 10 per cent.

Five-year rotation: first-year crop, 40 per cent; second-year crop, 25 per cent; third-year crop, 20 per cent; fourth-year crop, 10 per cent; fifth-year crop, 5 per cent.

The residual influence of chemical fertilizers and lime is distributed as follows:—

Mixed fertilizers: first-year crop, 55 per cent of cost; second-year crop, 30 per cent of cost; third-year crop, 10 per cent of cost; fourth-year crop, 5 per cent of cost.

Nitrate of soda supplied alone: first-year crop, 80 per cent of cost; second-year crop, 20 per cent of cost.

Lime: cost is divided equally among each crop in the rotation.

ALBERNI, VANCOUVER ISLAND

OPERATOR, C. CHASE

The season on the whole was favourable for crop growth. Work on the land started in February but backward weather during April delayed growth. Up to the middle of June growth appeared stationary but good rains and a warm sun at this time advanced growth rapidly up to the time of harvest.

The four-year rotation which is in operation on the station is well suited to this dairying district. Along with barnyard manure, supplemented by commercial fertilizers and fall cover crops, the fertility of the soil is maintained. A high average yield of crops is taken from the land under systematic treatment of this kind.

A summary of yields and costs is given in the following table:—

OPERATIONS AT ALBERNI, FOUR-YEAR ROTATION

Crop	Number of years grown	Yield per acre		Cost		Average profit or (—) loss per acre
		1929	Average	1929	Average	
				$	$	$
Potatoes	4	6·14 tons	8·40 tons	18 18 per ton	17 37 per ton	84 73
Hay, second year	2	2 96 tons	3·00 tons	8 79 per ton	8 78 per ton	27 54
Oats	4	53·0 bush.	59·7 bush.	0 70 per bush.	0 71 per bush.	7 07
Fall wheat	1	20·7 bush.	.....	1 39 per bush.	.....	2 27

Grain was seeded April 27 and potatoes planted May 16. Hay was cut July 8, fall wheat July 25, grain was harvested August 14, and potatoes dug October 1. Fertilizers were broadcast March 18. A dry period quite frequently follows seeding in this district. For this reason fertilizers are applied in early spring in order that they will be in solution and immediately available to seedlings after germinating.

The hay crop made a particularly fine showing this season and was harvested in excellent shape. Ingredients in the mixture are as follows: timothy at 3 pounds per acre; meadow fescue, 2 pounds; Italian rye, 2 pounds; tall oat, 1 pound; common red clover, 8 pounds; alsike, 2 pounds, and alfalfa, 2 pounds, making a total of 20 pounds of seed to the acre. This mixture gave early growth, a heavy bottom and considerable second growth.

The fertilizer test with potatoes was continued this year. Yield was lower than usual but tubers were an even marketable size. A good price returned the operator a nice profit on this crop. In calculating the profit and loss per acre, potatoes are valued at $40 per ton this season.

COMMERCIAL FERTILIZER DEMONSTRATION ON THE POTATO CROP AT ALBERNI

Plot	How fertilized per acre	Yield per acre	Increase over check plot	Cost of fertilizer per acre	Profit per acre above plot not fertilized
		tons	tons	$	$
1	Nitrate of soda—50 pounds Sulphate of ammonia—150 pounds	5·10	0·87	6 40	28 40
2	Superphosphate—600 pounds	6·14	1·91	5 59	70 81
3	Sulphate of potash—200 pounds	5·53	1·30	3 94	48 06
4	4–10–10— 500 pounds	6·78	2·55	7 50	94 50
5	4–10–10—1,000 pounds	7·97	3·74	15 00	134 60
6	check	4·23	.....	.....	.....

ARMSTRONG, NORTH OKANAGAN

OPERATOR, W. B. MCKECHNIE

The season was one of the driest in the history of the station. The corn crop gave a very poor return, and only one cutting of hay was taken from the alfalfa fields.

This station is illustrating the value of alfalfa as a soil builder, a drought resister and forage crop for a dairying district.

In the ten-year rotation which is conducted on this station, the alfalfa stand is cropped for six successive years. It is then broken with tractor power

and a mixed crop of peas and oats sown on the new breaking. Volunteer alfalfa in this crop improves the ensilage mixture. Fall wheat is sown following the mixed crop and this in turn by corn. The field is then seeded to alfalfa again. In this way the whole station area receives systematic treatment in manuring and cultivation throughout the ten-year cycle. The farm, which was purchased by the operator a few years ago in a run-down condition, is responding with better crops under this treatment.

A summary of yields and costs is given in the following table:—

OPERATIONS AT ARMSTRONG, TEN-YEAR ROTATION

Crop	Number of years grown	Yield per acre		Cost		Average profit or (−) loss per acre
		1929	Average	1929	Average	
				$	$	$
Field peas	4	8·0 bush.	11·2 bush.	5 02 per bush.	3 01 per bush.	7 50
Mixed O.P., grain	2	33·0 bush.	41·5 bush.	0 41 per bush.	0 47 per bush.	20 24
Fall wheat, Jones Fyfe	5	18·0 bush.	31·3 bush.	1 03 per bush.	0 73 per bush.	17 36
Alfalfa hay, old stand	5	1·00 ton	1·90 tons	21 11 per ton	10 16 per ton	11 44
Alfalfa hay, second year stand	2	1·00 tons	2·00 tons	21 11 per ton	13 73 per ton	8 92
Alfalfa hay, first year stand	3	0·66 ton	1·72 tons	20 76 per ton	14 21 per ton	4 89

Fall ploughing was completed on the station on September 25. Winter wheat was sown on October 2. Grain was sown April 3, alfalfa April 17, and corn May 13. Alfalfa was cut June 19 and fall wheat was harvested July 15.

COMOX, VANCOUVER ISLAND

OPERATOR, J. A. CARTHEW

In general the season was cool. Soil was well supplied with moisture throughout spring and early summer. This condition suited the grains and hay meadows, which made excellent growth, but retarded the corn crop.

Soil and crop improvement work with a four-year rotation is under way on this station. The regular application of manure and the inclusion of legumes are having a beneficial effect on the soil. Systematic methods of cultivation are gradually bringing weeds under control and each year shows gradual improvement in crop growth.

A summary of yields and costs is given in the following table:—

OPERATIONS AT COMOX, FOUR-YEAR ROTATION

Crop	Number of years grown	Yield per acre		Cost		Average profit or (−) loss per acre
		1929	Average	1929	Average	
				$	$	$
Corn, Longfellow	6	9·00 tons	13·17 tons	6 97 per ton	5 37 per ton	20 27
Potatoes, Green Mountain	4	5·25 tons	6·09 tons	21 78 per ton	21·79 per ton	51 43
Hay, second year	4	3·75 tons	3·27 tons	8 16 per ton	10 06 per ton	26 41
Hay, first year	5	3·00 tons	2·88 tons	11 95 per ton	11 07 per ton	23 77
Oats, Victory	4	104·6 bush.	73·7 bush.	0 46 per bush.	0 53 per bush.	22 01

One pound of tall oat grass and two pounds of Italian rye in the grass and clover mixture increased bulk and quality of the hay considerably. Alfalfa at two pounds per acre has been included in all mixtures in order to test out its adaptability to this location and gradually inoculate the soil. It has demonstrated such strength and vigour that it will now be grown alone for pasture and hay. This practice is recommended for other farms in the district where alfalfa should do equally well.

COURTENAY, VANCOUVER ISLAND

Operators, Halliday Bros.

The season was generally cool with fair distribution of rain throughout the growing period. Hay and grains made good growth but the corn crop was much below average.

The hay mixture on this station consists of the following ingredients, timothy at 3 pounds per acre, meadow fescue, 2 pounds; Italian rye, 2 pounds; tall oat one pound; common red clover, 6 pounds; alsike, 4 pounds; alfalfa, 2 pounds and fall vetch, 5 pounds. Fall oat and Italian rye show up very strongly in the first year meadow. The inclusion of the fall vetch thickens up the first year stand considerably.

Difficulty was experienced on the station as well as on neighbouring farms to get a catch of clovers in 1927. The meadow was turned under last year after the hay crop was cut and an emergency crop of oats, peas and vetch seeded this season. The crop turned out successfully. Rate of seeding was as follows: oats at 1½ bushels per acre; field peas at one bushel; spring vetch at one-half bushel.

A summary of yields and costs is given in the following table:—

OPERATIONS AT COURTENAY, FOUR-YEAR ROTATION

Crop	Number of years grown	Yield per acre		Cost		Average profit or (−) loss per acre
		1929	Average	1929	Average	
				$	$	$
Potatoes, Burbank	6	10·36 tons	11·08 tons	14 52 per ton	13 79 per ton	189 85
Oats, Victory	5	54·0 bush.	59·4 bush.	0 73 per bush.	0 75 per bush.	6 48
Hay, first year	5	3·16 tons	2·46 tons	10 44 per ton	10 63 per ton	16 08
Oats, peas, and vetch ensilage	1	5·0 tons	.....	8 19 per ton	.....	−0 96

Fertilizers were applied to the land March 5, grain was sown May 7 and potatoes planted May 15. Hay was cut June 26 and oats August 22.

The growing of seed potatoes for certification is one of the main projects on this station. Through selection and careful management followed consistently over a number of years the operators have built up an excellent strain of high yielding potatoes comparatively free from disease.

In the test plot conducted by the District Inspector for all certified seed potato growers in the province, the seed stocks from all growers are compared by means of the tuber unit method. In this test Burbank potatoes from Halliday Brothers ranked highest for this variety in uniformity and vigour and in the percentage of marketable potatoes in the crop.

A commercial fertilizer test with potatoes is conducted on six one-quarter acre plots in duplicate. Barnyard manure was applied on all plots at the rate of sixteen tons per acre. In calculating the profit and loss potatoes are valued at $40 per ton.

COMMERCIAL FERTILIZER DEMONSTRATION ON POTATO CROP AT COURTENAY

Plot	How fertilized per acre	Yield per acre	Increase over check plot	Cost of fertilizer per acre	Profit or (−) loss per acre above plot not fertilized
		tons	tons	$	$
1	Nitrate of soda—50 pounds Sulphate of ammonia—150 pounds	9·57	0·77	5 98	24 82
2	Superphosphate—600 pounds	8·36	−0·44	4 72	−22 32
3	Sulphate of potash—200 pounds	9·46	0·66	3 66	22 74
4	4–10–10—1,000 pounds	11·66	2·86	13 47	100 93
5	4–10–10—2,000 pounds	11·82	3·02	26 95	93 85
6	Check—not fertilized	8·80	.....	.....	.....
	Duplicate Plot				
1	Nitrate of soda—50 pounds Sulphate of ammonia—150 pounds	11·59	6·37	5 98	248 82
2	Superphosphate—600 pounds	12·76	7·54	4 72	296 88
3	Sulphate of potash—200 pounds	14·30	9·08	3 66	359 54
4	4–10–10—1,000 pounds	11·72	6·50	13 47	246 53
5	4–10–10—2,000 pounds	11 98	6·76	26 95	243 45
6	Check—not fertilized	5·22	.....	.....	.....

DUNCAN, VANCOUVER ISLAND

OPERATOR, B. YOUNG

The season was unusually dry in this section of Vancouver island. Hard frosts and quick thaws during the winter with the thermometer registering a minimum of 2 degrees below zero caused such serious injury to the clovers on the station that the meadows were ploughed. Field operations commenced January 19.

Demonstration block of Kanota winter oats on the farm of the Illustration Station Operator, B. Young, Duncan, B.C. The crop was sown on October 7, and harvested July 19. Yield 55 bushels per acre.

A light soil underlain with gravel makes this a soil building problem. A short rotation, frequent and regular application of manure, fall sown cover crops and clovers are included in the cropping program.

An alfalfa demonstration block was laid out on the station this year on a piece of land which produced potatoes the previous year. The land was shallow ploughed in the fall and smoothed down with the harrows in the spring. Ontario Variegated alfalfa seed was drilled at the rate of 12 pounds per acre on April 1. No nurse crop of grain was used. The field was clipped three times during the season to control weeds. The stand is satisfactory. Similar results can be obtained on many other locations in the district.

A summary of yields and costs is given in the following table:—

OPERATIONS AT DUNCAN, THREE-YEAR ROTATION

Crop	Number of years grown	Yield per acre		Cost		Average profit or (—) loss per acre
		1929	Average	1929	Average	
				$	$	$
Potatoes	2	5·48 tons	5·43 tons	20 71 per ton	21 84 per ton	99 16
Oats, Victory	1	51·0 bush.	.....	0 56 per bush.	.....	17 26

A demonstration block of Kanota fall oats came through the winter without injury. They were sown October 7, headed out May 20 and were harvested July 19, yielding 55 bushlels to the acre. A mixture of vetch and fall wheat gave the operator a heavy crop for soiling purposes.

Early St. George potatoes for the early market proved a profitable crop. The potatoes were planted March 28 and harvested during July and August. Barnyard manure was applied at the rate of twenty tons per acre. In calculating profit and loss the potatoes are valued at $50 per ton.

COMMERCIAL FERTILIZER DEMONSTRATION ON THE POTATO CROP AT DUNCAN

Plot	How fertilized per acre	Yield per acre	Increase over check plot	Cost of fertilizer per acre	Profit per acre above plot not fertilized
		tons	tons	$	$
1	Nitrate of soda—75 pounds Sulphate of ammonia—225 pounds	6·80	2·05	8 90	93 60
2	Superphosphate—900 pounds	6·60	1·85	7 08	85 42
3	Sulphate of potash—300 pounds	6·84	2·09	5 45	99 05
4	4–10–10 mixture— 750 pounds	7·00	2·25	10 13	102 37
5	4–10–10 mixture—1,500 pounds	7·16	2·41	20 26	100 24
6	Average of two check plots—not fertilized	4·75	.....	.....	.....

FERNIE, EAST KOOTENAY

Operator, W. M. Dicken

Fernie district has a ten year average precipitation of over thirty-seven inches with a distribution through the growing period which averages over two inches per month. This season was unusually dry with 1·28 inches of rain in July and 0·60 inch in August. Other months maintained a fair average.

This station is illustrating in a very practical way that a systematic rotation of crops, good seed and good methods of cultivation increase the returns from the land.

Due to the splendid showing that alfalfa is making in this location, the four-year rotation with clover will gradually be changed to a longer rotation with alfalfa as the main forage crop. On the demonstration plot the Ontario Variegated and Grimm varieties came through the winter equally well, although Grimm outyielded the former by one-half ton per acre. Both varieties made strong second growth with an average yield of two tons per acre for the second cutting. Water for a light irrigation from a mountain stream assisted the alfalfa crop to overcome the drought and materially increased the yield.

A summary of yields and costs is given in the following table:—

OPERATIONS AT FERNIE, FOUR-YEAR ROTATION

Crop	Number of years grown	Yield per acre		Cost		Average profit or (—) loss per acre
		1929	Average	1929	Average	
				$	$	$
Potatoes	2	2·07 tons	4·81 tons	56 91 per ton	34 76 per ton	48 07
Mixed grain, O.P.V.	2	32·0 bush.	50·4 bush.	0 52 per bush.	0 52 per bush.	36 39
Wheat, Garnet	2	30·0 bush.	21·5 bush.	0 58 per bush.	1 37 per bush.	18 14
Wheat, fall	1	10·5 bush.	.....	1 97 per bush.	.....	—4 94
Oats, Banner	1	50·0 bush.	.....	0 23 per bush.	.....	33 72
Hay	2	3·50 tons	3·00 tons	4 36 per ton	5 08 per ton	40 12
Demonstration Block— Alfalfa hay	1	5·20 tons	.....	5 29 per ton	.....	76 45

Garnet wheat produced a splendid crop of well matured grain which ripened in 110 days. Last season, Marquis required 117 days to come to maturity. It was touched with frost before harvest. Jones' Fife fall wheat wintered without loss but fell far below the spring variety in yield.

Apparently due to a cold spring and the late fall drought, the potato crop was very light on account of seasonal conditions. Barnyard manure applied to the crop at the rate of 20 tons per acre and commercial fertilizers did not bring about any appreciable improvement. In calculating profit and loss in the following table, potatoes are valued at $40 per ton.

COMMERCIAL FERTILIZER DEMONSTRATION ON THE POTATO CROP AT FERNIE

Plot	How fertilized per acre	Yield per acre	Increase over check plot	Cost of fertilizer per acre	Profit per acre above plot not fertilized
		tons	tons	$	$
1	Nitrate of soda—75 pounds Sulphate of ammonia—150 pounds	3·01	1·26	7 52	42 88
2	Triple superphosphate—229 pounds	2·78	1·03	4 09	37 11
3	Superphosphate—600 pounds	2·34	0·59	7 89	15 71
4	Sulphate of potash—?00 pounds	2·26	0·51	4 70	15 70
5	4–10–10 mixture— 500 pounds	1·65	—0·10	9 38	—13 38
6	4–10–10 mixture—1,000 pounds	1·95	0·20	18 76	—10 76
7	Check—not fertilized	1·75	.....	.....	.....

KAMLOOPS, THOMPSON VALLEY

OPERATOR, C. R. GREEN

The season was the most unfavourable that the district has experienced for a number of years. With little reserve moisture in the ground, a late cold spring followed by a hot dry summer had almost disastrous effect on crop growth and yields were reduced far below the average.

The one bright spot on the station area this season was a five acre block of alfalfa, which came through the winter without injury and withstood the drought of summer remarkably well. This crop was seeded on April 25, 1928 with a grain drill in double drill rows, six inches apart with three feet between the double drill rows for cultivation. Seed was sown at the rate of seven pounds to the acre without a nurse crop of grain. Two varieties, Grimm and Turkestan, are being tested on this plot. A good catch of each was obtained and up to the present they are doing equally well. The first cutting was taken off June 12, yielding 1,700 pounds per acre. The second cutting on August 17 gave 600 pounds to the acre. This forage crop, which has demonstrated its ability to stand up through such a difficult season deserves wider use in the district.

A summary of yields and cost is given in the following table:—

OPERATIONS AT KAMLOOPS, FIVE-YEAR ROTATION

Crop	Number of years grown	Yield per acre		Cost		Average profit or (—) loss per acre
		1929	Average	1929	Average	
				$	$	$
Corn	6	3·70 tons	4·03 tons	9 14 per ton	9 46 per ton	—7 76
Wheat	4	11·0 bush.	18·9 bush.	1 49 per bush.	1 07 per bush.	8 24
Sweet clover hay	6	0·84 tons	1·10 tons	13 86 per ton	13 88 per ton	—0 55
Alfalfa hay	1	1·15 tons	.....	15 29 per ton	.....	0 81

Wheat is an important cash crop in the district. The Bluestem variety is the most generally grown spring wheat. This soft white wheat is not as acceptable on the market as the hard red varieties. Growers are looking for a wheat which will be adaptable to the district and meet the standard grading requirements. The Illustration Station is assisting farmers in this problem by conducting tests under field conditions with a number of spring wheats. Five varieties were included in the test and grown on one acre plots in duplicate. The demonstration was also conducted by a neighbouring farmer, Mr. George Klapstock in the Beresford district.

A summary of yields of the different varieties is given in the table below. Results on Mr. Green's farm are given under column A and on Mr. Klapstock's farm under column B.

WHEAT VARIETY TEST AT KAMLOOPS

(Results for one year)

Plot	Variety	Average yield per acre	
		A	B
		bush.	bush.
1	Bluestem	12·3	11·9
2	Renfrew	11·2	9·5
3	Marquis	9·5	10·9
4	Garnet	11·0	13·0
5	Reward	10·9	15·0

Arrangements have been made with the Dominion Cerealist to have these wheats analyzed and a milling and baking test conducted with each variety. This report will be published later. It is hoped to continue the test over a period of five years.

McBRIDE, CENTRAL BRITISH COLUMBIA

OPERATOR, J. T. OAKLEY

Rainfall was above the average with 2·85 inches recorded for June and 2·58 inches in July. The season generally was cool. Growth was abundant but difficulty was experienced in maturing and harvesting grain crops due to the wet season.

This station is illustrating in a convincing way that a systematic crop rotation and the introduction of clovers and alfalfas are practical and economical ways to improve the soil and increase crop yields.

Alfalfa is doing particularly well on the station and on demonstration plots throughout the district. Four pounds of alfalfa seed to the acre are sown in the hay mixtures. This is good practice in order to inoculate the soil and to test its behaviour before seeding down a large area to this crop alone.

A summary of yields and cost is given in the following table:—

OPERATIONS AT McBRIDE, FOUR-YEAR ROTATION

Crop	Number of years grown	Yield per acre		Cost		Average profit or (—) loss per acre
		1929	Average	1929	Average	
				$	$	$
Hay, oats, peas and vetch..	6	3·00 tons	2·21 tons	9 85 per ton	14 90 per ton	5 76
Oats, Victory.....	7	65·00 bush.	58·4 bush.	0 28 per bush.	0 35 per bush.	26 99
Barley, O.A.C., 21.....	1	26·0 bush.	.....	0 43 per bush.	.....	17 41
Hay, second year.....	5	2·75 tons	2·30 tons	4 39 per ton	6 49 per ton	20 46

A demonstration block of Chewing's fescue for seed was set out at this station in 1927. One hundred pounds of seed were taken from an acre last year. This season the crop appeared more promising but the seed heads were completely shattered by a heavy gale just before time of harvesting. This grass has withstood several hard winters in Central British Columbia and looks very promising from a seed production standpoint.

Heavy crops of Sterling field peas and spring vetch continued growing right up to the time of frost and failed to ripen seed.

O.A.C. 21 barley sown May 21 as an emergency crop on a newly seeded meadow that failed, produced a satisfactory crop of grain. This crop is well suited to Central British Columbia conditions and might well be more widely grown.

PRINCE GEORGE, CENTRAL BRITISH COLUMBIA

OPERATOR, J. BLACKBURN

This district experienced one of its best seasons. Well distributed rainfall throughout the growing period amounting to 10·07 inches assured magnificent crops of hay and grain.

This station which is typical of conditions over a large area of the central interior of the province has demonstrated the farming possibilities of this great hinterland of British Columbia. Records now covering a period of seven years show that all crops necessary to operate and maintain a general mixed farm can be successfully and profitably grown. Grain, hay and ensilage provide home grown concentrates, roughage and succulence. Such special crops as alsike and red clover seed provide a remunerative cash return.

Clover meadows were established in 1922 and each succeeding year. The seven-year record shows an average yield of over one and one-half tons per acre with no failures to obtain a stand and no serious loss from winter killing. This year clover hay averaging over two and one-half tons to the acre was cut from a field seeded down with clover seed grown on the Illustration Station in 1927.

A summary of yields and costs is given in the following table:—

OPERATIONS AT PRINCE GEORGE, FIVE-YEAR ROTATION

Crop	Number of years grown	Yield per acre		Cost		Average profit or (—) loss per acre
		1929	Average	1929	Average	
				$	$	$
Sunflowers, ensilage	7	4·37 tons	6·30 tons	10 81 per ton	6 91 per ton	—3 13
Oats and peas, ensilage	7	7·26 tons	5·51 tons	7 60 per ton	8 15 per ton	3 29
Oats, Banner	7	83·0 bush.	63·7 bush.	0 21 per bush.	0 26 per bush.	35 04
Hay, first year	7	2·65 tons	1·58 tons	6 48 per ton	10 14 per ton	11 34
Hay, second year	6	2·15 tons	1·61 tons	9 13 per ton	7 91 per ton	13 81
Hay, third year	3	1·87 tons	1·58 tons	6 64 per ton	7 86 per ton	10 79
Barley, hulless	1	20·0 bush.	.....	0 50 per bush.	.....	11 98

Clover for seed was cut for hay on account of the wet season. Alfalfa is showing up very strongly in mixtures. The proportion of this seed in all hay mixtures will be increased and a pure stand will be seeded next spring.

Work on the land commenced May 5. Grain was seeded May 14. Rain delayed hay cutting until August 6. Inclement weather gave difficulty in the curing of this crop. Grain was harvested September 20.

SALMON ARM, THOMPSON VALLEY

Operator, Geo. Paterson

The growing period with the exception of the month of June was dry. In this month 3·36 inches of rain stimulated all crops and carried them through to maturity.

Work was started on this location last year shortly after purchase by the operator. The farm was run down and badly infested with weeds. For the time being control and eradication of weeds is the major problem. A systematic crop rotation with hoed and soiling crops, after-harvest cultivation, summer ploughing and chemical weed-killers are included in the control program. The operator is getting results.

A summary of yields and costs is given in the following table:—

OPERATIONS AT SALMON ARM, FOUR-YEAR ROTATION

Crop	Number of years grown	Yield per acre		Cost		Average profit or (—) loss per acre
		1929	Average	1929	Average	
				$	$	$
Corn, N.W.D.	2	17·0 tons	12·5 tons	4 84 per ton	6 50 per ton	9 64
Oats and pea hay	2	3·30 tons	3·26 tons	9 95 per ton	10 28 per ton	15 54
Oats, Banner	2	83·7 bush.	79·3 bush.	0 30 per bush.	0 36 per bush.	43 01
Hay, first year	1	5·23 tons	.....	4 82 per ton	.....	58 45

Work on the land commenced April 3. Grain was seeded April 15, alfalfa April 13 and corn planted May 25. Hay was cut July 1, grain August 7 and corn September 20.

The first year hay gave two heavy cuttings yielding a total of 5·23 tons per acre. The alfalfa predominated and gave almost a pure stand in the second growth. The mixture which produced this splendid crop consists of timothy at 8 pounds to the acre, alfalfa at 5 pounds, common red clover at 5 pounds and alsike at 2 pounds. An alfalfa demonstration block of two acres was seeded this spring. The field was clipped twice to control weeds. The stand is satisfactory.

SALMON VALLEY, CENTRAL BRITISH COLUMBIA

Operator, J. S. Johnson

The season was favourable with ample moisture throughout the growing period. Ideal weather in September enabled farmers to harvest a late crop of grain without loss.

Clover and alfalfa wintered without injury and produced heavy crops of hay. Alfalfa is included in all mixtures and next season one field will be sown to this crop alone with a view to changing to a longer rotation with alfalfa as the base.

The soil in many parts of this district is a burned over clay which compacts when wet. A deep rooted legume, such as alfalfa will do much to improve the texture of the soil and restore its fertility.

Twenty-five ton stack of alsike clover harvested for seed from the demonstration block on the farm of Illustration Station Operator J. S. Johnson, Salmon Valley, B.C.

A summary of yields and costs is given in the following table:—

OPERATIONS AT SALMON VALLEY, FIVE-YEAR ROTATION

Crop	Number of years grown	Yield per acre		Cost		Average profit or (−) loss per acre
		1929	Average	1929	Average	
				$	$	$
Oats, peas and vetch hay	2	1·75 tons	1·37 tons	13 84 per ton	20 27 per ton	2 34
Oats, Victory	2	62 bush.	41·5 bush.	0 20 per bush.	0 55 per bush.	22 60
Hay, first year	4	2·5 tons	1·69 tons	4 74 per ton	6 79 per ton	14 85
Hay, second year	3	2·0 tons	1·75 tons	5 60 per ton	5 71 per ton	17 37
Hay, third year	3	1·5 tons	1·37 tons	7 37 per ton	7 51 per ton	9 16

Ploughing was completed in the fall of 1928. Grain was sown May 9. Hay was cut July 29 and grain harvested September 14.

TELKWA, BULKLEY VALLEY

Operator, F. M. Dockrill

Spring work commenced with very little reserve moisture in the soil and the weather continued dry up to the middle of July. Good rains at this time benefited the grain crop but came too late for the hay, which returned a very light crop throughout the Valley. Harvesting of the grain crop was nearly two weeks later than usual but generally the crop was good.

Marquis wheat produced a good crop of well matured grain. This variety seems well suited to this district. Over a six-year period it has yielded an average of 31·4 bushels to the acre. Maturing and general quality has always been satisfactory.

A summary of yields and cost is given in the following table:—

OPERATIONS AT TELKWA, SIX-YEAR ROTATION

Crop	Number of years grown	Yield per acre		Cost		Average profit or (−) loss per acre
		1929	Average	1929	Average	
				$	$	$
Turnips	1	8·0 tons	.....	4 42 per ton	.....	4 65
Wheat, Marquis	6	43·0 bush.	31·5 bush.	0 70 per bush.	0 84 per bush.	23 17
Hay, first year	3	1·25 tons	1·35 tons	10 92 per ton	17 00 per ton	7 93
Hay, second year	4	0·75 tons	1·31 tons	18 17 per ton	10 30 per ton	13 34

A fifteen acre block of alfalfa on this farm wintered without injury. Several farmers in the district are following the operator's example and seeding down a portion of their farm to this valuable forage crop.

VANDERHOOF, NECHAKO VALLEY

Operator, D. Turcotte

The season was favourable with 9·33 inches of rain recorded during the growing period. Several records in crop yields were set up and altogether the season was one of the best in the farming history of the district.

Alfalfa is the feature crop on this station. The nine-years rotation consisting of six years alfalfa, two years grain and one year ensilage or mixed crop

appears well suited to this dairying and beef raising district. Alfalfa of the Ontario Variegated variety is sown in the spring of the year at the rate of twelve pounds to the acre on fall ploughed land. No nurse crop is used. Sweet clover has proven a splendid preparatory crop for alfalfa. Satisfactory stands have been obtained under a nurse crop of grain and after taking off a hay crop there is usually a heavy after growth to turn under. This practice inoculates the soil and fits it for the alfalfa which succeeds.

Ploughing under second growth of sweet clover, September 17, on the Illustration Station at Vanderhoof, B.C., in preparation for seeding to alfalfa.

Four varieties of alfalfa are being tested on this station on one acre blocks. They include Turkestan, Cossack, Ontario Variegated, and Grimm. All are doing equally well.

A summary of yields and costs is given in the following table:—

OPERATIONS AT VANDERHOOF, NINE-YEAR ROTATION

Crop	Number of years grown	Yield per acre		Cost		Average profit or (—) loss per acre
		1929	Average	1929	Average	
				$	$	$
Wheat, Reward	2	33·0 bush.	26·0 bush.	0 32 per bush.	0 45 per bush.	28 22
Sweet clover hay	3	1·50 tons	1·28 tons	7 62 per ton	10 15 per ton	5 92
Alfalfa, first year	4	2·35 tons	1·56 tons	5 84 per ton	14 49 per ton	15 22
Alfalfa, second year	3	1·5 tons	1·33 tons	6 25 per ton	14 47 per ton	10 31

All ploughing was completed in the fall in preparation for seeding in the spring as soon as weather permitted. Grain was sown April 29. Alfalfa and sweet clover crops were cut July 15. Second growth alfalfa was cut September 4.

Reward wheat produced a fine crop of well matured high grade grain. This variety is recommended for districts which cannot grow Marquis successfully.

FIELD DAYS AND MEETINGS IN BRITISH COLUMBIA

Field days were held on the Illustration Stations in British Columbia at which the University of British Columbia, the Dominion Experimental Farm, Summerland and the Provincial Department of Agriculture were represented. At all points the Farmers' Institutes co-operated in making the meetings a success. Picnics and social evenings were arranged by local committees in connection with the Field Day program. The first meeting was held at McBride on July 2 with twenty present. At Prince George twenty-six attended, at Salmon Valley forty, Vanderhoof seventy-five, Wistaria thirty-one, Francois Lake, twenty-four, Telkwa eighteen, Smithers fifty-four. On August 1 a field meeting was held at Salmon Arm with twenty-four present and at Fernie, August 23, seventy-five attended, making a total of 387 persons. During the year the supervisor also addressed the Rose Hill Farmer's Institute on January 4, the District Farmer's Institute convention at Salmon Arm on August 1. The supervisor was in charge of the Dominion Experimental Farms Exhibit at Vancouver Exhibition, August 12 to 17, and at the Provincial Exhibition, New Westminster, September 2 to 7.

FORT ST. JOHN, PEACE RIVER DISTRICT, B.C.

OPERATOR, J. W. ABBOTT

The season opened a little later than usual. Work commenced on the land during the last week in April. The precipitation for the growing period, while not heavy, was sufficient to promote generous growth. In the four months, May to August inclusive, 8·33 inches of rain were recorded. The month of June was cool causing a retardation of crop growth. The cereals remained in the "soft dough" stage an unwarranted length of time. No killing frosts were registered on the station between May 13 and September 1. Each of these dates registered a minimum of 30 degrees. The fall season was excellent for harvest operations, with the exception of one week's break after a heavy snow storm.

CEREAL TEST

Two varieties of wheat, namely, Garnet and Reward, also oats and peas, were under test this year. The comparative yields were as follows:

Plot	Crop	Date of seeding	Date of harvest	Yield per acre
				bush.
1	Wheat, Reward	May 6	Aug. 28	33·5
2	Wheat, Garnet	" 6	" 28	37·3
3	Wheat, Reward	" 6	" 27	14·6
4	Oats, Banner	" 10	" 26	50·4
5	Peas, Chancellor	" 10	Sept. 22	22·3

Plots 1 and 2.—Garnet and Reward varieties were grown after a hoed crop. Both received the same cultural treatment. Garnet matured two days earlier than Reward.

Plot 3.—This eleven acre field was in grass and feed crops the previous year. The poorer yield of Reward wheat on this plot may be explained by a number of reasons. The land is of decidedly poorer quality than plot 2. Brome

and sweet clover volunteered on portions of the field which necessitated early cutting on the best portions of the field. The best stand of wheat resulted after sweet clover, followed closely by the portion after alfalfa. After western rye grass the stand was poor, and after brome grass decidedly so.

The Reward wheat by sample content certificate from the Dominion Seed Branch gave a return of 95 per cent germination with No. 1 grade.

Plot 4.—Banner oats on this field followed various grasses and clovers. Rate of seeding was two and one-half bushels per acre. The stand was heaviest after sweet clover, then after alfalfa. Following western rye grass the stand was fairly light and after brome grass was decidedly light. The yield of grain after sweet clover is estimated at 74 bushels per acre and after brome grass at 23 bushels. The threshed sample submitted for inspection gave 99 per cent germination in six days with no weed seeds of any kind present.

ROTATION TESTS

The grass plots enumerated below were seeded in 1925; this season's yields were as follows:

Plot	Grasses and clovers, third year stand	Yield per acre
		tons
1	Brome grass alone, seeded in mixture with sweet clover	1·1
2	Brome grass and alfalfa	1·2
3	Western rye grass, seeded in mixture with sweet clover	1·0
4	Western rye grass and alfalfa	1·2

Yields on the above plots are much below the average return. An intensive fall and early winter pasturing after the first crop probably had much to do with the reduced yield.

INTERTILLED CROPS

The table below shows the yields of intertilled crops grown in the general farm fields and on demonstration plots.

Plot	Crop	Yield per acre
		tons
1	Potatoes, Irish Cobbler	7·33
2	Field carrots, Danish Champion	8·23
3	Swede turnips—	
	Ditmars	21·15
	Bangholm Kentville	21·83
	Purple Top Mammoth	22·05
	Magnum Bonum	20·03
4	Sunflowers	5·30

Potatoes were planted May 20 and harvested September 27. Sets were cut to two eyes and spaced three feet apart with three feet between rows. Seven to eight per cent of the plants were affected by rhizoctonia.

Th mangel crop was destroyed by the flea beetle in the seedling stage.

Quebec 28 corn produced no mature ears with numerous immature. Howes Alberta Flint gave a few mature cobs.

The Manchurian and Mennonite Rosthern sunflowers were tested. Both varieties matured and numerous heads produced good seed.

Dwarf Essex rape produced a heavier crop than Thousand Headed kale. Hogs showed a preference for the rape.

In a wheat variety test on summer-fallow the following yields were obtained:—

Variety	Date of seeding	Date of harvest	Yield per acre
			bush.
Garnet	May 10	Aug. 26	38·5
Reward	" 10	" 29	35·3
Marquis	" 10	Sept. 22	41·4

All wheats this year, particularly Reward and Marquis, were notably slow in ripening. This test indicates that it is scarcely safe to sow Marquis on summer-fallow in this district after the end of April. Garnet was four or five days earlier than Reward.

Alfalfa in rows for seed production yielded at the rate of 202 pounds per acre. The control sample was given an official grade of No. 1, total germination of 90 per cent, with no weed seeds of any kind.

A successful field day and evening meeting was held August 14. Over one hundred residents attended the meetings.

REPORT OF THE ILLUSTRATION STATIONS IN ALBERTA

R. E. Everest, B.S.A., Supervisor

Fourteen Illustration Stations were supervised from the Experimental Station, Lethbridge, in 1929. A transfer was effected in March of two northerly Stations, Wainwright and St. Paul de Metis, to the supervision of the Experimental Station, Scott, Sask. Nearness as well as similarity of conditions were factors in making this change advisable.

The fourteen stations supervised from Lethbridge comprised six hundred and fifty-nine acres, in which were represented one hundred and forty-four fields. Field areas ranged from permanent pastures of ten acres to half-acre blocks in grass and clover tests.

THE SEASON

The snowfall for the first three months of 1929 was light, as was also the precipitation during the last four months of the previous year. Spring snow and early summer rains in 1929 were quite favourable in amount over the south and southwesterly portions of the province. Out from the mountains, however, and north of the Lethbridge-Medicine Hat line, rainfall supplies tapered off so that a large part of Alberta was suffering from lack of moisture by the end of June. From July forward a condition of drought was general over the province.

Following an autumn and winter of light precipitation, the 1929 crop was largely dependent upon current supplies of moisture for its growth.

This relationship of grain yield to summer rain is clearly brought out by the accompanying figures.

RELATIONSHIP OF YIELD TO SUMMER RAIN

Place	Precipitation in 1929, April, May, June	Wheat yields per acre on fallow
	inch.	bush.
Lethbridge	8·90	26·25
Orion	6·51	14·00
High River	6·46	34·00
Foremost	6·42	22·00
Milk River	6·33	18·40
Pincher Creek	6·30	22·00
Whitla	4·49	17·00
Bindloss	3·47	15·00
Sunnynook	3·11	8·00
Jenner	3·04	9·60
Youngstown	2·99	6·00
Cessford	2·81	9·60

Where wheat was produced the grain was frost free and obtained a good grade on marketing.

With a light strawed crop, hastened ripening, increased use of combines, and a return in some districts to headers, harvest threshing and grain hauling were generally completed at an early date. An open autumn was favourable to live stock and permitted outside operations to continue into early winter.

For the dry land wheat farmer where six inches or more of moisture was received during April, May and June, the crop returns were quite satisfactory. Grain quality was high and the per acre cost of production in many instances was unusually low.

IRRIGATION FARMING

In the irrigated districts irrigation water occupied a premier position for the months of July and August. Where the farmer had his laterals ready and applied water in good time, the results from irrigation were quite satisfactory.

During the past year the sugar beet acreage was considerably extended. Good stands of plants were secured in most localities and the fields went on to above average tonnage at digging time. The weather was favourable for lifting and the sugar content of the beets extremely high. As a consequence the factory at Raymond had the longest and most successful run of any season since it was established in 1925.

In order to depict more clearly the moisture conditions for the crop year 1929, the autumn precipitation of 1928 is given followed by the figures of 1929. A third section of the table includes the yearly precipitation for the past five years at points where these records are complete.

PRECIPITATION AT ILLUSTRATION STATIONS IN ALBERTA

—	Bindloss	Cessford	Chedderville ville	Foremost	Glenwoodville.	High River	Jenner	Kipp	Milk River	Orion	Pincher Creek	Sunnynook	Whitla	Youngstown	Lethbridge
1928	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.
September....	Nil	0·10	0·21	.....	0·17	0·08	0·07	0·23	.....	Nil	0·66	Nil	0·60	0·59	0·24
October.....	0·82	1·27	1·23	.....	0·47	0·18	0·54	0·74	0·45	0·20	0·83	1·30	0·55	0·55	0·85
November....	Nil	Nil	Nil	.....	0·25	0·30	0·25	0·50	0·40	Nil	0·15	Nil	Nil	0·15	0·28
December....	0·20	3·00	3·00	.....	0·70	0·40	0·25	0·30	.....	0·60	0·33	Nil	0·40	Nil	0·33
Total.....	1·02	4·37	2·69	*	1·59	0·96	1·11	1·77	*	0·80	1·97	1·30	1·55	1·29	1·70
1929															
January.....	0·40	0·40	1·75	2·10	1·12	0·60	0·80	0·80	1·05	0·42	1·18	0·20	0·70	0·80	1·08
February.....	Nil	0·55	1·40	2·90	1·50	0·80	0·42	0·70	1·10	0·58	0 65	0·15	0·90	0·50	0·63
March.....	0·10	0·40	1·32	0·60	0·68	1·10	0·25	1·01	0·60	0·62	1·35	1·30	0·75	0·23	1·34
April.....	0·90	0·75	1·19	2·85	1·92	1·57	1·38	2·86	2·43	2·75	0·48	0·95	0·47	0·45	2·55
May.....	1·16	1·55	2·40	1·56	1·40	1·70	1·00	2·24	0·80	1·70	2·94	1·78	1·75	2·11	2·63
June.....	1·41	0·51	3·47	2·01	3·19	3·19	0·66	3·91	3·10	2·03	2·88	0·38	2·27	0·43	3·72
July.....	0·39	0·32	1·26	0·65	1·04	Nil	0·79	0·63	0·80	0·60	1·31	0·25	0·74	0·63	0·52
August.....	0·12	Nil	2·22	0·06	0·53	Nil	0·56	0·38	0·50	Nil	0·60	Nil	0·36	0·11	0·59
September....	0·37	Nil	2·35	0·59	1·67	0·89	0·28	1·30	1·20	0·37	2·36	0·12	0·50	0·68	2·05
October.....	0·05	Nil	0·88	1·64	1·86	0·80	0·03	1·97	1·32	0·80	1·60	Nil	0·67	Nil	2·20
November....	0·65	1·60	3·00	0·83	1·11	1·80	1·17	0·80	1·00	0·88	1·15	2·80	1·00	1·68	0·49
December....	0·70	2·20	1·60	0·80	2·08	1·20	1·03	1·80	2·27	1·60	3·55	0·27	1·44	0·80	1·91
Total.....	6·25	8·28	22·84	16·59	18·10	13·65	8·37	18·40	16·17	12·38	20·05	8·20	11·55	8·42	19·71
Five Years															
1925.....	13·18	.....	.....	.....	16·50	15·49	13·49	19·48	.....	14·45	22·15	.....	15·93	13·58	18·76
1926.....	18·26	.....	.....	.....	14·24	17·29	11·02	16·22	.....	8·97	20·46	.....	10·57	13·07	16·23
1927.....	19·84	.....	.....	.....	30·74	22·39	22·64	22·37	.....	22·33	33·60	.....	26·28	21·07	23·85
1928.....	9·19	.....	.....	.....	19·85	14·22	10·87	18·58	.....	11·85	20·94	.....	14·06	11·00	18·07
1929.....	6·25	.....	.....	.....	18·10	13·65	8·37	18·40	.....	12·38	20·05	.....	11·55	8·42	19·71
Average..	13·34	*	*	*	19·89	16·61	13·28	19·01	*	14·00	23·44	*	15·68	13·43	19·32

* Incomplete.

REWARD WHEAT

Upon two westerly stations, located at High River and Pincher Creek, Reward wheat was grown with marked success. The advantage of this early variety was noted particularly from the view point of quality as seen in size of kernel, colour, hardness and general appearance. In yield also Reward stood well; at Pincher Creek returning more bushels per acre than Marquis and at High River standing one bushel ahead of Marquis, and one bushel behind Garnet wheat in per acre yield.

SEED AND POULTRY SALES

The spread of high class seed grain continued from the Illustration Stations in 1929. Of oats 1,306 bushels and of wheat 5,242 bushels were sold by the operators to seventy-seven different farmers. Distribution of poultry for the breeding season amounted in sales to 38 cockerels and 181 settings of eggs from the fourteen stations.

FERTILIZER TRIALS

Upon five of the prairie stations tests were made with triple superphosphate. This commercial fertilizer was applied broadcast at the rate of 100 pounds per acre and the land harrowed immediately. This work was done following the seeding of the grain crop. Wheat on fallow and wheat on second crop land were treated in this way.

CROP SEASON 1929

In compiling this report the cost of production and profit or loss are based on the rates that are given below:—

COST CHARGES

Rent dry land Stations	8 per cent of land value.
Rent irrigated Stations	$8 00 per acre.
Use of machinery	$1 35 per acre.
Horse labour (per horse)	$0 08 per hour.
Manual labour per hour	Rates prevailing in the district.
Combining per acre	" " "
Threshing per bushel	" " "
Binder twine per pound	

COST OF SEED

Wheat per bushel	$1 25
Oats per bushel	0 90
Barley per bushel	1 00
Corn per pound	0 07
Sweet clover per pound	0 09
Western rye grass per pound	0 08
Alfalfa per pound	0 40

RETURN VALUES

Wheat per bushel	$1 25
Oats per bushel	0 55
Barley per bushel	0 70
Hay per ton	15 00
Oat sheaf feed per ton	15 00
Corn fodder green per ton	5 00

ALLOCATION COST OF SUMMER-FALLOWING

When computing the cost of growing the various crops two-thirds of the cost of summer-fallowing is charged to the first crop and one-third to the second crop. The yields given for hay and fodder crops are estimated weights.

GENERAL OUTLINE OF ROTATIONS IN USE

Three-year rotation—three fields.
Summer-fallow.
Wheat on fallow.
Wheat on spring ploughing.

Three-year rotation—three fields.
Summer-fallow.
Wheat seeded with sweet clover.
Sweet clover hay.

Four-year rotation—four fields.
Summer-fallow.
Oats seeded with western rye grass.
Western rye grass hay.
Western rye grass hay.

Two-year rotation—two fields.
Wheat on corn stubble.
Corn on wheat ground.

Two-year rotation—two fields.
Summer-fallow.
Wheat.

An additional field is devoted to alfalfa in rows as a continuous hay crop.

In the three-year rotation including hay, sweet clover is sown with the wheat crop at the rate of 12 pounds per acre. If in the succeeding year the stand of clover is light, oats is sown in as a substitute crop; if the clover is a failure the field is then ploughed and seeded outright to oats.

IRRIGATED STATIONS

Ten-year rotation—ten fields.
Alfalfa hay.
Alfalfa hay.
Alfalfa hay.
Alfalfa hay.
Alfalfa hay.
Alfalfa hay.
Wheat.
Rowed crop or wheat.
Oats.
Barley seeded with alfalfa.

On the irrigated stations there is in addition to the above rotation a well fenced permanent pasture which is laid out with a border system of irrigation. The mixture used in seeding this pasture totals 22 pounds per acre, and is made up of Kentucky blue grass 6 pounds, English blue grass 6 pounds, western rye grass 4 pounds, alfalfa 4 pounds and 2 pounds of timothy seed.

BINDLOSS, ALBERTA

Operator, John Barnes

The season was one of disappointment to this dry land farming area. From the 41 bushel yield of 1928, there is a 26 bushel drop to the 15 bushel per acre yield of 1929. This range is in large part accounted for by the variation of summer rainfall. In 1928 the April to August precipitation amounted to 7·87 inches, and in 1929 to 3·98 inches.

Work on the land commenced at the station on April 23. Wheat was sown at the rate of one and one-quarter bushels on fallow and one bushel per acre on second crop land. Combining wheat commenced on August 12.

RESULTS OF THE SEASON'S WORK AND AN AVERAGE OF FIVE YEARS' YIELDS AND COST OF PRODUCTION AT BINDLOSS

Rotation of crops	Yield per acre		Cost		Profit per acre 1925–1929, average
	1929	Average 1925–1929	1929	Average 1925–1929	
			$	$	$
Three-year Rotation—					
Summer-fallow	.....	.....	5 29 per acre	5 29 per acre	.....
Wheat, Marquis after fallow	13·00 bush.	25·04 bush.	0 84 per bush.	0 69 per bush.	14 89
Wheat, Marquis after wheat	5·50 bush.	17·82 bush.	1 65 per bush.	0 83 per bush.	9 51
Three-year Rotation—					
Summer-fallow	.....	.....	4 87 per acre	5 13 per acre	.....
Wheat, Marquis after fallow	15·00 bush.	26·84 bush.	0 71 per bush.	0 58 per bush.	17 14
Sweet clover and oats	Failure	.....	6 61 per acre	.....	.....
Two-year Rotation—					
Wheat after corn	6·00 bush.	19·54 bush.	1 59 per bush.	0 85 per bush.	11 87
Corn, N.W. Dent	2·00 tons	4·60 tons	3 81 per ton	3 27 per ton	8 04
Demonstration Test Field—					
Alfalfa for seed	12·50 lb.	.....	.....	.....	.....

A sweet clover seeding of 1928 was poor in its spring showing so the field was sown over to oats. The oats failed to make even sheaf feed. Corn, a crop that is one of the easiest in its demands upon water, wilted and stayed from making reasonable returns on account of the light rainfall.

In the local field crops competition, Mr. Barnes won the first award on his entry of ten acres of Marquis wheat.

The operator followed through for registration with five acres of Marquis wheat from elite stock seed, five acres of Marquis from first generation seed (these fields were grown upon the Station) and a general crop acreage from registered Marquis wheat. Hence Mr. Barnes' 1929 crop was largely a high class seed grain proposition.

The sales of seed grain made by the operator totalled 1,565 bushels of Marquis wheat.

CESSFORD

Operator, G. E. Griffith

Work on the land commenced at the station on April 1. Throughout the season the moisture received was not equal to the promoting of good growth. For the five months April to August inclusive, 3·13 inches of rainfall were recorded. Wheat was sown at the rate of one and one-quarter bushels on fallow and one bushel per acre on second crop land.

The wheat fields were harvested by the header methods on August 14.

RESULTS OF THE SEASON'S WORK AND AN AVERAGE OF THREE YEARS AT CESSFORD

Rotation of crops	Yield per acre		Cost		Three-year average profit per acre, 1927–1929
	1929	Average 1927–1929	1929	Average 1927–1929	
			$	$	$
Three-year Rotation—					
Summer-fallow	.....	.....	4 21 per acre	4 67 per acre	.....
Wheat, Marquis after fallow	9·60 bush.	29·47 bush.	0 99 per bush.	0 59 per bush.	18 78
Wheat, Marquis after wheat	7·80 bush.	17·10 bush.	1 02 per bush.	0 68 per bush.	8 85
Three-year Rotation—					
Summer-fallow	.....	.....	4 21 per acre	4 40 per acre	.....
Wheat, Marquis after fallow	9·00 bush.	28·47 bush.	0 99 per bush.	0 59 per bush.	18 33
Sweet clover hay	Failure	.....	3 06 per acre	.....	.....
Two-year Rotation—					
Wheat after corn	8·80 bush.	23·60 bush.	0 78 per bush.	0 49 per bush.	16 60
Corn, N.W. Dent	Failure	.....	7 69 per acre	.....	.....
Demonstration Test Field—					
Western rye grass	Failure	.....	1 75 per acre	.....	.....

The station at Cessford was started in 1926, and has been recorded for a period of three years; hence an average for that length of time is all that can be given at present. It is obvious that a comparison of results cannot be fairly made with those older stations that have a five-year average record.

The operator made seed sales for the 1929 crop to eight farmers of the locality to the amount of 100 bushels of Marquis wheat.

CHEDDERVILLE

Operator, A. May

Experimental work continued at this point during 1929. Further tests with commercial fertilizers were carried on. The results of these trials are in favour of the fertilizer, single or in combination, that carries nitrogen as a leading element.

The gross returns in grain crops for this station were better than they have been in our previous years of operation. However, this season's yields were reduced considerably by the recurrence of summer frosts.

Our work in this district continues to be of an investigational nature. Mr. May, though a highly efficient and faithful operator, does not receive returns that are at all encouraging towards profitable farming.

Dairy cows, hogs and poultry are his main source of revenue.

Garnet wheat in each of the past three years has suffered from early frosts to such an extent that at the present time it is inadvisable to regard Cheddarville as a possible spring wheat producing locality.

FOREMOST

Operator, T. M. Calhoun

In the spring of 1929 this station was laid out and rotation work started. Upon a field that was summer-fallowed in 1928, Marquis wheat gave a yield of 22 bushels per acre. Rainfall for the five-month period, April to August, inclusive, totalled 7·13 inches. Wheat cutting commenced August 8.

A table of yields and costs in order of the respective years is not given in this report for the reason that the sequence of crops in the rotation is not as yet fully established.

HIGH RIVER

OPERATOR, B. F. KISER

The season from a crop standpoint was a profitable one at High River. Freedom from summer frosts permitted this district to thresh a higher grade of wheat than they usually obtain. Work on the station fields commenced April 11. Precipitation for the five-month period, April to August, inclusive, totalled 6·46 inches.

Wheat on fallow was sown at the rate of one and one-quarter bushels per acre, and wheat second crop one bushel per acre. Wheat cutting commenced with Garnet August 15, and followed on with Marquis on August 23.

RESULTS OF THE SEASON'S WORK AND AN AVERAGE OF FIVE YEARS' YIELDS AND COST OF PRODUCTION AT HIGH RIVER

Rotation of crops	Yield per acre		Cost		Five-year average profit per acre, 1925–1929
	1929	Average 1925–1929	1929	Average 1925–1929	
			$	$	$
Three-year Rotation—					
Summer-fallow			8 22 per acre	8 67 per acre	
Wheat, Marquis after fallow	32·00 bush.	35·40 bush.	0 62 per bush.	0 60 per bush.	20 22
Wheat, Marquis after wheat	27·00 bush.	29·74 bush.	0 64 per bush.	0 62 per bush.	16 24
Three-year Rotation—					
Summer-fallow			8 22 per acre.	8 76 per acre	
Wheat, Garnet after fallow	34·00 bush.		0 60 per bush.		
Sweet clover hay	Failure				
Oats replacing clover	35·00 bush.		0 50 bush.		
Demonstration Test Fields—					
Varieties of wheat on summer-fallow—					
Garnet	34·00 bush.				
Reward	33·00 bush.				
Marquis	32·00 bush.				

With the fair yields and high grade of wheat harvested, the operator, Mr. Kiser, places this as the most profitable year for him out of the last three crops.

The early wheats, Garnet and Reward, made a fine showing upon this farm. Garnet was harvested eight days before Marquis and threshed out two bushels more per acre. Reward gave an extra fine sample of wheat and led Marquis in yield by one bushel per acre.

In general crop Mr. Kiser grew thirty acres of the Reward variety of wheat the season of 1929. This approximately 900-bushel lot of Reward is a fair supply to care for the local demand for this popular wheat in 1930.

JENNER

OPERATOR, NELS. KLEIN

Work on the land commenced at this station April 19. A shortage of rain throughout the summer resulted in a light crop. Rainfall for the five-month period, April to August inclusive, totalled 4·39 inches. Wheat on fallow was sown at the rate of one and one-quarter bushels per acre and wheat second crop at the rate of one bushel per acre.

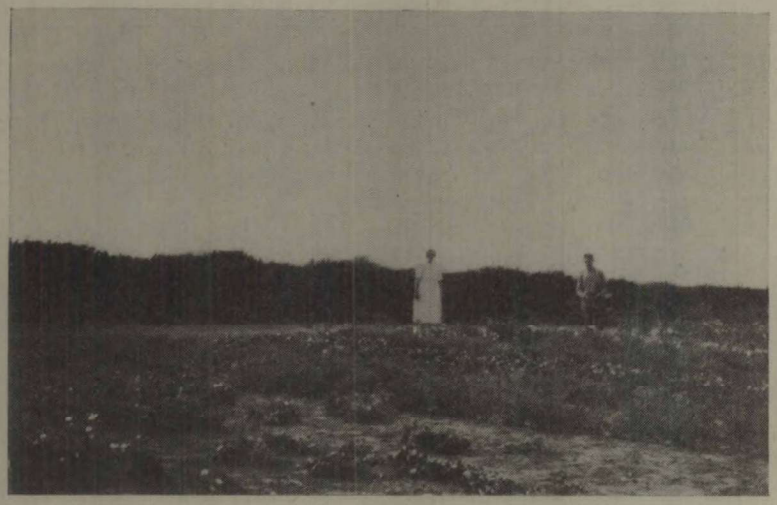
RESULTS OF THE SEASON'S WORK AND AN AVERAGE OF THREE YEARS' YIELDS AND COST OF PRODUCTION AT JENNER

Rotation of crops	Yield per acre		Cost		Three-year average profit per acre, 1927–1929
	1929	Average 1927–1929	1929	Average 1927–1929	
			$	$	$
Three-year Rotation—					
Summer-fallow	.....	.....	4 81 per acre	5 50 per acre	.....
Wheat, Marquis after fallow	9·60 bush.	26·87 bush.	1 15 per bush.	0 66 per bush.	16 24
Wheat, Marquis after wheat	6·00 bush.	18·33 bush.	1 64 per bush.	0 89 per bush.	9 61
Three-year Rotation—					
Summer-fallow	.....	.....	4 87 per acre	5 52 per acre	.....
Wheat, Marquis after fallow	9·40 bush.	26·13 bush.	1 13 per bush.	0 66 per bush.	15 54
Sweet clover, hay and oats	Failure	.....	6 29 per acre	.....	.....
Two-year Rotation—					
Wheat after corn	Failure	.....	3 60 per acre	.....	.....
Corn, N.W. Dent	Failure	.....	8 04 per acre	.....	.....
Demonstration Test Fields—					
Alfalfa hay	0·50 ton	.....	8 44 per ton	.....	.....
Western rye grass	Failure	.....	2 01 per acre	.....	.....

Jenner in 1929 was once more in the dry belt of Alberta. The crop average for the district would not exceed four bushels per acre.

From the table above it can be observed that alfalfa grown in rows was the only forage crop to give a return amid the drought conditions of the summer. Corn, one of the crops that is considered drought resistant, found the season's moisture inadequate for favourable growth.

Work upon the station was carried on with timely care for each operation required. The sales of seed grain made by the operator in the spring of 1929 totalled 1,611 bushels of Marquis wheat and 406 bushels of Banner oats.



Farm garden on the Illustration Station at Jenner, Alberta, in a season when the annual rainfall totalled 8.37 inches. The land in the garden is divided into two parts and each year's crop is planted on summer-fallowed land.

MILK RIVER

Operator, Wm. Albrecht

Spring work commenced in good time at Milk River. Operations on the station began on April 4. April and June were the favourable months from the standpoint of rainfall. The failure of July and August to give an appreciable amount of moisture was a severe blow to the station crops. The soil being quite light on the station, these fields suffered more than did the average run of the district.

Rainfall for the five-month period, April to August inclusive, totalled 7·63 inches. Wheat was sown at the rate of one and one-fifth bushels upon fallow and one bushel per acre on second-crop land. Wheat cutting commenced on August 10.

RESULTS OF THE SEASON'S WORK AT MILK RIVER

Rotation and crops	Yield per acre	Cost	Profit or (−) loss per acre
		$	$
Three-year Rotation—			
Summer-fallow	.....	7 87 per acre	.....
Wheat, Marquis after fallow	14·20 bush.	1 14 per bush.	1 56
Wheat, Marquis after wheat	14·00 bush.	1 03 per bush.	3 08
Three-year Rotation—			
Summer-fallow	.....	7 87 per acre	.....
Wheat, Marquis after fallow	19·40 bush.	0 88 per bush.	6 81
Sweet clover hay	3·20 tons	3 23 per ton	37 66
Two-year Rotation—			
Wheat, after corn	13·00 bush.	0 81 per bush.	5 72
Corn, N.W. Dent	2·00 tons	5 83 per ton	−1 66
Demonstration Test Field—			
Alfalfa hay	1·58 tons	6 14 per ton	14 03

The outstanding feature of the returns shown in the table is the good yield of sweet clover. This field by June 26 was as luxuriant a growth as has been seen in the station work for Alberta, and when mowed on July 4 represented a heavy yield of hay.

A field meeting was held upon this farm in the afternoon of July 25. The attendance of local men was not so large as expected nor yet up to what the appearance of the farm and the calibre of the addresses merited.

A matter of regret in regard to the work at Milk River is that Mr. Albrecht sold and vacated his farm this past autumn and as a result a good operator has been lost.

ORION

Operator, George Wagar

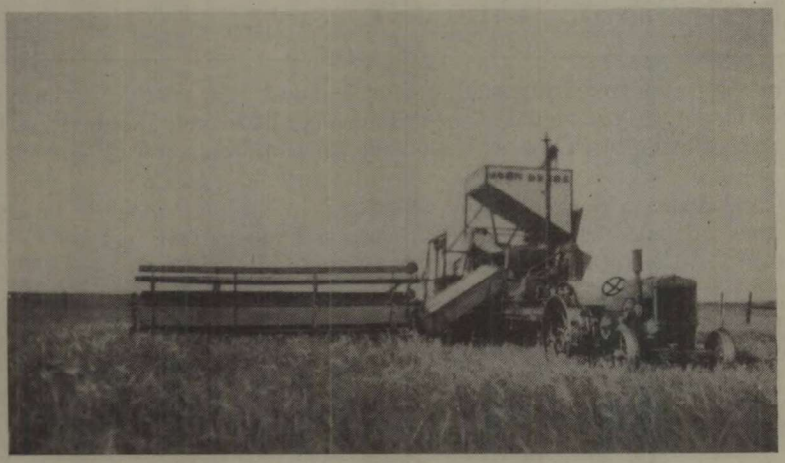
Work on the land commenced at this station on April 18. Precipitation for April was high, May and June moderate, and July and August droughty.

Crop growth followed the line of the rainfall, a uniform start, good early promise, pinching back somewhat in the closing period of its life. Rainfall for the five months, April to August, inclusive, totalled 7·11 inches. Wheat was sown at the rate of one bushel per acre. Combining wheat on the station fields was done on August 23.

RESULTS OF THE SEASON'S WORK AND AN AVERAGE OF FIVE YEARS' YIELDS AND COST OF PRODUCTION AT ORION

Rotation and crops	Yield per acre		Cost		Five-year average profit per acre, 1925–1929
	1929	Average 1925–1929	1929	Average 1925–1929	
			$	$	$
Three-year Rotation—					
Summer-fallow	.....	.....	5 42 per acre	4 82 per acre	.....
Wheat, Marquis after fallow	14·00 bush.	23·22 bush.	0 75 per bush.	0 73 per bush.	14 24
Wheat, Marquis after wheat	11·00 bush.	15·08 bush.	0 80 per bush.	1 25 per bush.	6 85
Three-year Rotation—					
Summer-fallow	.....	.....	5 42 per acre	4 90 per acre	.....
Wheat, Marquis after fallow	14·00 bush.	22·10 bush.	0 77 per bush.	0 72 per bush.	13 14
Sweet clover hay	Failure	.....	.....	.....	.....
Oats replacing clover	0·75 tons	.....	10 21 per ton	.....	.....
Two-year Rotation—					
Wheat after corn	9·00 bush.	15·06 bush.	0 85 per bush.	0 90 per bush.	9 39
Corn, N.W. Dent	1·00 ton	3·40 tons	8 28 per ton	.....	2 26
Demonstration Test Fields—					
Alfalfa hay	0·50 ton	.....	8 08 per ton	.....	.....
Western rye grass hay	1·00 ton	.....	4 25 per ton	.....	.....

Though acre yields at Orion were not high, increased acreage of crop and decreased acre costs of operation left Mr. Wagar in a favourable position from the season's work. Seven hundred acres comprised the grain crop area of general operations. One quarter section of this acreage carrying a cover of weed and trash from previous idle years was spring burnt, surface worked, sown to good seed, Marquis, and gave a yield of eighteen and one-half bushels per acre.



Combine in use on the farm of Mr. G. Wagar, operator of the Illustration Station at Orion, Alberta, at the close of a 1,500 acre crop season.

Economy of harvesting and threshing was also effected by the purchase of a combine. With this machine, Mr. Wagar and one man handled fifteen hundred acres of grain crop. Combining was started in August and continued into the early days of October.

In the early part of the year Mr. Wagar in having a well drilled obtained a flow of gas and water. These two commodities he harnessed up by pipe lines so that the convenience of the home was considerably improved. During the summer a commodious new barn was erected and the material laid on the ground for the building of a new residence.

A field meeting was held at this station on the afternoon of July 27. This gathering was representative of the farmers of the district. Judging by the local correspondent's report published in the Lethbridge *Herald,* the inspection of the Illustration fields and addresses of the speakers were much appreciated and formed a valuable source of information to the community.

The sales of stock and seed by the operator were such as to exert a considerable influence for improvement on the output of the district.

In poultry, fifteen settings of eggs and six Barred Rock males were sold; in swine, six Yorkshires went for herd work. Of seed grain, one hundred and forty bushels of Victory oats and seven hundred bushels of Marquis wheat were purchased by fourteen different farmers in the spring of 1929 from this operator.

PINCHER CREEK

Operators, Sandgren and Carlson

Work on the land commenced April 19. The season was favourable up to the end of June. This locality as well as the open country further east suffered from a falling off in rainfall during July and August. Precipitation for the five month period, April to August inclusive, totalled 8·21 inches.

Wheat was sown at one and one-fifth bushels per acre and wheat harvest commenced August 24.

RESULTS OF THE SEASON'S WORK AT PINCHER CREEK

Crops	Yield per acre	Cost	Profit or (—) loss per acre
		$	$
Summer-fallow		14 47 per acre	
Wheat, Marquis after wheat	10·40 bush.	1 40 per bush.	—1 56
Wheat, Reward after hay	22·00 bush.	0 61 per bush.	14 08
Barley after wheat	30·00 bush.	0 60 per bush.	3 00
Oats, Banner after oats	48·00 bush.	0 33 per bush.	10 56
Alfalfa hay	1·30 tons	5 82 per ton	11 93
Timothy hay	0 90 ton	7 12 per ton	7 09

ALFALFA

The field seeded to alfalfa on the Pincher Creek station in 1916 has returned a crop of hay for each of the thirteen succeeding years. Two acres were seeded in rows thirty-six inches apart and one acre was sown broadcast. In 1923 two additional acres were put in broadcast, thus completing a five acre field to alfalfa. The summer of 1928 a second five-acre field was sown broadcast to this legume crop.

In driving out from Pincher Creek beyond the Illustration Station the influence of these alfalfa fields may be seen by the number of farms that have blocks of alfalfa growing successfully in the fields.

A feature of the practice of the Pincher Creek district compared with the open prairie was vividly brought to the operator's working knowledge during the summer of 1929. Whereas ploughing and two cultivations kept fallow clean upon the farm they were operating east and south of Lethbridge; ploughing and six cultivations were not sufficient to keep their fallow free from weed growth on the Pincher Creek farm. These conditions are what accentuate the problem of weed control in this area.

A five acre field on the station was devoted to Reward wheat. This variety made a good showing throughout the season, threshed out well comparatively, and the sample of grain obtained was excellent.

The operator sold 224 bushels of Marquis wheat for seed purposes this spring.

SUNNYNOOK

Operator, Robert Montgomery

Work on the land commenced at this station March 22.

Precipitation of the previous winter was light. The five summer months, April to August inclusive, recorded a total amount in moisture of 3·36 inches. This very light rainfall resulted in a meagre crop on fallow and upon second crop land a failure was the common result. Wheat was sown at one and one-fifth bushels per acre. Combining wheat commenced on August 20.

RESULTS OF THE SEASON'S WORK AT SUNNYNOOK

Rotation and crops	Yield per acre	Cost	Profit or (—) loss per acre
		$	$
Three-year Rotation—			
Summer-fallow	.....	4 10 per acre	.....
Wheat, Marquis after fallow	8·00 bush.	1 06 per bush.	1 52
Wheat, Marquis after wheat	Failure	5 26 per acre	—5 26
Other Fields—			
Wheat, Marquis on breaking	7·75 bush.	1 09 per bush.	1 24
Oats after oats	Failure	5 17 per acre	—5 17

The fields upon the station which were broken in 1927 are now coming into their rotational sequence. The four additional fields broken in 1928 are not yet appearing in their regular crop positions.

The sales of seed grain made by the operator in the spring of 1929 were eighty bushels of Banner oats and 160 bushels of Marquis wheat.

Mr. Montgomery and his partner had a satisfactory season for the second year in the use of their combine. With home work and custom work this machine was out over thirty days.

WHITLA

Operator, R. H. Babe

Spring cultivation started at this station on April 16. Rainfall for the early part of the season was sufficient to promote a good growth. The larger supplies of moisture required to carry a lusty crop through the hot period of the

summer did not follow on through July. Hence the promised yield per acre was somewhat reduced. Although the threshing results were quite up to the later predictions judged by appearance of the ripening crop.

Rainfall for the five month period, April to August inclusive, amounted to 5·59 inches. Wheat was sown at the rate of one bushel per acre. Wheat cutting commenced August 4.

RESULTS OF THE SEASON'S WORK AND AN AVERAGE OF FIVE YEARS' YIELDS AND COST OF PRODUCTION AT WHITLA

Rotation and crops	Yield per acre		Cost		Five-year average profit per acre, 1925–1929
	1929	Average 1925–1929	1929	Average 1925–1929	
			$	$	$
Three-year Rotation—					
Summer-fallow	.....	.....	4 93 per acre	5 74 per acre	.....
Wheat, Marquis after fallow	17·00 bush.	22·36 bush.	0 71 per bush.	0 69 per bush.	11 88
Wheat, Marquis after wheat	15·00 bush.	14·62 bush.	0 78 per bush.	0 99 per bush.	4 28
Three-year Rotation—					
Summer-fallow	.....	.....	4 93 per acre	5 74 per acre	.....
Wheat, Marquis after fallow	15·80 bush.	21·64 bush.	0 74 per bush.	0 74 per bush.	11 00
Sweet clover hay	1·00 ton	.....	8 13 per ton	.....	.....

As seen in the above table, the Whitla station has maintained a fair average in wheat production over the past five years. In 1929 sweet clover hay gave an encouraging return, the stand being ahead of what we usually obtain at this point. The May and June rainfall produced a reasonable growth for the cutting that was made on June 29, when one ton of sweet clover hay per acre was the resulting crop.

The five acre field of Marquis wheat from first generation seed passed the standing crop inspection, but one foreign head was found, by the inspector, in the field.

The sales of seed grain made by the operator this spring amounted to sixty bushels of Banner oats and six hundred bushels of Marquis wheat.

YOUNGSTOWN

OPERATOR, R. L. COAD

Work on the land commenced at this station on April 13. During the winter a very light precipitation had been received and this condition of drought continued into and throughout the crop season. The total amount of rainfall for the five month period, April to August inclusive, was 3·73 inches.

Wheat was sown at one and one-quarter bushels per acre on fallow and one bushel per acre on second crop land. Heading wheat commenced on August 8.

RESULTS OF THE SEASON'S WORK AND AN AVERAGE OF FIVE YEARS' YIELDS AND COST OF PRODUCTION AT YOUNGSTOWN

Rotation and crops	Yield per acre		Cost		Five-year average profit per acre, 1925–1929
	1929	Average 1925–1929	1929	Average 1925–1929	
			$	$	$
Three-year Rotation—					
Summer-fallow			4 48 per acre	5 05 per acre	
Wheat, Marquis after fallow	6·00 bush.	17·50 bush.	1 58 per bush.	0 83 per bush.	7 70
Wheat, Marquis after wheat	4·00 bush.	13·46 bush.	2 21 per bush.	1 07 per bush.	3 97
Four-year Rotation—					
Summer-fallow			4 48 per acre	5 14 per acre	
Oats, Victory after fallow	0·25 ton		38 92 per ton		
Western rye grass hay (first year)	Failure		5 83 per acre		
Western rye grass hay (second year)	0·25 ton		17·76 per ton		
Three-year Rotation—					
Summer-fallow			4 18 per acre	5 63 per acre	
Wheat, Marquis after fallow	4·33 bush.	17·56 bush.	2 25 per bush.	0 96 per bush.	7 23
Sweet clover hay	Failure				
Oats replacing clover	0·25 ton		29 32 per ton		

Youngstown was well within the low crop area of Alberta for 1929. All grain cut was a header or combine proposition and many acres were left unharvested. Notwithstanding this discouraging result the agricultural society toward the end of the year sponsored a seed fair which was favourably supported and attended. The operator of the Illustration Station, Mr. R. L. Coad, received the highest award of the show on a sample of Marquis wheat grown from registered seed.

The sales of seed grain made by the operator amounted to one hundred bushels of Marquis wheat and six hundred bushels of Victory oats.

IRRIGATED STATIONS

GLENWOODVILLE

OPERATOR, GLEN WOOD

Following the experience of 1928 when ample rainfall was received to meet the moisture requirements of crops, farmers of the district were loath to apply water in 1929 when at the beginning of July the fields were indicating a need of moisture. The expectancy of early rains held in abeyance preparation for and application of water. Irrigation was later undertaken with gratifying results, for in place of getting rains a somewhat dry July was experienced. Rainfall for the five months, April to August inclusive, totalled 8·08 inches. The same period in 1928 recorded 15·78 inches of rainfall.

RESULTS OF THE SEASON'S WORK AND AN AVERAGE OF FIVE YEARS FOR ALFALFA AT GLENWOODVILLE

Crop	Yield per acre		Cost		Five-year average profit per acre, 1925–1929
	1929	Average 1925–1929	1929	Average 1925–1929	
			$	$	$
Alfalfa hay	2·27 tons	2·90 tons	5 91 per ton	5 79 per ton	14 39
Wheat, Marquis	23·00 bush.		0 84 per bush.		
Barley, O.A.C. No. 21	10·00 bush.		1 67 per bush.		
Oats, Banner	50·00 bush.		0 39 per bush.		

The station fields for 1929 with the exception of barley, gave a profitable return.

A cutting of hay was made from the ten acre permanent pasture field on July 17. The yield of hay was 1·27 tons per acre. Following the hay crop this area was grazed to the amount of forty-two cow days, 2,560 sheep days, and 516 horse days. Computing the returns from this pasture, a profit of 14·64 per acre was obtained from the dual purpose use of the field.

Upon his general crop land Mr. Wood devoted several acres and gave considerable attention to sugar beets. When shipped to the factory at Raymond the beets left a satisfactory margin of profit above the cost of production. Considering the cleaning and improved tilth effect of sugar beet growing upon the land, this root crop is a valuable acquisition to the farming practice of the Glenwoodville district.

KIPP

OPERATOR, C. M. NICOL

For the months, April, May and June, 9·01 inches of precipitation was received. This amount of moisture precluded the necessity of early irrigation. July and August had together 1·01 inches of rainfall at Kipp, and this small amount during the heat of summer, and heavy growth of crops, made a strong demand for late irrigation water.

The first cutting of alfalfa was made on July 2 and the second cutting on August 17.

RESULTS OF THE SEASON'S WORK AND AN AVERAGE OF FIVE YEARS AT KIPP

Crop	Yield per acre		Cost		Five-year average profit or (—) loss per acre, 1925–1929
	1929	Average 1925–1929	1929	Average 1925–1929	
			$	$	$
Alfalfa hay	2·29 tons	2·82 tons	10 39 per ton	7 79 per ton	10 20
Wheat, Marquis	26·50 bush.	.....	0 85 per bush.	.....	.....
Barley, O.A.C. No. 21	19·50 bush.	22·70 bush.	1 15 per bush.	1 13 per bush.	—10 67
Oats, Banner	62·00 bush.	53·39 bush.	0 37 per bush.	0 43 per bush.	5 94
Corn, N.W. Dent	2·00 tons	.....	11 59 per ton	.....	.....

As viewed from the highway this station maintained a prosperous appearance throughout the season of 1929.

Dairying by way of a retail milk route in the mining town of Coalhurst has been a leading line with this farm for a number of years. Since the irrigation water became available in 1924, the winter feed for the Holstein herd has been assured by the alfalfa hay and coarse grains that have been successfully grown.

As years pass the ten acre field of permanent pasture is increasing in importance in the farm scheme of operations. During June, fifteen head of calves and yearlings ran on this area and for the months of August and September, fifteen Holstein cows fed from this ten acre field. The pasture opens to a watering pond and being located within easy reach of the farm buildings, makes a convenient night run for the milch cows and an ideal home for the growing females.

REPORT OF ILLUSTRATION STATIONS IN NORTHWESTERN SASKATCHEWAN AND NORTHEASTERN ALBERTA

N. F. Bell, B.S.A., Supervisor

During the year there were thirteen Illustration Stations supervised from the Dominion Experimental Station, Scott, Sask. Nine of these are in northwestern Saskatchewan and three are in northeastern Alberta. This number includes two new stations, Glenbush, Sask., and Meanook, Alta., on which certain preparatory work was done, but no crops were grown in 1929.

THE SEASON

Spring opened a few days earlier than the average date on the southern stations and a few days later on the northern stations. Taken as a whole, the opening date was not far from the average of the years for which records are available. The earliest spring work was reported from Wainwright as April 22, while work at Meadow Lake did not commence until May 9. Work at the other stations began between these dates. A heavy fall of snow early in April supplied ample moisture for germination at the eastern and northern stations. At Loverna, Lloydminster, and Wainwright, however, an increased supply of moisture would have improved conditions for germination. During the month of May, Loverna, Kindersley, and Guernsey each received good rains, ranging from 1·38 inches to 2·28 inches. The other stations were not so fortunate in this respect, and in some cases weeds made greater headway in the fields, particularly on land that had been fallowed last year. The June rains were not so general as usual. Some districts reported less than half an inch, while others received more than six inches. In July the rains were again unevenly distributed. Fortunately, however, there were no frosts to damage the late grains and the quality was generally good.

The yields of wheat ranged from 1·4 bushels per acre to almost 40·0, and oats from 3·0 bushels to 106·0 bushels per acre or from almost a complete crop failure to a "bumper" crop. Hay crops varied with the precipitation from total failure to good yields.

The precipitation for the growing months of this year, together with the average for the same period over a term of years, is shown in the following table:—

PRECIPITATION AT ILLUSTRATION STATIONS IN NORTHERN SASKATCHEWAN AND NORTHERN ALBERTA, FROM APRIL 1 TO AUGUST 31, 1929

Station	April	May	June	July	August	Total	5-year average
	in.	in.	in.	in.	in.	in.	in.
Guernsey, Sask.	1·97	2·28	5·10	1·28	0·03	10·66	9·74
Kindersley, Sask.	0·44	1·38	1·74	1·29	0·30	5·15	7·42
Lloydminster, Sask.	0·73	0·22	0·81	0·94	0·54	3·24	7·64
Loverna, Sask.	0·40	1·64	0·47	0·43	0·40	3·34	(2 years 5·70)
Marcelin, Sask.	1·20	0·65	2·25	0·10	0·50	4·70	6·25
Meadow Lake, Sask.	0·73	0·97	6·31	1·78	0·55	10·34	(2 years 8·49)
Meota, Sask.	2·11	0·89	4·59	0·60	0·36	8·55	8·68
Spruce Lake, Sask.	1·29	0·24	2·11	0·49	0·28	4·41	7·48
St. Paul, Alta.	0·67	0·80	2·26	1·95	1·22	6·90	9·56
Tisdale, Sask.	1·08	0·67	2·77	1·54	0·28	6·34	.....
Wainwright, Alta.	0·66	0·85	0·54	0·84	0·74	3·63	7·36

The following values were used as a basis in determining the cost of producing crops and calculating return values:—

COST VALUES

Rent	8 per cent of land value.
Taxes	50 cents per acre.
Use of machinery	$1 35 per acre.
Manual labour	30 cents per hour.
Horse labour	08 cents per hour.
Threshing	Rates prevailing in district.
Binder twine	" " "

COST OF SEED

Wheat	$1 25 per bushel.
Oats	0 60 per bushel.
Barley	0 75 per bushel.
Fall rye	0 90 per bushel.
Spring rye	0 90 per bushel.
Corn	0 07 per pound.
Sunflowers	0 11 per pound.
Sweet clover	0 14 per pound.
Western rye grass	0 11 per pound.
Alfalfa	0 52 per pound.
Timothy	0 12 per pound.

RETURN VALUES

Wheat, No. 1 Nor	$1 27 per bushel.
Wheat, No. 2 Nor	1 24 per bushel.
Wheat, No. 3 Nor	1 21 per bushel.
Wheat, No. 4 Nor	1 16 per bushel.
Wheat, No. 5 Nor	1 01 per bushel.
Oats, 2 C.W	0 55 per bushel.
Oats, 3 C.W	0 52 per bushel.
Extra 1 Feed	0 52 per bushel.
Oats, 1 Feed	0 50 per bushel.
Barley, 3 C.W	0 57 per bushel.
Barley, 4 C.W	0 52 per bushel.
Barley, 5 C.W	0 44 per bushel.
Fall rye	0 70 per bushel.
Hay	10 00 per ton.
Oat sheaves	0 05 per sheaf.
Oats, green feed	10 00 per ton.
Corn and sunflower silage	3 00 per ton.
Corn fodder	6 00 per ton.
Sunflower fodder	5 00 per ton.

The value of grain was obtained by taking the average of actual price paid for grain for the threshing period, August 28 to October 8, at stations taking 24 cents per 100 pounds freight rate, adjusting the price where a different rate prevailed. This gives as near as possible the actual price of the grain at the shipping point nearest the Illustration Stations. Small samples of grain were taken at each station and graded.

Two-thirds of the cost of summer-fallow was charged to the first crop and one-third to the second crop where the rotations cover three or more years. Where fall rye was used in the rotation as a cleaning crop, the fallow preceding the rye was charged against the whole rotation rather than against the rye crop.

GLENBUSH

JOHN C. GRANT, OPERATOR

A new station this year was located on Mr. Grant's farm, S.W. of Sec. 17, Twp. 49, Rge. 14, west of the third meridian, adjacent to the village of Glenbush, and facing the main highway connecting this district with North Battleford.

The land is a dark loam and is slightly rolling and typical of the district.

The work this year was entirely of a preparatory nature, practically all of the land being fallowed.

GUERNSEY

C. H. SNIDER, OPERATOR

Spring opened in fair time, with seeding operations starting on April 29, about three days earlier than the six-year-average date for this station. From a standpoint of moisture, the season was a good one.

A serious infestation of perennial sowthistle, and a marked tendency to soil drifting are problems with which the farmers of this district have to grapple. On the other hand, moisture conditions are more favourable here than in many districts and it is possible to reduce the area in bare fallow to a minimum.

SUMMARY OF YIELDS, COST AND PROFIT OR LOSS AT GUERNSEY

Rotations and crops	Yields per acre, bushels or tons		Cost per bushel or ton		Profit or (−) loss per acre	
	1929	Four-year average	1929	Four-year average	1929	Four-year average
			$	$	$	$
Two-year Rotation—						
Sweet clover	0·88	1·35	7 42	8 02	2 27	3 01
Wheat	13·0	14·7	0 88	0 86	4 94	4 10
Average for rotation	.....	.....	.....	.....	3 61	3 56
Two-year Rotation—						
Corn	1·20	0·95	8 26	16 88	−2 71	10 34
Wheat	13·0	14·7	0 75	0 83	6 69	4 54
Average for rotation	.....	.....	.....	.....	1 99	2 90
Four-year Rotation—						
Fallow	.....	.....	*6 86	*7 39	.....	.....
Wheat, Garnet	11·5	15·6	1 14	0 99	0 78	3 80
Hay, sweet clover	1·75	1·86	5 10	4 59	8 57	10 33
Oats, Banner	40·8	45·3	0 30	0 31	10 75	8 79
Average for rotation	.....	.....	.....	.....	5 03	5 73
Three-year Rotation—						
Wheat, Reward	16·0	18·0	0 74	0 71	8 37	6 79
Barley, O.A.C. 21	21·5	29·5	0 45	0 41	1 22	3 75
Hay, sweet clover	0·75	1·63	8 80	6 24	90	8 35
Average for rotation	.....	.....	.....	.....	3 50	6 30
Three-year Rotation—						
Wheat, Garnet	14·5	19·7	0 80	0 69	6 67	7 33
Barley, O.A.C. 21	21·5	29·5	0 46	0 41	1 22	3 75
Hay, sweet clover	0·75	1·63	8 80	6 24	−1 30	7 25
Average for rotation	.....	.....	.....	.....	2 93	6 11
Demonstration Field—						
Alfalfa	0·88	1·95	6 27	3 77	3 28	12 87

* Cost per acre.

There are four rotations in operation at this station, designed to keep sowthistle under control and at the same time produce a satisfactory crop. One of these was divided in order to compare the values of the two earlier varieties of wheat, Garnet and Reward. Every rotation gave a profit this season. The same is true of every crop sown except corn, which failed to show a profit this season, or for a number of years.

The four-year rotation appears to be well suited to the needs of this district. A fallow that is well ploughed in the fall and kept black throughout the following summer destroys most of the sowthistle and a good, clean crop of wheat is usually obtained from this field the second year. By seeding down to

rye grass or sweet clover, a good crop of hay has been harvested and the field ploughed when the sowthistle roots are at their weakest stage. A crop of oats has a good chance in the fourth year. This rotation has been quite profitable at this station, and permits cultivation necessary to keep weeds under control. The hay crop provides root fibre that helps hold the soil from drifting.

The two-year rotation, sweet clover and wheat, shows a substantial profit, but unless a farmer feeds quite a number of cattle or sheep, he would have more hay than could be profitably used.

The three-year rotation, wheat, barley, and hay, does not appear to control the sowthistle as well as the four-year rotation, and has rather more barley than most farmers care to grow.

The operator of this station conducted rod-row tests in co-operation with the Experimental Farms and four varieties of grain for an environment test in co-operation with the University of Saskatchewan. Fertilizer experiments were also carried on at his farm.

Attractive home and surroundings of Mr. C. H. Snider, operator of the Illustration Station at Guernsey, Sask.

A field meeting was held on this station on August 6, when the work of this station was discussed very thoroughly. Some of the farmers present had attended previous field days and commented favourably on the progress made.

A start in pure-bred dual-purpose Shorthorns was made this season when two registered cows were bought. A good flock of Barred Rocks has been established and 14 settings of eggs were sold locally last spring. Slightly over 500 bushels of seed grain were sold from this station to neighbouring farmers during the year.

KINDERSLEY

ROBERT SIMPSON, OPERATOR

Seeding on this station commenced on April 24. This was ten days earlier than the previous year and two days earlier than the six-year-average date at this station. There was plenty of moisture for germination but the temperature was rather low for maximum growth in the early stages of the crop. The precipitation was somewhat less than the average, but was fairly well distributed.

SUMMARY OF YIELDS, COST AND PROFIT OR LOSS AT KINDERSLEY

Rotations and crops	Yield per acre, bushels or tons		Cost per bushel or ton		Profit or (—) loss per acre	
	1929	Average 2 years	1929	Average 2 years	1929	Average 2 years
			$	$	$	$
Six-year Rotation—						
Fallow			9 39	8 54		
Wheat, Marquis	20·0	31·5	0 86	0 57	8 23	15 08
Oats, Banner	37·5	49·8	0 36	0 29	5 19	7 56
Hay, sweet clover	1·00	1·13	9 18	7 81	0 82	2 43
Wheat, Marquis	4·0	18·8	3 05	0 64	—7 22	6 44
Hay, sweet clover	1·50	1·75	6 29	5 19	5 57	8 42
Average for rotation					2 10	6 66
Six-year Rotation—						
Fallow			9 39	8 54		
Wheat, Marquis	20·0	31·5	0 86	0 57	8 23	15 08
Oats, Banner	37·5	49·8	0 36	0 29	5 19	7 56
Oats in rows (green feed)	0·88	0·94	8 78	9 39	1 97	2 47
Wheat, Marquis	7·5	20·5	1·26	0 52	—0 18	9 96
Hay, sweet clover	1·50	1·75	6 29	5 19	5 57	8 42
Average for rotation					3 46	7 25
Three-year Rotation—						
Fallow, surface cultivation only			7 82	7 06		
Wheat, surface cultivation only	15·0	26·5	1 02	0 64	3 74	10 61
Wheat, surface cultivation only	13·0	15·3	0 95	0 79	4 10	—2 12
Average for rotation					2 61	2 83
Three-year Rotation—						
Fallow (ploughed)			9 00	8 11		
Wheat	17·0	27·5	0 96	0 64	5 26	11 37
Wheat	14·5	13·0	0 90	0 99	5 43	—2 58
Average for rotation					3 56	2 93
Two-year Rotation—						
Fallow			†9 62			
Wheat, Garnet	14·8	18·9	1 32	16 42	—1 59	5 77
Average for rotation					—0 80	2 89
		Average 6 years		Average 6 years		
Demonstration Fields—						
Brome		0·42	†5 05	14 27	—5 05	—1 34
Alfalfa	0·75	0·84	8 37	14 11	1 22	3 10
Marquis on fallow	20·0	1·0	1 19			
Reward on fallow	20·0	1·0	1 09			
*Garnet on fallow	14·8	3·0	1 07			

† Per acre. * Garnet was grown after fallow in a two-year rotation while Marquis and Reward were grown after fallow in the six-year rotation.

Reward and Marquis were seeded side by side on fallowed land. Reward was ripe and cut five days before Marquis and gave the same yield—20 bushels of No. 1 wheat per acre. Garnet in another field yielded 14·8 bushels of No. 3 wheat. It ripened two days before Reward and twelve days ahead of Marquis but was badly shrivelled and shrunken, grading only No. 3 Northern.

The weather conditions at this station this season were less favourable to the earlier varieties than to those which matured later.

Wheat after oats in rows yielded more than wheat after sweet clover. The six-year rotation with oats in rows in the fourth year gave a better yield than did a similar rotation using sweet clover instead of this crop. The field of Brome grass failed to produce a crop worth cutting and was broken up. This grass has not been a profitable crop at this station. Alfalfa yielded three-quarters of a ton of choice hay and has shown a profit again this year.

The results of the cultural test where surface cultivation was compared with ploughing in the fallow and in the third year of the rotation, indicate that in order to control deep rooted perennial weeds, land should be ploughed at least

once in three years, preferably in the fallow year, although surface cultivation gave better yields than spring ploughing for the second crop. The practice of spring ploughing is not generally followed in this district because of the light yields that usually follow.

Mr. Simpson sold over 800 bushels of pure seed grain last season to farmers in his district, and nearly a thousand bushels of his 1929 wheat were purchased by his neighbours and taken from the threshing machine. Six pure bred Barred Rock cockerels and 46 settings of eggs were sold last spring by this operator.

A very successful field meeting was held at this station on July 30 with about 100 people in attendance. A lunch was provided by the Kindersley Agricultural Society.

LLOYDMINSTER

Hugh Hill, Operator

Seeding operations commenced at this station on May 2, about three days later than the average date, but two days earlier than last year. The soil was too dry for satisfactory germination of the seed. Some of the seed sown failed to start, and the thin crop that started never received enough moisture during the growing season to satisfy its needs. The total precipitation between January 1 and September 1 was less than four inches and did not total one inch in any month during the summer.

SUMMARY OF YIELDS, COST, AND PROFIT OR LOSS AT LLOYDMINSTER

Rotations and crops	Yields per acre, bushels or tons		Cost per bushel or ton		Profit or (−) loss per acre	
	1929	Five-year average	1929	Five-year average	1929	Five-year average
			$	$	$	$
Three-year Rotation—						
Hay and fallow	0·30	1·10	23 70	7 52	−4 11	5 70
Wheat	4·0	27·2	2 20	0 81	−3 82	16 87
Oats	12·0	44·6	0 81	0 33	−3 06	9 39
Average for rotation	.....	.....	.....	.....	−3 66	10 65
Five-year Rotation—						
Fallow	.....	Two-year average	*6 70	Two-year average	.....	Two-year average
Wheat	9·5	16·6	1 44	0 76	−2 92	3 97
Wheat	7·0	17·5	1 80	0 80	−3 95	4 30
Oats seeded	11·5	27·6	0 78	0 44	−2 60	0 45
Hay and breaking	Nil	0·90	.....	6 76	−7 50	1 05
Average for rotation	.....	.....	.....	.....	−3 19	1 95
Three-year Rotation—						
Fallow	.....	.....	*6 30	.....	.....	.....
Wheat, Garnet	7·0	.....	1 77	.....	−3 69	.....
Wheat, Garnet	6·0	.....	1 88	.....	−3 83	.....
Average for rotation	.....	.....	.....	.....	−2 50	.....
Three-year Rotation—						
Fallow	.....	.....	*6 30	.....	.....	.....
Wheat	7·8	.....	1 63	.....	−3 07	.....
Wheat, Reward	6·5	.....	1 79	.....	−3 85	.....
Average for rotation	.....	.....	.....	.....	−2 22	.....

* Cost per acre.

Where Garnet and Reward were compared under similar conditions, there was but little difference in yields.

The hay crop in the five-year rotation was a complete failure this year. This factor brought the loss on this rotation higher than the loss on the three-year rotation in spite of the higher yield of wheat on this rotation.

During the year this operator sold 590 bushels of seed wheat, 230 bushels of seed oats, 60 bushels of seed peas and 25 bushels of potatoes. From the flock of pure bred Barred Rocks, two dozen pullets, eleven cockerels and fifteen settings of eggs were sold.

LOVERNA

ROBERT BRUMWELL, OPERATOR

Spring opened late in April and the first seeding was done on May 2, which is the average date for the years that records are available at this station.

A snowfall of about 4 inches just before seeding helped conditions for germination and the crop received a fair start. The precipitation in May was 1·64 inches. This was more than half of the total rainfall for the summer. June gave a quarter of that amount and August gave still less. All crops suffered severely. A large percentage of the crop land in this district was fallowed after being sown to crop.

SUMMARY OF YIELDS, COST, AND PROFIT OR LOSS AT LOVERNA

Rotations and crops	Yields per acre, bushels or tons		Cost per bushel or ton		Profit or (−) loss per acre	
	1929	Two-year average	1929	Two-year average	1929	Two-year average
			$	$	$	$
Seven-year Rotation—						
Fallow	.....	.....	5 03	5 93	.....	.....
Wheat, seeded down	4·7	17·4	2 02	1 20	−3 68	6 56
Hay	.....	0·63	†6 95	13 25	−6 95	−2 20
Corn	.....	1·25	†6 68	7 94	−6 68	−6 46
Wheat	3·0	10·9	1 94	1 25	−2 11	2 52
Fallow, sown to fall rye	.....	.....	†5 34	6 08	−5 34	−6 08
Fall rye	4·0	*11·3	1 43	0 83	−2 50	−0 33
Average for rotation	.....	.....	.....	.....	−3 90	−0 86
Two-year Rotation—						
Fallow	.....	.....	†5 46	†6 45	.....	.....
Oats	5·0	13·0	2 32	0 92	−9 12	−6 45
Average for rotation	.....	.....	.....	.....	−4 56	−3 23
Demonstration Test Fields—						
Wheat, Renfrew	4·9	11·2	2 05	1 05	−3 98	−0 42
Western rye grass	0·33	1·42	16 73	4 59	−2 22	7 64
Sweet clover	0·67	1·59	8 46	4 25	−1 03	8 06
Alfalfa and brome	.....	1·25	†4 45	5 89	−4 45	6 61
Alfalfa	.....	1·25	†4 45	6 25	−4 45	6 25

* Spring rye was substituted in 1928. † Per acre.

The average yield of wheat on fallow was 4·6 bushels per acre. Only two of the four fields in hay produced a crop worth cutting. The extremely light crop due to climatic conditions, makes a comparison of crops and rotations of little value this year. This being the second year for these rotations, the average for two years only can be shown.

During the year 433 bushels of seed grain have been sold from this station to neighbouring farmers.

Mr. Brumwell set out a shelter belt of box elder, ash, willow, poplar, caragana, spruce, and pine, some years ago and has now one of the finest shelter belts that can be found in the district, and during the summer one could find around one hundred fine Bronze turkeys at home among these trees.

MARCELIN

J. B. Godbout, Operator

Seeding commenced at this station on May 9, which was five days later than the previous year and one day later than the average date for five years.

A heavy snowfall in April furnished moisture to start the crop. The precipitation for May and June was sufficient for the needs at the time, but during July only one-tenth of an inch of rain fell, and none fell during August. In spite of the fact that only three inches of rain fell during May, June and July a fair crop was harvested, as reference to the following tables will show.

SUMMARY OF YIELDS, COST, AND PROFIT OR LOSS AT MARCELIN

Rotations and crops	Yields per acre, bushels or tons, 1929	Cost per ton or bushel	Profit or (—) loss per acre
		$	$
Three-year Rotation—			
Fallow	.....	†7 24	.....
Wheat, Garnet	17·0	0 91	5 57
Wheat, Garnet	11·0	1 25	—0 07
Average for rotation	.....	.....	1 83
Three-year Rotation—			
Fallow	.....	†7 24	.....
Wheat, Reward	16·0	0 97	4 29
Wheat, Reward	10·0	1 38	—1 36
Average for rotation	.....	.....	0 98
Five-year Rotation—			
Fallow	.....	†7 44	.....
Wheat, Marquis	18·0	0 92	5 82
Wheat	13·0	1 12	1 61
Oats (seeded down)	1·32	7 30	3 07
Hay	1·38	6 78	4 45
Average for rotation	.....	.....	2 99
Demonstration Test Fields—			
Barley, O.A.C. 21	15·0	0 74	—2 64
Alfalfa and western rye grass	0·75	10 00	.....
Western rye grass	0·75	10 00	.....

† Per acre.

It will be noted that Garnet wheat in a three-year rotation exceeded Reward in point of yield, both after fallow and on stubble. Marquis, while yielding higher than either of the earlier varieties, was grown on another field and the yield may have been influenced by other factors and is, therefore, not comparable to the others.

The five-year rotation returned a greater profit than did the three-year rotation. The yields of hay were not heavy but were able to pay their way in the rotation and have a fair margin of profit. Alfalfa, sweet clover, and western rye grass, all do well at this station.

Both tractor and horse-power are used by this operator. The tractor is used chiefly as an auxiliary power to take care of the peak load, or where crop is disked in, then the disking is done by the tractor, the teams being used to harrow, seed, and pack immediately after in order to conserve as much as possible of the moisture.

The use of wide implements and plenty of horses helps to keep down costs at this station. A combine was used in 1928 but a trial failed to convince Mr. Godbout that this machine was more satisfactory than the binder method under his conditions. The combine was exchanged and the binder used to harvest the 1929 crop.

MEADOW LAKE

MARTIN GRAN, OPERATOR

This is the most northern Illustration Station in Saskatchewan and is located in twp. 57, rge. 17, west of the third meridian. Spring was a little later in opening here than in districts farther south, the first seeding being done on May 9. Climatic conditions approached the ideal here this season. There was plenty of moisture throughout the growing months with only half an inch of rain in August. There were no damaging frosts.

The yields of hay were satisfactory. A mixture of Arctic sweet clover and western rye grass, in the six-year rotation, yielded $1\frac{3}{4}$ tons per acre. In the test fields western rye grass outyielded alfalfa and timothy by a quarter of a ton per acre. The hay in every case was of choice quality.

SUMMARY OF YIELDS, COST, AND PROFIT OR LOSS AT MEADOW LAKE

Rotations and crops	Yields per acre, bushels or ton, 1929	Cost per ton or bushel	Profit or (—) loss per acre
		$	$
Demonstration Test Fields—			
Hay, western rye grass	1·50	3 71	9 44
Hay, alfalfa	1·25	4 54	6 83
Hay, timothy	1·25	4 23	7 21
Three-year Rotation—			
Fallow	.....	†5 04	.....
Wheat, Reward	37·5	0 39	24 81
Wheat, Reward	30·0	0 43	18 36
Average for rotation	.....	.....	14 39
Three-year Rotation—			
Fallow	.....	†5 04	.....
Wheat, Garnet	39·5	0 37	26 56
Wheat, Garnet	35·0	0 38	23 01
Average for rotation	.....	.....	16 52
Three-year Rotation—			
Fallow	.....	†5 04	.....
Wheat, Marquis	35·6	0 40	22 61
Wheat, Marquis	37·6	0 37	25 10
Average for rotation	.....	.....	15 90
Five-year Rotation—			
Wheat, Garnet	38·0	0 42	22 46
Wheat, Reward	30·0	0 46	16 59
Oats, Banner	106·0	0 16	30 97
Barley, O.A.C. 21	68·3	0 23	15 03
Hay, western rye grass and sweet clover	1·75	3 73	10 97
Average for rotation	.....	.....	19 20

Garnet wheat was sown in the fallow field this year on account of the land being newly broken the previous year.

† Per acre.

Marquis, Garnet and Reward wheats were tested side by side in three-year rotations. Reference to the above table will show that Garnet yielded heaviest for a fallow crop and total yield, while Marquis led on stubble. Garnet and Reward ripened on the same date, while Marquis was ten days later; all were sown the same day. The date of maturity is an important factor at all northern stations, although in 1928 when a larger percentage of the wheat in practically every district was frozen, wheat grown on this station was but little damaged and graded high.

In the five-year rotation, it was considered advisable to sow wheat on the field that would ordinarily have been fallowed on account of the land having been cleared and broken only last year. The returns are, therefore, greater than would be expected when only four of the five fields produced a crop.

Crop of Garnet wheat on the Illustration Station, Meadow Lake, Sask., which yielded 39¾ bushels per acre.

This Illustration Station is located 65 miles from the nearest shipping point. For this reason hauling charges of 20 cents a bushel for wheat and 10 cents a bushel for oats were deducted from the return values. These charges reduced the profit considerably.

Rod-rows of wheat, oats and barley varieties were grown by this operator in co-operation with the Dominion Experimental Station at Scott, and plots of four varieties of wheat were grown in co-operation with the University of Saskatchewan for their work in environment studies.

MEANOOK

Fred Macintyre, Operator

This station was established during the summer of 1929 on the S.E. quarter of sec. 3, twp. 65, rge. 23, west of the 4th meridian, about three miles west of Meanook on a main road.

The soil is fairly representative of the district. Several types of soil are present in most of the fields. The low land has patches of peat and the knolls are inclined to be light. No crop was sown on the station this season but some land was prepared for seeding next year.

MEOTA

WALTER TAIT, OPERATOR

Seeding commenced on May 3, one day later than last year and three days later than the average date for nine years at this station. An eighteen inch snowfall on April 5 and 6 provided a generous supply of moisture for germination and starting the crop.

During May the weeds that failed to grow in 1928 fallows made a desperate fight to gain supremacy over the 1929 crop and in many cases in this district, one could truthfully say, the weeds won. On the station however, while the weeds did considerable damage, the crop was able to keep well ahead of them.

SUMMARY OF YIELDS, COST, AND PROFIT OR LOSS AT MEOTA

Rotations and crops	Yields per acre, bushels or tons		Cost per bushel or ton		Profit or (—) loss per acre	
	1929	7-year average	1929	7-year average	1929	7-year average
			$	$	$	$
Three-year Rotation—						
Fallow	.....	.....	†8 80	.....	.....	.....
Wheat, Garnet	24·0	.....	17 42	.....	12 34	.....
Wheat, Garnet	15·0	.....	15 51	.....	3 09	.....
Average for rotation	.....	.....	.....	.....	5 14	.....
Three-year Rotation—						
Fallow	.....	.....	†8 80	.....	.....	.....
Wheat, Reward	19·8	.....	0 85	.....	7 72	.....
Wheat, Reward	11·5	.....	1 30	.....	—0 75	.....
Average for rotation	.....	.....	.....	.....	2 32	.....
Three-year Rotation—						
Wheat, Marquis	19·2	40·7	0 57	0 40	12 81	25 74 (3 yrs.)
Oats seeded, Banner	34·0	49·4	0 36	0 27	5 60	9 84 (3 yrs.)
Hay	1·20	1·89	8 38	4 52	1 95	10 91 (3 yrs.)
Average for rotation	.....	.....	.....	.....	6 79	15 50
Six-year Rotation—						
Fallow	.....	.....	†8 80	7 82	.....	.....
Wheat, Marquis	13·0	37·4	1 16	0 37	—0 01	.....
Wheat, Marquis	13·7	.....	1·13	.....	1·07	.....
Oats, green feed	0·80	0·90	15 90	11 94	—4 73	—1 25
Wheat, Marquis	13·0	28·8	0 92	0 65	3 74	.....
Hay	0·90	1·67	10 77	5 55	—0 69	5 65
Average for rotation	.....	.....	.....	.....	—0 10	.....
Demonstration Test Fields—						
Alfalfa	0·90	.....	13 87	.....	—3 38	.....
Reward, seeded to western rye grass	24·5	.....	0 70	.....	12 49	.....

† Per acre.

In July the growing grain looked well from the roadside but on examination was disappointing. Just previous to, and during the filling stages of the grain, dry, hot winds prevailed, and the rank growth of straw had exhausted the available supply of moisture with the result that the yields were low. Many fields of stooks that gave promise of yielding 40 bushels per acre, actually yielded 15 to 20 bushels per acre.

In the rotations where Garnet and Reward were grown side by side, the Garnet out-yielded Reward both on fallow and on stubble, although in another field where Reward was used as a nurse crop for western rye grass, the yield was the heaviest on the station. Garnet wheat has been tested here for a number of years and now has the largest acreage of any wheat variety in the district. Its early maturity has made it popular with many farmers. Reward, introduced later than Garnet, has not yet proven its value for this area.

The purity of seed grain grown by this operator is appreciated by the community as illustrated in 1929 when 45 farmers purchased 3,568 bushels of seed wheat.

It is worthy of note that Mr. Tait sold 1,964 bushels of Marquis seed and 591 bushels of seed Garnet in 1928, while in 1929 Garnet led in point of bushels sold for seed with a total of 3,071 bushels as compared with 465 bushels of Marquis.

The yields of hay were good, although the alfalfa field was not uniform and was broken up. The average yields of hay on this station, covering the past seven years, would indicate that western rye grass, sweet clover and alfalfa all do well in this district. The growing of corn has been discontinued as it could not be depended upon to yield a profitable crop for fodder.

SPRUCE LAKE

Harry Eagle, Operator

Spring work commenced about May 1. The first seeding on the station was done on May 2, which is the average date of commencing seeding for eight years although a week earlier than 1928 and two weeks earlier than 1927.

There was only a quarter of an inch of precipitation in May, 2·11 inches in June, and less than half an inch in July. The crop started well and gave good promise until July when the dry weather set in and in many fields particularly, in a crop following summer-fallow weeds did considerable damage in grain crops. Crops were light as a general rule throughout the district.

SUMMARY OF YIELDS, COST, AND PROFIT OR LOSS AT SPRUCE LAKE

Rotations and crops	Yields per acre, bushels or tons, 1929	Cost per ton or bushel	Profit or (—) loss per acre
		$	$
Four-year Rotation—			
Fallow	.....	†6 13	.....
Wheat, Marquis	15·8	0 79	7 05
Wheat, Marquis	8·0	1 18	0 45
Hay	0·75	9 44	0 42
Total for rotation	.....	.....	7 92
Average for rotation	.....	.....	1 98
Three-year Rotation—			
Fallow	.....	†6 41	.....
Wheat, Garnet	17·0	0 76	8 22
Oats, Banner	14·0	0 78	−3 68
Total for rotation	.....	.....	4 54
Average for rotation	.....	.....	1 51
Three-year Rotation—			
Fallow	.....	†6 41	.....
Wheat, Reward	11·0	1 14	1 06
Oats, Banner	14·0	0 78	−3 68
Total for rotation	.....	.....	−2 62
Average for rotation	.....	.....	0 87
Demonstration Test Fields—			
Fallow	.....	†6 41	.....
Garnet on fallow	11·5	1 10	2 37
Reward on fallow	9·0	1 30	−0 50
Marquis	19·0	0 67	10 83
Alfalfa	1·00	7 24	2 76

† Per acre.

On the station six fields of wheat on fallow averaged 13·9 bushels per acre. The oat crop was light. Each of the three rotations gave a profit this year.

There were 311 bushels of seed sold from this station to nineteen farmers during the year. A flock of pure bred Barred Rock poultry has been established and a few settings of hatching eggs were sold in the spring.

ST. PAUL

Hector Therrien, Operator

Spring work on the land commenced on April 24. First seeding was done May 1. There was plenty of moisture to insure germination and the supply of moisture was fairly good throughout the summer, although increased precipitation might have given better yields.

SUMMARY OF YIELDS, COST, AND PROFIT OR LOSS AT ST. PAUL, ALTA.

Rotations and crops	Yields per acre, bushels or tons, 1929	Cost per ton or bushel	Profit or (—) loss per acre
		$	$
Six-year Rotation—			
Fallow	.....	†6 24	.....
Wheat, Marquis	18·2	0 77	8 74
Wheat	16·2	0 75	7 93
Oats, seeded	33·2	0 31	7 97
Hay	1·20	6 24	4 51
Hay	.....	†4 25	—4 25
Average for rotation	.....	.....	4 15
Four-year Rotation—			
Fallow	.....	†5 75	.....
Wheat, Garnet	16·4	0 81	6 91
Wheat, Garnet	16·0	0 75	7 91
Oats, Banner	55·2	0 21	18 54
Average for rotation	.....	.....	8 34

† Per acre.

Most of the land used at this station has been cropped for a long time and has become badly infested with weeds, particularly ball mustard and lamb's quarters. These weeds made strong growth during May when the moisture supply was at its lowest point, and no doubt reduced the yields considerably. In spite of the weeds every field with the exception of one gave a substantial profit and both rotations gave good returns, after paying all expenses.

Marquis wheat yielded 18·2 bushels on fallow and matured in 118 days, while Garnet on similar land yielded 2 bushels less and ripened in 110 days. Reward, sown later, was grown on land beside the station and yielded 15 bushels per acre.

A field meeting was held at this station on the evening of August 19, with over 100 people in attendance.

During the summer Mr. Therrien purchased about 20 pure-bred Aberdeen Angus calves which should make a good start for him in the pure-bred cattle business. A good registered bull of this breed has been maintained on this farm for some time.

TISDALE

GEO. A. MCMURDO, OPERATOR

Seeding operations commenced on April 29—four days earlier than last year. While the weather was somewhat cold and backward during April and May, the season as a whole was satisfactory. The precipitation was low but was well distributed over the growing period. Profitable crops were obtained from every field sown.

SUMMARY OF YIELDS AND COST OF GROWING CROPS AT TISDALE

Rotations and crops	Yields per acre, bushels or tons		Cost per bushel or ton		Profit per acre	
	1929	Average 2 years	1929	Average 2 years	1929	Average 2 years
			$	$	$	$
Five-year Rotation—						
Fallow			7 24	7 57		
Wheat, seeded	29·0	33·9	0 57	0 53	19 42	20 86
Hay, sweet clover and brome grass	1·25	2·13	8 26	5 40	2 18	6 76
Wheat	34·0	38·2	0 37	0 42	29 45	27 58
Oats	51·5	35·8	0 25	0 37	15 15	5 55
Average for rotation					13 24	12 15
Demonstration Test Field—						
Alfalfa, Grimm	1·50	1·90	4 50	4 85	8 31	9 80

Marquis and Reward wheat were grown on this station, but since one variety was sown on fallow and the other on stubble, the yields were not comparable.

The yields of hay, although lighter than last year, were satisfactory in yield and quality.

This operator owns a good herd of pure-bred Holsteins and won practically all the prizes offered for this class of stock at Tisdale Fair this season. A start has been made with pure-bred Barred Rock poultry which was obtained from the Dominion Experimental Farm, Brandon.

WAINWRIGHT

GEO. C. BOYD, OPERATOR

Seeding operations commenced on April 22, twelve days earlier than the previous year and one day earlier than the average date covering a period of ten years. There was no more than enough moisture available at this time to start germination. Light showers fell, ocasionally, but at no time during the summer was there sufficient moisture to satisfy the needs of a growing crop. In May only 0·85 of an inch of rain fell and in June only 0·54 of an inch. In July when the crops were burning up, 0·84 of an inch fell in two showers, making this total the record season for light precipitation.

SUMMARY OF YIELDS, COST, AND PROFIT OR LOSS AT WAINWRIGHT

Rotations and crops	Yields per acre, bushels or tons		Cost per bushel or ton		Profit or (—) loss per acre	
	1929	Average 5 years	1929	Average 5 years	1929	Average 5 years
			$	$	$	$
Fallow	.....	.....	†5 35	†6 26	.....	.....
"A" Wheat, Marquis	15·0	24·5	0 86	0 64	5 48	14 45
"B" Wheat, Marquis	1·6	21·6	6 26	0 69	−8 09	10 71
Average for rotation	.....	.....	.....	.....	−0 87	8 39
Four-year Rotation—						
Fallow	.....	.....	†5 35	.....	.....	.....
Wheat	2·0	22·6	5 37	0 77	−8 33	10 74
Hay	Nil	1·96	.....	4 78	−7 03	10 27
Hay	Nil	1·32	.....	3·00	−4 25	6 66
Average for rotation	.....	.....	.....	.....	−4 90	6 92
Two-year Rotation—						
Wheat, after sunflowers	1·4	20·4	5 60	0 57	−6 16	11 70
Sunflowers	1·80	4·26	4 23	3 26	0 30	5 49
Average for rotation	.....	.....	.....	.....	−2 93	8 60
Demonstration Test Fields—						
Alfalfa	0·56	1·03	9 20	7 02	0 45	5 09
Banner oats	20·0	33·2	0 51	0 37	−0 96	.....
Reward	3·0	.....	2 74	.....	−4 63	.....

† Per acre.

Much of the crop in the district was so short that it could not be cut. On the station the yields were all light, only three fields were able to show a profit and none of the rotations did that well.

Field "A," sown to Marquis wheat after fallow, gave rather interesting results. When every other wheat field on the station was burning up with the heat and drought, this field remained comparatively green. At threshing time the yields were even more interesting in that four other fields of wheat averaged 2 bushels per acre while "A" yielded 15 bushels. There was no apparent reason for such a difference, but by consulting previous records we found that this field had been seeded to sweet clover and alfalfa in 1920. The sweet clover having lived its time, died out, but the alfalfa continued until 1925 when it was broken up. Two crops of wheat and then fallow preceded the 1929 crop. It would indeed be interesting to know just what influence those five-year-old alfalfa roots played in producing a profitable crop in this field this year. On account of the extreme drought and the corresponding light yields of all kinds of crops, a comparison of the different rotations is of little value this year, except field "A".

Of the hay fields, alfalfa was the only crop cut. It yielded a little better than half a ton per acre, which was one-third the yield of the previous year.

While the yields shown in this report places this station at, or near, the bottom of the list in point of yields, it seems only fair that attention should be called to the fact that the average yield of wheat for ten years, including 1929, has been 26·8 after fallow and 21·9 after stubble which is quite a creditable average.

During the past year Mr. Boyd sold to 27 farmers of this district, the following seed grain: 110 bushels Reward, 120 bushels Marquis, and 200 bushels Garnet wheat, 1,700 bushels Banner oats, and 75 bushels O.A.C. 21 barley.

REPORT OF THE ILLUSTRATION STATIONS IN SOUTHERN SASKATCHEWAN

E. C. Sackville, B.S.A., Supervisor

This report deals with the thirteen Illustration Stations in southern Saskatchewan which are supervised from the Swift Current Experimental Station. One new station was established this spring and preparations have been made for starting operations on two more next year.

THE SEASON

On the whole this was one of the most unfavourable seasons for crop production which has been experienced in this part of the province on account of the lack of moisture.

The previous fall of 1928 was one of light rainfall, hence there was not much carry over of moisture. The spring of 1929 in this territory except in a few places was dry and cool, however, in most cases, there was sufficient moisture to start the crop fairly well but not sufficient later in June and July when a larger amount was needed to supply the increasing demands of the growing crops. The result in case of the grain crop was that practically all the available moisture was used early in the season and with no more effective rains there was not a sufficient supply to fill the heads normally. This resulted in a crop of low yield even on land which had been well summer-fallowed the previous year. The grain on stubble land suffered the worst from the drouth and with only a few exceptions was produced at a loss and in some cases was not worth harvesting.

The quality of the grain, however, was good with a protein content higher than the average though the kernels were not so plump as in a normal season. Hay crops also suffered from the drouth conditions and yields were on the whole much below the average. It was an unfavourable season for the corn crop and the growth was short. The weather was fine during the most of the fall and favourable for harvesting and threshing.

RAINFALL APRIL-NOVEMBER FOR 1929—SASKATCHEWAN

Station	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Total
	in.	in.	in.	in.	in.	in.	in.	in.	in.
Avonlea	.....	1·25	1·01	0·23	1·45	0·95	0·10	.....	4·99
Davidson	0·21	1·03	1·43	0·85	0·16	0·92	0·29	.....	4·89
Fox Valley	.....	0·96	2·34	0·44	0·26	0·28	.....	.....	4·28
Herbert	.....	.....	1·02	0·32	0·20	0·89	0·15	.....	*
Lisieux	.....	0·38	0·39	0·03	0·80	0·67	0·50	.....	†
Parkbeg	0·24	0·57	1·37	0·05	0·07	0·53	0·35	0·09	3·27
Piapot	0·42	1·68	2·34	0·78	0·14	1·43	.....	.....	6·79
Radville	0·25	2·20	0·62	0·18	0·43	0·59	.....	.....	4·27
Riverhurst	0·49	1·20	1·70	0·57	1·04	1·04	.....	.....	6·04
Shaunavon	0·32	0·82	1·97	0·71	0·30	1·49	0·29	.....	5·90
Trossachs	.....	4·16	0·93	0·12	0·42	0·74	0·47	.....	6·84
Tugaske	.....	1·20	0·46	0·84	0·69	0·86	.....	.....	4·05
Weyburn	0·17	3·77	0·79	0·26	0·48	1·11	.....	0·15	6·75

* Not complete for May.
† Records from May 10.

SEED GRAIN

The production and sale of grain for seed purposes by the Illustration Stations has been increasing from year to year and is one of the most important projects carried on.

The principal varieties used on the Stations in this territory are as follows: Wheat, Marquis; oats, Banner or Victory; barley, O.A.C., 21 (six-rowed) and Hannachen (a two-rowed type); fall rye, Dakold; spring rye, Prolific.

In order to keep the quality of this seed to a high standard, a definite plan is followed. In the case of wheat, the operator is supplied with sufficient registered seed of the most suitable variety for the district to sow one of the station fields. The product of this field is sown the next year on a well-prepared summer-fallow field. In the average season this will produce a sufficient quantity to supply a large number of farmers in the vicinity of the station.

The objective of this work is to provide a constant supply of seed grain of good quality at a reasonable price and in this way encourage the more general use of this class of seed.

THE SUMMER-FALLOW

The results of experimental and illustration work, as well as the experience of farmers, have proven that the time of doing the work on the summer-fallow is the most important consideration of all. This is especially true for the district with which this report deals, the south and western parts of the province.

Results have shown that if we do not do the first work on the land which is to be summer-fallowed early enough in the season to kill the weeds or plant growth in the early stage before they have had a chance to rob the soil of much of its moisture, no amount of work afterwards can compensate for this loss. Under the average conditions prevailing in this territory, experience has shown that if cultivation of some kind is given early enough in the season to destroy this weed growth and frequently enough during the remainder of the season to accomplish the same object, as a rule this is all that is necessary to make a satisfactory summer-fallow. The particular method by which this can be most efficiently and economically accomplished will depend on the conditions under which the work is done, particularly the prevailing weeds and nature of the soil.

For the first working of the summer-fallow the disk harrow has been found the most satisfactory chiefly on account of the speed with which this operation can be done.

Ploughing is a slow operation and allows weeds to get too far advanced, but if the disking is done first so as to set the weeds back the ploughing can be deferred until later with quite satisfactory results. An implement which has recently been introduced under the name of the "One Way Disk" or "Wheatlands Plow" is now used by a few farmers in working their summer-fallows. Where this is used, it is not necessary to do the ordinary disking as the first operation, since this implement performs that function as well as acting as a disk plough at the same time. Following the ploughing a stroke of the harrow or packer is usually given. Further work at intervals as necessary to kill weed growth can usually be best accomplished with the duck-foot cultivator.

The method as outlined above is the one followed on most of the Illustration Stations in the south and western parts of Saskatchewan, and it is also the general method followed by most farmers in this territory working under the average conditions. It has given good results when the work has been done at the right time.

Under conditions where there are only annual weeds with which to contend such as wild oats and stinkweed, surface working of the summer-fallow with the disk and cultivator without ploughing is sometimes practised. This method has been tried on some of the stations and also by many farmers. The immediate results on the whole have been satisfactory, so long as the work has been done efficiently and often enough. This system, however, has a tendency to leave the soil in a pulverized condition and render it more liable to drifting. The cost is sometimes less than when the land is ploughed, though not always.

By this method weed seeds can be germinated more readily and more weeds killed than when the land is ploughed, especially if the ploughing be done deeply. This is one reason why the practice of deep ploughing in this territory is not nearly so general as it used to be. There are, however, special conditions of soil and perennial weeds where deep ploughing has an advantage. Where there is much grass in the land or any creeping or deep-rooted perennial weeds present, ploughing as the chief operation is the most efficient method of dealing with this condition.

In a few districts where soil drifting is a problem, a variation from the standard method is practised on the station fields. Under these conditions the ploughing is deferred until the latter part of July, surface work as necessary being done previously. As a rule, after ploughing no further work is necessary. This treatment leaves the soil in a coarse condition and lessens the tendency to drift.

The influence of a well-prepared summer-fallow on the yields of our grain crops is too well known to need emphasizing here.

The results of experiments in soil moisture at Swift Current Experimental Farm show that under an efficient method of summer-fallowing about one-third of the season's rainfall can be stored in the soil for the use of the next crop. If weeds are allowed to get established on this land less than this amount will be stored and under extreme conditions it is possible that no storage may take place. This relatively small proportion stored, however, has a very pronounced effect on the yield of the following grain crops.

In order to arrive at the cost of producing crops, the following charges were used, and in calculating profits, crops were given the following return values:—

COST VALUES

Rent of land per acre	8 per cent interest on land value.
Taxes	At rates charged.
Use of machinery, per acre	$1 35.
Horse labour	8 cents per hour.
Manual labour	Rates prevailing in the district.
Threshing	" " "
Binder twine	" " "

COST OF SEED

Wheat, per bushel	$1 25
Oats, per bushel	0 60
Barley, per bushel	0 65
Fall rye, per bushel	0 80
Peas, per bushel	3 00
Corn, per pound	0 08
Sunflowers, per pound	0 08
Sweet clover, per pound	0 12
Western rye grass, per pound	0 08
Brome grass, per pound	0 08
Alfalfa, per pound	0 40

RETURN VALUES

Wheat, per bushel	$1 30
Oats, per bushel	0 60
Barley, per bushel	0 65
Fall rye, per bushel	0 80
Peas, per bushel	3 00
Hay, per ton	15 00
Oat sheaf feed, per ton	15 00
Corn and sunflower silage, per ton	3 00
Corn, fodder, per ton	6 00

Two-thirds of the cost of summer-fallowing is charged to the first crop and one-third to the second crop. The yields given for hay and fodder crops are estimated weights.

AVONLEA

OPERATOR, J. W. MILLER

Spring opened about the average time this year and the first seeding on the station was done on April 23. The season was unfavourable for crop production on account of the shortage of moisture. It was the driest season we have had on this station since work was started seven years ago.

During May there were two fair rains which gave crops a favourable start although the weather was cool. In June the rainfall was only an inch and there was no heavy rain to soak the ground. July gave no further rain of any material help and the result was that the ripening process set in too early, as the plants had used all the available moisture before the heads could be filled normally. The total rainfall for the growing season from the opening of spring until August 1 was only 2·49 inches.

The hay crop was too thin to make a stand, so the field was ploughed and fallowed. Corn was a light crop and was pastured off. Harvest was started August 8 when the first wheat was cut.

SUMMARY OF YIELDS, COST, PROFIT OR LOSS AT AVONLEA

Rotations and crops	Yield per acre		Cost		Profit or loss (−) per acre	
	1929	Average six years	1929	Average six years	1929	Average six years
			$	$	$	$
Six-year Rotation—						
Fallow			7 38 per acre	7 57 per acre		
Wheat, Marquis	5·0 bush.	16·1 bush.	2 57 per bush.	0 95 per bush.	−6 35	5 83
Wheat, Marquis			Failure.		(−10 43)	
Corn, Northwestern Dent			Pastured off.			
Wheat, seeded down	2·0 bush.	12·0 bush.	5 08 per bush.	1 73 per bush.	−7 56	3 95
Hay, sweet clover	Hay	failed to m	ake a stand, la	nd fallowed.		
Hay, western rye grass			7 38 per acre		−7 38	
Average for rotation					−5 29	
Three-year Rotation—						
Fallow			7 38 per acre	7 30 per acre		
Wheat, Marquis	6·0 bush.	18·0 bush.	2 17 per bush.	1 36 per bush.	−5 22	3 15 (2-yr.)
Wheat, Marquis			Failure.		(−10 43)	
Average for rotation					−5 22	
Demonstration Test Fields—						
Sweet clover and brome		Reseeded this year.				
Western rye and alfalfa		Reseeded this year.				

The operator of this station sold 200 bushels of Marquis seed wheat last spring to farmers in the district. This was grown from registered seed. There will be approximately 250 bushels of Marquis wheat reserved for sale as seed this fall. Twelve settings of hatching eggs from the flock of Barred Rocks were sold this year also a number of cockerels for breeding purposes.

DAVIDSON

OPERATOR, REUBEN LLOYD

Seeding on this station commenced on April 25 when the first wheat was sown. Oats and barley were sown on May 13. The spring was quite cool and backward with just a fair moisture supply, yet sufficient to give crops a start. During June the rainfall was much below the average with only 1·43

and July received only 0·85 of an inch. With such unfavourable moisture conditions crops were unable to make anything like normal growth and yields were much lower than usual. Wheat came through the best and as shown in the table below, produced about half the average yield, grading No. 1 and 2 and where sown on fallow gave some profit over all expenses but the oats and barley were both produced at a considerable loss. The hay crop also failed to show any profit. Harvesting of Reward wheat was started August 3 and Marquis August 8. The hay crop was cut July 25.

SUMMARY OF YIELDS, COST, AND PROFIT OR LOSS AT DAVIDSON

Rotations and crops	Yield per acre		Cost		Profit or (—) loss per acre	
	1929	Average four years	1929	Average four years	1929	Average four years
			$	$	$	$
Six-year Rotation—						
Fallow			6 50 per acre	7 24 per acre		
Wheat, Marquis	11·0 bush.	24·2 bush.	1 26 per bush.	0 88 per bush.	0 44	6 19 (2-yr.)
Oats, Banner	5·4 bush.		1 97 per bush.		—7 39	
Fallow, Reward wheat this year	8·5 bush.		1 58 per bush.		—2 38	
Wheat, Marquis seeded down—after oats in rows	6·0 bush.		1 40 per bush.		—0 60	
—after fallow	9·0 bush.		1 24 per bush.		0 54	
Hay, western rye and sweet clover	0·4 ton		17 55 per ton		—1 02	
Three-year Rotation—						
Fallow			6 50 per acre	6 79 per acre		
Wheat, Marquis	12·8 bush.		1 11 per bush.		2 44	
Barley, O.A.C. 21	3·0 bush.	29·0 bush.	3 37 per bush.	1 31 per bush.	—8 16	5·41 (3-yr.)
Average for rotation					—1 90	
Demonstration Field Test—						
Alfalfa, Grimm	0·3 ton	0·9 ton	17 83 per ton	9 77 per ton	—0 84	2 62 (3-yr.)

Wheat following a crop of oats in rows gave 6 bushels per acre as compared to 9 and 12·8 respectively, following a summer-fallow. All the summer-fallowing this year was done with the duckfoot cultivator and drag harrow, no ploughing being done. This system apparently, is more effective in destroying annual weeds and the result will be observed in next year's wheat crop. Reward wheat was grown for the first time on this station this year. The yield did not come quite up to the Marquis, but the quality was fully as good.

Mr. Lloyd sold 800 bushels of Marquis seed wheat, also 400 bushels of Banner oats to his neighbours for seeding this spring's crop. He also distributed through sales in the district 20 breeding cockerels from his Barred Rock flock as well as a large supply of hatching eggs.

FOX VALLEY

Operator, Chris. Mutschler

Spring was later than usual in this district and the first seeding was done on the station on May 3. Fairly dry conditions prevailed during April and May with cool weather which was favourable for seeding operations. During June there was a fair rainfall, 2·39 inches, with the most effective rains about the middle of the month. In July there was no heavy rain and the weather was too

dry for favourable growth. The result was that yields were not so good as anticipated earlier in the season. However, a fair crop of wheat and barley was harvested, but oats and fall and spring rye were quite light. The fall rye which was on fallow had winter killed considerably. The hay crop of western rye and sweet clover was too thin to make a satisfactory stand so this field was reseeded to oats. Alfalfa came through the winter well and gave a fair cutting. The growth of corn was also much lighter than usual owing chiefly to the dry conditions during July. Harvesting of rye was started August 2, barley August 3, wheat August 14 and oats August 16.

SUMMARY OF YIELDS, COST, AND PROFIT OR LOSS AT FOX VALLEY

Rotations and crops	Yield per acre		Cost		Profit and (—) loss per acre	
	1929	Average two years	1929	Average two years	1929	Average two years
			$	$	$	$
Wheat continuously	9·5 bush.	13·2 bush.	9 88 per bush.	0 80 per bush.	3 04	4 40
Two-year Rotations—						
Fallow			6 08 per acre	6 55 per acre		
Wheat	12·0 bush.	24·7 bush.	1 19 per bush.	0 85 per bush.	1 32	8 90
Average for rotation					0 66	
Fallow			6 08 per acre	6 55 per acre		
Oats, Banner	17·0 bush.	49·1 bush.	0 90 per bush.	0 56 per bush.	—5 10	4 36
Average for rotation					—2 55	
Fallow			6 08 per acre	6 55 per acre		
Fall rye	8·0 bush.	12·0 bush.	1 71 per bush.	1 33 per bush.	—6 48	4 52
Average for rotation					—3 24	
Seven-year Rotation—						
Wheat seeded down	12·5 bush.	24·2 bush.	0 64 per bush.	0 55 per bush.	8 25	12 27
Hay (reseeded to oats)	1·0 ton		8 33 per ton		6 67 per ton	
Corn	1·0 ton fodder	1·5 tons	9 45 per ton	6 96 per ton	—3 45	—1 34
Wheat	17·0 bush.	24·7 bush.	0 51 per bush.	0 44 per bush.	13 43	16 15
Fallow			6 08 per acre	6 55 per acre		
Fall rye	8·0 bush.		1 71 per bush.		—6 48	
Fallow			6 08 per acre	6 55 per acre		
Average for rotation					2 35	
Six-year Rotation—						
Barley, Hannchen, seeded down	20·0 bush.	26·2 bush.	0 48 per bush.	0 39 per bush.	3 40	3 32
Sweet clover (reseeded to oats, clover killed out)	0·75 ton		12 11 per ton		2 17	
Fallow			6 08 per acre	6 42 per acre		
Wheat	12·5 bush.	27·2 bush.	1 04 per bush.	0 73 per bush.	3 25	12 54
Spring rye	9·0 bush.	23·0 bush.	0 99 per bush.	0 71 per bush.	—0 81	—6 25
Corn	0·75 ton fodder	0·9 ton	11 80 per ton	9 09 per ton	—4 35	—1 89
Average for rotation					0 61	
Three-year Rotation—						
Fallow			6 98 per acre	7 00 per acre		
Wheat	18·0 bush.	24·6 bush.	0 74 per bush.	0 63 per bush.	10 08	11 76
Wheat	10·5 bush.		1 15 per bush.		1 58	
Demonstration Test Field—						
Alfalfa, Grimm—						
(Half in row 3 feet)	1·0 ton		6 14 per ton		8 86	
(Half sown solid)	0·5 ton		12 20 per ton		1 40	

RESULTS OF SUMMER-FALLOW EXPERIMENTS IN A TWO-YEAR ROTATION OF WHEAT, FALLOW ON NINETEEN-ACRE FIELDS

Rotations and crops and cultural work	Yield per acre, 1929	Cost, 1929	Profit or (—) loss 1929
		$	$
Wheat after fallow surface worked (not ploughed)	15·7 bush.	1 01 per bush.	4 56 per acre
Wheat after fallow surface worked until July 20, then ploughed	15·0 bush.	1 05 per bush.	3 75 per acre
Wheat after fallow (standard method), disked, ploughed, surface worked	15·5 bush.	1 02 per bush.	4 34 per acre
*Wheat after fallow, standard method	15·5 bush.	1 02 per bush.	4 34 per acre
Fallow surface worked, not ploughed	.....	5 87 per acre	.....
Fallow surface worked until July 20, then ploughed	.....	6 78 per acre.	.....
Fallow standard method, disked, ploughed, surface worked	.....	6 98 per acre	.....
Fallow standard method	.....	6 98 per acre	.....

* Note: Fall ploughing not done last year.

From the table above it will be observed that on one field wheat is being grown continuously. This system, while not one which can be recommended for this district, is being carried on as an experiment so as to compare it with the other methods of growing wheat in a rotation where the land is summer-fallowed either every other year or after two crops have been grown. It can also be compared with growing grain after corn. It is interesting to note the yields of the wheat crop under each system. The wheat continuously this year has given 9½ bushels per acre while on summer-fallow one field yielded as high as 18 bushels with an average of about 14 bushels. After corn the yield of wheat was 17 bushels and the greatest net profit was obtained from this crop. Wheat following wheat, that is second crop after fallow, gave 10½ bushels per acre. All the wheat crop shows some profit as does also the barley, but oats, fall and spring rye and corn were not paying crops this year.

Hannchen barley is grown on this station; it is a two-rowed variety which seems well adapted for conditions prevailing in this district. It has also yielded well on both the Swift Current and Scott Experimental Farms. Alfafla in rows three feet apart gave a yield of one ton per acre while the adjoining field which was sown the regular way gave only one-half ton per acre.

The operator of this station sold the following quantities of seed grain in his district this spring: 150 bushels of Marquis wheat and 140 bushels of Banner oats. Nine farmers took advantage of the opportunity to secure this seed grain.

Judging from the past experience of farmers in this district in growing grain, it is evident that frequent summer-fallowing of the land is necessary if we are to produce profitable crops. Just how often this summer-fallowing should be done is a question which cannot be answered without more experience or experimental work. It may be that in this district and many others in the southwestern part of the province where the rainfall is light and evaporation high, experience will prove that a two-year system of wheat, summer-fallow is the most profitable. Some farmers have already adopted this system, but on most farms the three-year system where two crops of grain are produced, one directly after the fallow and then a crop on the stubble land, is followed. It is quite evident that unless this second crop of grain gives a yield of more than one-half as heavy as that directly after a fallow, it does not pay to grow it. For with half our land in wheat on fallow, we would have just the same number

of bushels with a smaller total acreage and less expense. This second crop must give at least a yield over and above half of the yield on fallow sufficient to pay the extra cost involved in handling a larger acreage of crop.

A field meeting was held on this station on the afternoon of July 23, when a large number of farmers from the surrounding territory attended to look over the station fields and take part in the discussion of various phases of the work.

HERBERT

Operator, Milton Holmes

The first seeding on this station was done April 27. The spring was dry and cool and there were only a few showers until the middle of June, when there was a fairly good rain which helped the crops but was not enough to thoroughly soak the ground. During the month of June the total rainfall was 1·02 inches. The weather was extremely dry throughout July with 0·32 of an inch of rain. The result was that grain did not fill as well as usual and ripened too quickly, causing the kernels to be shrunken. Yields were very low even on a well-prepared summer-fallow, while on the stubble land and after corn most of the grain was not worth harvesting. The quality was fairly good, grading No. 2. It was a difficult crop to harvest as it was too short to handle with the binder in the usual way. Under the circumstances the knotter was removed and an extra table put on that side to catch the loose material.

The hay crops made a poor start in the spring, resulting in a light growth. Western rye grass had not sufficient growth to be cut for hay, while sweet clover gave about a half ton per acre. The alfalfa in rows, which has been cropped for eight years, winter-killed in patches, hence only parts of the field were worth cutting. The season was unfavourable for corn and the growth was short. Harvesting was started August 1.

SUMMARY OF YIELDS, COST AND PROFIT OR LOSS AT HERBERT

Rotations and crops	Yield per acre		Cost		Profit or (−) loss	
	1929	Average seven years	1929	Average seven years	1929	Average seven years
			$	$	$	$
Three-year Rotation—						
Fallow	.....	.....	7 13 per acre	7 92 per acre	.....	.....
Wheat, Marquis	4·0 bush.	17·4 bush.	3 18 per bush.	1 20 per bush.	−7 52	2 46
Wheat, Marquis	2·0 bush.	9·4 bush.	5 40 per bush.	1 93 per bush.	−8 20	−2 58 (5 yrs.)
Average for rotation	.....	.....	.....	.....	−5 24	.....
Six-year Rotation—						
Fallow	.....	.....	6 98 per acre	8 05per acre	.....	.....
Wheat, Marquis	4·0 bush.	17·6 bush.	3 08 per bush.	1 20 per bush.	−7 12	2 89
Wheat, Renfrew	1·0 bush.	13·5 bush.	11 08 per bush.	5 85 per bush.	−9 78	−2 03 (2 yrs.)
Corn, two acres N.W. Dent pastured off	.....	.....	6 98 per acre	.....	.....	.....
Fallow, three acres						
Wheat, seeded down	1·6 bush.	14·6 bush.	4 70 per bush.	1 23 per bush.	−5 44	3 89
Hay, sweet clover	0·6 ton	1·1 tons	11 95 per ton	8 55 per ton	1 83	4 79 (2 yrs.)
Western rye grass	Growth too short for hay.				−3 16	−0 27
Average for rotation	.....	.....	.....	.....	−2 96	.....
Two-year Rotation—						
Fallow, sweet clover ploughed under	.....	.....	7 58 per acre	8 07 per acre	.....	(2 yrs.)
Wheat, Marquis, seeded to sweet clover	5·0 bush.	18·2 bush.	2 99 per bush.	1 80 per bush.	−8 45	−0 76 (2 yrs.)
Average for rotation	.....	.....	.....	.....	−4 22	.....
Demonstration Test Field—						
Alfalfa, grown in rows 30 feet	0·2 ton	1·5 tons	26 85 per ton	8 33 per ton	−2 37	4 03

The best yield of wheat, as well as the average for two years, was produced in the two-year rotation consisting of summer-fallow, wheat. By this system the land is summer-fallowed every other year and wheat is sown only on land prepared in that way. This rotation was started two years ago to find out how it compares with growing wheat as practised by most farmers in the western part of the province where two crops of wheat are grown after the summer-fallow. In districts where the yield of the second crop of wheat is not more than 50 per cent of the yield of the crop on fallow it is evident that it will not pay to grow the second crop. Under these conditions just as much wheat could be produced by the two-year system and at a lower cost. There are other advantages in the two-year system apart from the matter of yield such as more efficient weed control and better distribution of the season's labour. Some farmers are already growing wheat by the two-year system summer-fallowing half their land each year. This system has not been tested here for a sufficient time yet to give definite information, but judging from the yields on summer-fallow and stubble land on the station fields at Herbert for the past ten years there have not been more than three years when it has paid better to grow two crops of wheat than one after the summer-fallow.

The operator of this station sold 300 bushels of Marquis seed wheat this spring to six farmers in the district.

LISIEUX

Operator, Omer Prefontaine

This station was established early in the spring and preparatory work undertaken.

The land selected was on the farm owned by Mr. Prefontaine and located on the northwest quarter of section 9, township 4, range 30, west of the 2nd meridian adjoining the village of Lisieux. The land is of a rolling nature with a loam soil typical of that in the district.

The work this year was of a preliminary nature as most of the land required summer-fallowing in preparation for the crops and rotations which will be put down next year.

Five fields were seeded down with a nurse crop of barley.

The following is the plan of cropping which it is intended to have in operation next year:—

(1) A three-year rotation of 1st year fallow, 2nd year wheat, 3rd year wheat, with cultural experiments in methods of working the fallow and also in preparing the land for the 2nd crop of wheat.

(2) A two-year rotation of grain and fallow: this will be carried out with wheat, oats and fall rye, each crop being sown on fallow every year.

(3) A four-year rotation consisting of wheat, wheat, hay (western rye and sweet clover) and fallow.

(4) A three-year rotation of wheat, barley, hay (sweet clover) and fallow after the hay is taken off.

In addition to these rotations and cultural experiments, four fields are seeded down with permanent hay crops as follows: (*a*) brome, (*b*) western rye, (*c*) alfalfa, (*d*) a mixture of western rye 10 pounds, alfalfa 6 pounds per acre.

This was a very dry season in this district. The precipitation from May 10 was as follows: May 10 to May 31 0·38 inch: June 0·39 inch; July 0·03 inch;

August 0·80 inch; September 0·67 inch; October 0·50 inch. There was one fairly good rain early in May previous to setting up the gauge which could not be recorded.

With such a light rainfall crops were unable to make anything like normal growth. The barley was the only grain sown on the station fields this year. It was sown late in May on stubble land as a nurse crop for the seedings to hay. It made a very short growth which was not worth harvesting, but was utilized for feed by pasturing a number of hogs on the fields this fall.

PARKBEG

Operator, T. L. Humphrey

Seeding on the station fields commenced April 29 and weather during seeding was cool and dry. This was the driest season since work has started at this station with only 2·63 inches of rain from the opening of spring until the first of August. All crops were quite light. Wheat on fallow gave eight bushels per acre and on land which grew a sweet clover hay crop last year the wheat was practically a failure.

Of the hay crops sweet clover was the only one that made sufficient growth to make a cutting worth while. Corn also was a very light crop.

Harvesting was started August 7. Although the wheat was somewhat shrunken owing to the dry conditions, it was of good quality. The following table gives the results of the season's work.

SUMMARY OF YIELDS, COST AND PROFIT OR LOSS AT PARKBEG

Rotations and crops	Yield per acre		Cost		Profit or (—) loss per acre	
	1929	Average six years	1929	Average six years	1929	Average six years
			$	$	$	$
Three-year Rotation—						
Fallow			6 90 per acre	6 71 per acre		
Wheat, Marquis	8·0 bush.	24·0 bush.	1 50 per bush.	0 94 per bush.	—1 60	10 59 (2 yrs.)
Hay, sweet clover and western rye	Failed to make successful stand. Oats seeded, failed.				—8 77	
Average for rotation					3 46	
Five-year Rotation—						
Fallow			6 90 per acre	7 05 per acre		
Wheat, Marquis	6·0 bush.	27·0 bush.	1 98 per bush.	0 95 per bush.	—4 08	8 51 (5 yrs.)
Half corn, Northwestern Dent pastured			6 90 per acre			
Half fallow						
Wheat, seeded down	6·0 bush.	17·0 bush.	1 23 per bush.	0 70 per bush.	—0 42	9 67 (3 yrs.)
Hay, western rye grass, alfalfa, sweet clover	Growth too short for hay crop.				—7 39	
Average for rotation					—0 34	
Two-year Rotation—						
Fallow, sweet clover ploughed under			8 10 per acre	7 32 per acre		
Wheat, Marquis	8·0 bush.	25·0 bush.	1 79 per bush.	1 00 per bush.	—3 92	7 46
Average for rotation					—1 96	
Two-year Rotation—						
Wheat, seeded down		Failure.			—7 80	
Hay, sweet clover	0·8 ton	1·7 ton	6 40 per ton	5 66 per ton	6 88	11 83 (3 yrs.)
Average for rotation					—0 46	
Demonstration Test Field—						
Brome grass	0·25 ton		21 96 per ton.		—1 74	

Brome grass made a short growth and gave a light cutting on the lower land. Later in the season the field provided fair pasture. The grain crops on this station during the early part of July looked promising for a fair yield, but as there were only a few light showers during all of July, the wheat filled as much as it could on the moisture available, then the ripening process set in with the result that the grain had thin kernels.

The operator of this station sold 555 bushels of Marquis wheat in his district for seeding this spring.

PIAPOT

Operator, E. Scherck

Spring opened later than usual and the first seeding on the station was done May 2. While the moisture supply was below the average, it was sufficient to produce profitable crops of grain and hay. There was a good rain the latter part of May which gave the crops a favourable start. During the first half of June there was a dry spell but a heavy rain of almost 1½ inches fell on June 17 which carried the crops along well. During July the rains were light and the total rainfall from the opening of spring until August 1 was 5·22 inches. The highest yield of fallowed land was 20 bushels per acre while fall rye gave 29 bushels on fallow and 13 bushels after wheat. Hay crops gave a yield from 1½ to 2 tons per acre and corn was a fair stand also. Harvesting of fall rye started August 3 and wheat August 21.

SUMMARY OF YIELDS, COST AND PROFIT OR LOSS AT PIAPOT

Rotations and crops	Yield per acre		Cost		Profit or (−) loss per acre	
	1929	Average two years	1929	Average two years	1929	Average two years
			$	$	$	$
Three-year Rotation—						
Fallow	.....	.....	6 21 per acre	6 31 per acre	.....	.....
Wheat, Marquis	20·0 bush.	26·7 bush.	0 54 per bush.	0 49 per bush.	15 20	15 13
{Half fall rye	13·0 bush.	13·5 bush.	0 66 per bush.	0 65 per bush.	3 12	2 68
{Half wheat	20·0 bush.	.....	0 43 per bush.	.....	17 40	.....
Six-year Rotation—						
Corn	Hogged off.					
Wheat, Marquis	16·0 bush.	18·9 bush.	0 44 per bush.	0 43 per bush.	13 76	12 65
Hay, western rye and sweet clover	2·0 tons	2·0 tons	3 81 per ton	3 76 per ton	22 38	17 48
Wheat, Marquis	18·0 bush.	22·0 bush.	0 36 per bush.	0 39 bush.	16 92	15 35
Fallow	.....	.....	5 76 per acre	5 54 per acre	.....	.....
Fall rye	29·0 bush.	28·2 bush.	0 43 per bush.	0 44 per bush.	13 63	11 62
Average for rotation	.....	.....	.....	.....	11 11	.....
Two-year Rotation—						
Fallow	.....	.....	5 76 per acre	5 78 per acre	.....	.....
Oats, Banner	32·0 bush.	43·0 bush.	0 37 per bush.	0 29 per bush.	7 36	8 90
Average for rotation	.....	.....	.....	.....	3 68	.....
Demonstration Test Fields—						
Brome grass	1·5 tons	1·7 tons	3 76 per ton	3 42 per ton	16 86	15 33
Western rye grass	1·5 tons	2·2 tons	3 76 per ton	3 20 per ton	16 86	19 45
Alfalfa (Grimm)	1·5 tons	2·5 tons	3 76 per ton	2 63 per ton	16 86	24 60

Fall rye on fallow gave a higher yield than wheat as it was well advanced before the dry weather of July set in. However, the increase in yield was not sufficient this year to make it as profitable a crop as the wheat on fallow or breaking. On stubble land wheat gave a considerably higher yield this year

than fall rye. In the six-year rotation where wheat follows a hay crop and the land is ploughed at once after the hay is taken off a yield of 18 bushels per acre was obtained and proved the most profitable grain crop on the station this year. The operator of this station sells Marquis seed wheat to his neighbours each year and last spring disposed of 100 bushels to four farmers.

A field meeting and picnic was held on this station in the afternoon of July 22. There was a good attendance of interested farmers and an enjoyable and profitable afternoon spent.

An interesting experiment is being carried on at this farm in growing winter wheat. Sufficient seed of the Kharkov variety was supplied Mr. Scherck in the fall of 1928 to seed four acres. This was drilled in wheat stubble the lattter part of August. The crop this year was a fairly even stand and gave a yield of eight bushels per acre of good quality grain. The wheat from this crop was all sown on a large field of wheat stubble this fall to give it a further test.

RADVILLE

Operator, J. H. Stockton

The first seeding on the station fields was done on April 17. There was a fairly good supply of moisture from both rain and snow during the month of May amounting to 2·20 inches. During June there was only one effective rain of 0·82 of an inch on the 26th with 0·93 for the month, this was a time when moisture was most needed. July was drier still with 0·26 of an inch. Under such conditions though the crops came through much better than expected yields of necessity were low. Wheat on fallow on the best producing field gave 14 bushels, while wheat after wheat yielded 8 bushels. The grade averaged No. 2. Oats after wheat gave a very light yield. Of the hay crops, sweet clover gave a fair yield and double the amount of feed which was obtained from the western rye grass and alfalfa mixture.

Harvesting of grain was done with the Combine starting August 15.

SUMMARY OF YIELDS, COST AND PROFIT OR LOSS AT RADVILLE

Rotations and crops	Yield per acre		Cost		Profit or (−) loss per acre	
	1929	Average six years	1929	Average six years	1929	Average six years
			$	$	$	$
Six-year Rotation						
Fallow	.....	.....	8 12 per acre	7 49 per acre	.....	.....
Wheat	14·0 bush.	25·6 bush.	0 99 per bush.	0 65 per bush.	4 38	13 61
Oats, Victory	10·0 bush.	27·6 bush.	1 30 per bush.	0 60 per bush.	−7 00	− 0 76
Corn, fallow substituted	.....	.....	8 42 per acre	.....	.....	.....
Wheat, seeded down	13·0 bush.	13·6 bush.	1 03 per bush.	1 17 per bush.	3 51	6 11
Hay, western rye and alfalfa	0·3 ton	0·71 ton	18 00 per ton	11 37 per ton	−0 90	3 23
Hay, sweet clover	0·6 ton	1·45 ton	10 10 per ton	6 33 per ton	2 94	8 99
Average for rotation	.....	.....	.....	.....	0 42	.....
Three-year Rotation—						
Fallow	.....	.....	7 37 per acre	6 84 per acre	.....	.....
Wheat	10·0 bush.	24·0 bush.	1 38 per bush.	0 73 per bush.	−0 80	12 58
Wheat	8·0 bush.	12·0 bush.	1 60 per bush.	1 26 per bush.	−2 40	1 90
Average for rotation	.....	.....	.....	.....	−1 07	.....
Two-year Rotation—						
Wheat	2·0 bush.	12·0 bush.	5 31 per bush.	2 94 per bush.	−8 02	−0 76
Sweet clover	.....	.....	8 57 per acre	Ploughed under this year.		
Average for rotation	.....	.....	.....	.....	−4 01	.....

By reference to the table above it will be noted that the 13 and 14 bushels per acre yield of wheat gave some profit over and above all labour and other expenses in production. When the yield was as low as 10 bushels on fallow, however, the crop was produced at a loss of 80 cents per acre. A yield of 8 bushels for the second crop also shows a loss of $2.40 per acre.

The highest yield of wheat was on fallow in the six-year rotation where a hay crop is grown the year previous to the fallowing. The average yield for a period of six years on this field is also slightly higher than in the three-year grain rotation. This would seem to suggest that the hay crop has had a beneficial effect on the soil. It has been noted before that the sweet clover in particular has improved the tilth on the burnt-out areas.

The lowest yield of wheat this year was after a sweet clover hay crop. The land was ploughed late last summer after the hay was taken off and wheat sown this spring without a year of summer-fallow intervening. The sweet clover crop evidently exhausted practically all the moisture from the soil and with a dry season following, there was not sufficient to produce a crop of wheat. Last year with a good supply of moisture during the growing season, the wheat on this field gave a yield of 22 bushels per acre. However, as the rainfall in this district is not heavy as a rule, it is evidently a safer system to summer-fallow the year after the hay crop before growing a crop of grain.

RIVERHURST

Operator, R. F. Rudd

Spring opened about the average time and work on the land started April 20. The weather was cool during the first part of the season and rainfall for May was fair with 1·2 inches. June was drier than usual with 1·70 inches, but crops maintained a very fair growth. During July there was only 0·57 of an inch, hence yields did not come up to what was promised earlier in the season. The wheat on fallow yielded from 10·4 to 14·6 bushels per acre, while the second crop gave 3·8 bushels. The quality was good, grading No. 1.

The hay crop was a thin stand in the spring and this field was reseeded to wheat. The wheat was harvested with the combine with good results, commencing August 26.

SUMMARY OF YIELDS, COST AND PROFIT OR LOSS AT RIVERHURST

Rotations and crops	Yield per acre		Cost		Profit or (−) loss per acre	
	1929	Average seven years	1929	Average seven years	1929	Average seven years
			$	$	$	$
Six-year Rotation—						
Fallow			7 03 per acre	6 73 per acre		
Wheat, Marquis	14·6 bush.	21·8 bush.	0 96 per bush.	0 76 per bush.	4 87	9 69 (5 yrs.)
Wheat, Marquis	3·8 bush.	21·6 bush.	2 99 per bush.	0 92 per bush.	−6 42	5 94 (3 yrs.)
Corn, Northwestern Dent	2·5 tons	4·2 tons	4 04 per ton	3 35 per ton	−2 60	0 59 (3 yrs.)
Wheat (seeded), Renfrew	11·3 bush.	20·5 bush.	0 77 per bush.	0 55 per bush.	5 99	13 05 (5 yrs.)
Hay, western rye and sweet clover, failed, reseeded to wheat	4·2 bush.		2 09 per bush.		−3 31	
Average for rotation					−0 24	
Three-year Rotation—						
Fallow			7 03 per acre	6 62 per acre		
Wheat, Reward	10·4 bush.		1 39 per bush.		−0 93	
Wheat, Marquis	3·75 bush.		3 02 per bush.		−6 45	
Average for rotation					−2 46	
Two-year Rotation—						
Marquis wheat, seeded to sweet clover	11·0 bush.	24·7 bush.	0 77 per bush.	0 61 per bush.	5 83	10 02 (2 yrs.)
Hay, sweet clover	0·4 ton	2·4 tons	15 92 per ton	4 95 per ton	−0 38	12 25 (2 yrs.)
Average for rotation					2 72	
Demonstration Test Field—						
Alfalfa, reseeded this year.						

Reward and Renfrew wheats were both tested this year, as well as Marquis, the standard variety for the district. Renfrew was grown after corn, while Reward and Marquis were after fallow, hence conditions were not strictly comparable. By reference to the table above it will be observed that Marquis gave the highest yield, with Renfrew three bushels and Reward four bushels less.

Mr. Rudd made sales of Marquis seed wheat in his district this spring to the extent of 450 bushels. This was grown from registered seed stock which was introduced two years ago. A good producing flock of Barred Rock poultry is kept on this farm and twenty settings of hatching eggs as well as a number of cockerels for breeding purposes were distributed through sales in the district this year.

SHAUNAVON

Operator, Stanley Murch

Spring opened in good time this year and seeding on the station fields commenced April 18. The weather was dry and cool during seeding, with only light rains. No soaking rain came until June 17, when 1½ inches fell. Coming at a time when most needed, it was very effective in promoting the growth of all crops. This was the only heavy rain received during the growing period for grain crops. A few more light rains during the remainder of June and July amounting to an inch was all the grain had for completing its growth and filling. The total rainfall until August 1 was only 3·82 inches, which was less than half of what fell last year during that period.

Crops came through better than expected and gave fair returns. Wheat on summer-fallow yielded as high as 15 bushels per acre, while stubble gave 8½ bushels. Though not so plump as last year, the quality of grain was good. Hay crops made a fair growth, but corn was quite short. Harvest was started August 13.

SUMMARY OF YIELDS, COST AND PROFIT OR LOSS AT SHAUNAVON

Rotations and crops	Yield per acre		Cost		Profit or (—) loss per acre	
	1929	Average five years	1929	Average five years	1929	Average five years
			$	$	$	$
Six-year Rotation—						
Fallow			7 03 per acre	7 16 per acre		
Wheat, Marquis	15·0 bush.	25·2 bush.	0 97 per bush.	0 82 per bush.	4 95	10 91
Wheat, Marquis	8·5 bush.	14·7 bush.	1 39 per bush.	1 33 per bush.	0 76	4 22
Corn, Northwestern Dent—						
Half corn	Corn used for pasture supplement.					
Half fallow			7 48 per acre			
Wheat, seeded	11·0 bush.	22·7 bush.	1 23 per bush.	0 69 per bush.	0 78	14 11
Hay, western rye grass and alfalfa	0·8 ton	1·1 tons	7 15 per ton	8 20 per ton	6 28	5 08
Hay, sweet clover	0·8 ton	1·1 tons	7 46 per ton	8 60 per ton	6 04	5 18
Average for rotation					2 16	
Three-year Rotation—						
Fallow			6 88 per acre	7 28 per acre		(2 yrs.)
Wheat	13·0 bush.		1 09 per bush.		2 73	
Wheat	8·5 bush.		1 39 per bush.		—0 76	
Average for rotation					0 66	
Two-year Rotation—						
Fallow			7 18 per acre	7 29 per acre		
Wheat	8·5 bush.	26·2 bush.	1 52 per bush.	1 03 per bush.	—1 87	9 31 (2 yrs.)
Average for rotation					—0 93.	
Demonstration Test Fields—						
Alfalfa, sweet clover mixture	0·66 ton		8 36 per ton		4 39	

All the wheat grown on this farm now is from registered seed and the operator has a good supply of seed wheat for sale to farmers in the district. Last year Mr. Murch had a large quantity of excellent wheat and sold 2,400 bushels for seed in his locality. This was distributed among twenty farmers. Early Ohio potatoes, one of the best early varieties, are grown on this farm, the surplus of which is sold each year for seed.

The field seeded with an alfalfa and sweet clover mixture in the proportion of 6 pounds each per acre gave a fair cutting of one ton per acre this year. The clover in the mixture predominated. Next year it is expected that a full stand of alfalfa will have become established, as the sweet clover, a biennial crop, will have completed its growth.

A very successful field meeting was held on this station on the afternoon of July 24, when about 150 farmers from the surrounding country came out to look over the crops and take part in the discussion of various farm problems.

TROSSACHS

Operator, Chas. Carlson

Spring opened fairly early in this district and work on the land started about the middle of April. During the month of May there was a good supply of moisture with a rainfall of 4·16 inches. This gave the crops a good start, but during June and July the rainfall was so light that crops suffered from the drought and resulting yields were quite low.

The best yield of wheat was on fallow, which was 12 bushels per acre, and gave a profit of $2.83 per acre. The quality of the grain was good, though not so plump as usual. Hay crops benefited by the early rains and gave a fair return. Harvesting was started August 10.

SUMMARY OF YIELDS, COST, AND PROFIT OR LOSS AT TROSSACHS

Rotations and crops	Yield per acre		Cost		Profit or (—) loss per acre	
	1929	Average five years	1929	Average five years	1929	Average five years
			$	$	$	$
Three-year Rotation—						
Fallow			6 41 per acre	7 15 per acre		
Wheat, Marquis	5·0 bush.	19·6 bush.	2 38 per bush.	1 01 per bush.	—5 40	0 16
Wheat, Marquis	3·5 bush.	8·2 bush.	2 50 per bush.	1 74 per bush.	—4 20	—1 90 (2 yrs.)
Average for rotation					—3 20	
Six-year Rotation—						
Fallow			6 41 per acre	6 86 per acre		
Wheat, Marquis	8·0 bush.	22·4 bush.	1 55 per bush.	0 80 per bush.	—2 00	12 38
Oats, Victory	0·2 ton sheaf feed	0·6 ton	50 70 per ton	31 13 per ton	—7 14	—4 35 (2 yrs.)
Fallow, clover ploughed under			7 61 per acre	7 10 per acre		
Wheat, seeded down	12·0 bush.	16·9 bush.	1 06 per bush.	0 60 per bush.	2 83	10 93
Hay, western rye	0·8 ton		7 94 per ton		5 65	
Hay, sweet clover	0·8 ton	1·6 tons	7 94 per ton	4 72 per ton	5 65	9 47 (3 yrs.)
Average for rotation					0 71	

The operator of this station sold 240 bushels of Marquis seed wheat in his district last spring. This was purchased by three farmers. He also distributed through sales eight Rhode Island Red cockerels for breeding purposes and six settings of hatching eggs.

TUGASKE

Operator, Robert Wilson

Work on this station started the last days of April and the first seeding of wheat was done April 30. During the latter part of May there was a fairly good rainfall, which gave the crops a nice start. However, June was exceptionally dry, with the rainfall 0·46 of an inch. July gave 0·84 of an inch, with no heavy rain. With such continued drought conditions all crops suffered and yields were low. It was the driest season for this district on record since the station work was started ten years ago. Last year during the growing season there was over four times as much rainfall; namely, 9·24 inches, as compared with 2·25 inches this year. Hay crops on the whole were light. Sweet clover gave the most feed. The yield of the corn was also low. Hay crops were cut from July 2 to July 10 and first wheat was harvested August 13.

SUMMARY OF YIELDS, COST, AND PROFIT OR LOSS AT TUGASKE

Rotations and crops	Yield per acre		Cost		Profit or (−) loss per acre	
	1929	Average seven years	1929	Average seven years	1929	Average seven years
			$	$	$	$
Three-year Rotation—						
Fallow			7 01 per acre	6 91 per acre		
Wheat, Marquis	16·0 bush.	20·6 bush.	0 93 per bush.	0 84 per bush.	5 92	7 36
Wheat, Marquis	4·2 bush.	14·7 bush.	2 79 per bush.	0 98 per bush.	−6 25	3 36
Average for rotation					−0 11	
Six-year Rotation—						
Fallow			7 01 per acre	7 61 per acre		
Wheat, Reward	8·5 bush.		1 60 per bush.		−2 85	
Wheat, Marquis	7·0 bush.	22·3 bush.	1 91 per bush.	1 01 per bush.	−4 26	7 19 (3 yrs.)
Wheat, Marquis	Failure.				−7 91	
Corn, Northwestern Dent	Light crop pastured off.					
Wheat, seeded down	8·8 bush.	20·0 bush.	0 98 per bush.	0 68 per bush.	2 82	9 01 (2 yrs.)
Hay, western rye and alfalfa	0·6 ton	1·0 ton	12 26 per ton	8 57 per ton	2 35	3 74 (2 yrs.)
Average for rotation					−1 41	
Three-year Rotation—						
Fallow			7 01 per acre	7 05 per acre		
Wheat, seeded down	13·2 bush.	18·0 bush.	1 09 per bush.	0 89 per bush.	2 78	5 68
Hay, sweet clover	0·9 ton	1·7 tons	8 61 per ton	7 20 per ton	5 76	7 11
Average for rotation					2 84	
Demonstration Test Fields—						
Alfalfa, Grimm	0·2 ton	1·8 ton	29 25 per ton	10 11 per ton	−2 85	5 82
Hay, western rye, brome and sweet clover	0·4 ton	1·0 ton	14 12 per ton	9 32 per ton	0 36	4 56 (2 yrs.)

The highest yield of wheat, namely, sixteen bushels per acre, was obtained from the fallow in the ordinary three-year rotation. This field was given a fairly heavy dressing of fresh manure during the winter previous to summer-fallowing. The manure was burnt off in the spring before working the fallow. In this way no bulky material was ploughed under to leave the soil loose and open, but the plant food from the manure was leached into the soil. Apparently this extra plant food had a beneficial effect. It is possible that a little more snow and other moisture may have been held by the dressing of manure than would have been by the stubble alone.

The next highest yield of wheat was on the fallow in the three-year rotation consisting of wheat, sweet clover hay and summer-fallow. Thirteen and one-fifth bushels per acre were produced on this field. This rotation has been down seven years and apparently the sweet clover has had a good effect on the soil, thus enabling it to produce a fair yield under existing dry conditions. The yield of wheat on fallow in a larger field adjoining the station where no sweet clover has been grown, was eight bushels per acre.

WEYBURN

Operator, E. Meredith

Spring opened in good time and seeding on the station fields was started April 17. The early part of the season was cool, with little rain until the latter part of May, when from the 26th to the 29th three inches fell. This heavy rainfall gave all the crops a good start, but during the rest of the growing season there were no more heavy rains and all through June only 0·79 of an inch

fell and in July only 0·26 of an inch. The crops came through even better than expected, but resulting yields were in most cases low, particularly of the grain. Hay yields were not much below the average as the heavy rainfall of May brought this crop through. The grain ripened fast and harvest was earlier than usual, Garnet wheat being cut August 6 and Marquis August 9. Cutting of hay was started July 11.

SUMMARY OF YIELDS, COST, AND PROFIT OR LOSS AT WEYBURN

Rotations and crops	Yield per acre		Cost		Profit or (−) loss per acre	
	1929	Average five years	1929	Average five years	1929	Average five years
			$	$	$	$
Three-year Rotation—						
Fallow	.....	.....	6 71 per acre	6 81 per acre	.....	(2) yrs.)
Wheat, Marquis	10·0 bush.	27·6 bush.	1 38 per bush.	0 72 per bush.	−0 80	6 40 (6 yrs.)
Wheat, Marquis	16·0 bush.	24·0 bush.	0 78 per bush.	0 66 per bush.	8 32	14 35
Average for rotation	.....	.....	.....	.....	2 50	.....
Six-year Rotation—						
Fallow	.....	.....	8 27 per acre	8 05 per acre	.....	.....
Wheat, Marquis	10·0 bush.	21·5 bush.	1 41 per bush.	0 98 per bush.	−1 10	7 15 (2 yrs.)
Oats, Victory	25·0 bush.	61·0 bush.	0 45 per bush.	0 27 per bush.	3 75	11 45
Summer-fallow	.....	.....	8 27 per acre	.....	.....	.....
Wheat, Garnet, seeded	10·0 bush.	18·0 bush.	1 41 per bush.	0 93 per bush.	−1 10	5 82 (2 yrs.)
Hay, alfalfa and western rye	1·0 ton	1·1 ton	8 70 per ton	6 64 per ton	6 30	7 46
Demonstration Test Field—			Average for Rotation		1 31	
Alfalfa, Grimm	0·75 ton	1·2 tons	7 93 per ton	6 48 per ton	5 30	7 20

Garnet wheat was grown on a field which produced a hay crop last year and was broken and worked down after the hay was taken off. The yield was ten bushels per acre of good quality. Forty acres of Reward were grown on regular fallow land adjoining the station fields. This gave a yield of twenty bushels per acre and was a fine-looking sample.

Sales of seed wheat this year totalled 600 bushels. The most of this was Marquis and Garnet, with a small quantity of Reward. A considerable quantity of Reward is being offered for sale this year, and this variety seems quite promising for this district. It has made a good showing on the station and gives promise of being a suitable variety for the conditions prevailing in this district.

REPORT OF THE ILLUSTRATION STATIONS IN MANITOBA AND EASTERN SASKATCHEWAN

D. A. Brown, B.S.A., Supervisor

In 1929 sixteen stations were supervised from the Brandon Experimental Farm. Twelve of these are located in Manitoba and four in Eastern Saskatchewan.

NEW STATIONS

Work was thoroughly organized at the new station at Pelly, Sask., this year, while authorization was granted to establish stations at Swan River in Manitoba and Emo in the Rainy River district of Western Ontario.

SEASONAL NOTES

Yields of field crops were curtailed this season chiefly by drought. Average grain yields on the Illustration Stations were, however, much higher than the estimated average for the province of Manitoba.

Total precipitation for the year was lighter at most points than since 1917, while 1929 ranks as the third driest year at Brandon since 1893. The average precipitation on twelve Illustration Stations where records were kept was 12·21 inches for the year. May was the wettest month generally. The months of June, July, and August combined gave an average from all stations of only 2·54 inches. The carryover of moisture from the wet summer of 1928 was undoubtedly responsible for the satisfactory yields which were generally reaped from summer-fallow crops.

The spring opened reasonably early at most points in Manitoba and seed went into the soil in good condition. May rains induced a high percentage germination and vigorous, even stands of grain were to be seen in all localities. From the early part of June drought was general over most of the province, and on June 12, in the vicinity of the stations at Dugald, Gunton, Arborg, and Eriksdale, a frost ranging from 7 to 16 degrees was experienced. Crops in the inter-lake district were severely damaged by this frost, and the hot, dry weather immediately following prevented such recuperation as was necessary to make normal stands in many fields.

Notwithstanding the climatic adversities through which grain crops passed, wheat yields in Manitoba averaged fairly well. The quality of wheat was much higher than has been the case for several years. The crop was harvested in ideal weather, which with the light crop of straw reduced the cost of production much below the average. These factors, coupled with the prevailing high prices, rendered monetary returns for the 1929 wheat crop proportionately greater than for the 1928 crop. Coarse grain crops were on the average very light. Barley and oats were produced at a loss on several of the Illustration Stations, a condition which prevailed generally over the province.

WEEDS, INSECT PESTS AND PLANT DISEASES

A recent publication by the agricultural department of a well-known implement firm places the loss from weeds on an average prairie province wheat crop at 70,000,000 bushels. The havoc wrought by weeds is increasing annually in Manitoba and the problem of economic weed control is probably the biggest one entering into Illustration Station work. Wild oats, sowthistle and quack grass are particularly bad, and the majority of station rotations are planned chiefly to provide means for the effectual control of these or any other weeds common within the locality where a station is in operation.

SEED GRAIN

When station plots are comparatively free from weeds the operator is encouraged to use the best of seed so that all grain grown may be fit to sell as pure seed. The objective is that each station should be a seed centre within its respective community. Sales of seed from the 1928 crop were made to 118 purchasers as follows: wheat, 1,637 bushels; oats, 1,134 bushels; barley, 4,376 bushels; sweet clover, 4,937 pounds.

POULTRY

Definite flock improvement is under way on all stations and this constitutes a very important feature of demonstration work. For the hatching season of 1929 a total of 48 cockerels and 1,020 eggs were sold.

MONTHLY PRECIPITATION AT STATION POINTS IN MANITOBA, 1929

——	Arborg	Dugald	Dauphin	Eriksdale	Gilbert Plains	Gunton	Katrime	Petersfield	Pipestone	Pelly, Sask.	Roblin	Wawota, Sask.	Kamsack Sask.
	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.
January	0·15	0·60	0·00	0·35	0·19	0·65	1·00	0·93	0·65	0·70	0·21	0·35	.....
February	0·00	0·60	0·00	0·92	0·00	0·12	0·20	0·17	0·12	0·45	0·10	0·09	.....
March	1·35	1·25	0·12	1·15	0·21	1·25	1·00	1·34	1·14	1·65	0·25	0·60	.....
April	0·44	0·80	0·70	1·22	0·39	0·23	1·41	0·78	1·57	1·14	1·32	2·70	.....
May	1·39	1·50	1·96	1·83	1·13	0·95	1·89	0·94	3·23	1·12	2·69	3·28	1·80
June	0·90	0·80	0·89	1·27	1·22	0·30	0·86	1·34	0·81	1·13	0·69	0·85	1·60
July	1·17	0·74	0·10	1·35	0·23	2·48	1·12	1·13	0·97	0·96	0·75	0·74	0·48
August	0·45	0 20	0·90	0·86	1·33	0·00	0·22	0·09	0·33	1·19	1·89	0·32	0·33
September	2·66	2·40	1·10	2·50	0·63	1·75	2·55	2·64	0·87	0·88	0·72	1·16	0·71
October	1·30	0·70	0·59	1·41	0·61	0·55	1·57	0·89	1·36	1·90	0·50	0·95	.....
November	0·40	1·65	0·25	0·92	0·50	1·00	1·93	0·95	0·90	0·74	1·07	0·90	.....
December	1·60	1·75	0·70	1·40	0·60	2·25	2·00	2·15	1·00	2·05	1·47	1·10	.....
Totals	11·81	12·99	7·31	15·18	7·04	11·53	15·74	13·35	12·95	13·91	11·66	13·04	4·92

HORTICULTURE

The influence which Illustration Stations can exert to improve home surroundings, fruit and vegetable gardens within a community is unlimited in scope. All operators are receiving encouragement, and the ways and means, whereby a type of horticulture considered most beneficial to the district may be developed. At Arborg, Ericksdale, Katrime, and Plumas trial fruit orchards, including plums and apples, are now well established. Improved strains of potatoes and other vegetables have been supplied to all stations. In 1929, 240 bushels of potatoes for seed were disposed of by seven operators. In several years it is expected that roots, cuttings, and seedlings may be available to neighbours from most of the stations.

FIELD MEETINGS

These were held this year during the last week of July and first week of August at Plumas, Gilbert Plains, Roblin, Katrime, Petersfield, and Eriksdale. At these meetings farming problems within the district were discussed by the Superintendent of the Brandon Experimental Farm, while the visitors were conducted over the work of the station by the supervisor. At Eriksdale a very fine joint meeting was held with the Dominion Live Stock Branch, where besides field crop and horticultural talks, stock judging competitions and demonstrations with cattle and sheep were put on.

COST OF PRODUCING CROPS

Cost of production figures are based on the scale of prices presented below:—

COST VALUES

Rent of land	8 per cent of land values.
Use of machinery	$1 35 per acre.
Horse labour	8 cents per hour.
Man labour	Prevailing district rates.
Threshing	" " "
Binder twine	" " "

COST OF SEED

Wheat, common	$2 00 per bushel.
Wheat, Durum	1 80 "
Oats	0 90 "
Barley	1 30 "
Corn, Brandon grown N.W. Dent	4 45 "
Brome	0 15 per pound.
Western rye grass	0 12 "
Meadow fescue	0 25 "
Timothy	0 12 "
Alfalfa No. 1, Grimm commercial	0 48 "
Alsike	0 35 "
Red clover	0 36 "
Sunflowers	0 12 "

RETURN VALUES, GRAIN AND FODDER

Wheat, common	$1 35, basis No. 1.
Wheat, Durum	1 23, "
Oats	0 63, " C.W.
Barley	0 64, " No. 3 C.W.
Corn, green for silage	4 00 per ton.
Sunflowers, for silage	3 00 "
Alfalfa hay	13 00 "
Mixed clover and grass hay	12 00 "
Grass hay	11 00 "
Oat hay and green oat sheaves	10 00 "

ARBORG

OPERATOR, M. SHEBESKI

There was an unusually light snowfall in this district during the winter of 1928-29. Spring opened early and wheat seeding began April 22. Cool weather with snow and rain interfered with spring work during the first half of May. Favourable weather following this developed an even, strong stand on cereal fields, but on June 12 sixteen degrees of frost were registered throughout the district. This inflicted severe damage to many fields and on numerous spots complete killing occurred. The Reward wheat on the station plots sustained more damage from the frost than most other fields, and this was the chief cause for the comparatively low yield it gave. Dry, hot weather followed the frost, consequently the damage was emphasized.

SUMMARY OF YIELDS, VALUE AND COST OF GROWING CROPS AT ARBORG

Rotations and crops	Yield per acre, bushels or tons		Value of crop per acre, 1929	Cost per bushel or ton		Profit or (−) loss per acre	
	1929	Average three years		1929	Average three years	1929	Average three years
			$	$	$	$	$
Six-year Rotation—							
Wheat, Reward seeded down, meadow fescue; western rye grass	14·75	17·51	19 91	1 01	3 69	4 98	7 38
Hay, red and alsike clover	1·5	3·7	18 00	4 19	3 36	11 71	28 96
Hay and break	0·75	.....	9 00	8 74	.....	2 44	.....
Oats, Alaska	17·50	34·25	10 50	0 57	0 44	0 58	6 56
Barley, O.A.C. No. 21	23·00	27·58	13 80	0 48	0 49	2 81	3 62
Corn	0·75	2·25	3 00	14 16	6 86	−7 62	−3 88

Heretofore a five-year rotation has been under demonstration on the Arborg station. The hay mixture was, however, an expensive one to leave down only for one year, and, since this district is particularly well suited for growing hay crops, it was deemed advisable to extend the rotation to six years by leaving down the hay for two years.

Alaska, an early white oat, was introduced this season. They were seeded on land which had grown grain during the two previous years and the competition from sowthistle prevented the oats from doing as well as was expected. Late, wet seasons are common to this district, and under these conditions Alaska oats should do well.

Corn was planted for the fourth successive year. It has not yet produced a worth-while crop before being frozen down. This year it was frozen in June and made but a weak recovery. In early August it was again severely frozen, and what was left at this time was cut for hay and the field ploughed as a summer-fallow. The variety used was Northwestern Dent seed grown on the Brandon Experimental Farm. It appears that the risks attending corn growing in the Arborg district are too great. It has therefore been decided to use a bare summer-fallow in place of corn in the rotation.

Sowthistle and wild oats are quite prevalent in this district. The six-year rotation as it is now laid out provides conditions under which these weeds can be held in check.

CHURCHBRIDGE

OPERATOR, HENRY GRUBE

In common with all Central Northern districts the spring opened early at Churchbridge, and soil conditions were ideal for seeding operations. Wheat was sown on the station plots April 27, while oats were sown April 30 and barley May 14.

SUMMARY OF YIELDS, VALUE AND COST OF GROWING CROPS AT CHURCHBRIDGE

Rotations and crops	Yield per acre, bushels or tons		Value of crop per acre, 1929	Cost per bushel or ton		Profit or (−) loss per acre	
	1929	Average five years		1929	Average five years	1929	Average five years
			$	$	$	$	$
Six-year Rotation—							
Summer-fallow	.....	.....	.....	9 88	.....	.....	.....
Wheat, Reward, seeded down	25·00	26·00	33 75	0 49	0 50	21 38	19 11
Hay, western rye grass and alfalfa	1·60	2·30	19 20	7 09	4 12	7 85	15 92
Hay and break	1·25	2·00	16 80	8 92	4 96	5 65	10 97
Wheat, Reward	17·00	16·88	22 95	0 65	0 74	11 88	8 64
Oats, Banner	25·00	48·05	15 00	0 41	0 29	4 64	9 37
Four-year Rotation—							
Wheat, Garnet	16·50	.....	21 62	0 79	.....	8 44	.....
Corn, Northwestern Dent	6·25	.....	25 00	2 41	.....	9 89	.....
Barley, O.A.C. No. 21 seeded	20·00	.....	12 00	0 53	.....	1 36	.....
Hay and break	1·00	.....	12 00	7 05	.....	4 95	.....

The six-year rotation continues to hold sowthistle in check, but wild oats present some difficulty. These were so bad in the 1928 corn crop that it was cut before the oats ripened and the field was then fallowed. This field produced a clean crop of wheat this year. It was evident in 1928 that unless the corn crop were given an immense amount of cultivation and hand hoeing that it would continue to increase rather than decrease wild oats. Corn has therefore been removed from the six-year rotation, summer-fallow replacing it.

A four-year rotation on four two-acre fields was started this spring. It is situated on lower land than the six-year and has more sowthistle to contend with. Being a short rotation, it is considered well adapted to the control of the existing weeds, and at the same time provides for what should be profitable crops every year. In this rotation wheat follows a crop of sweet clover hay, the land being broken as soon as possible after the hay is removed. Corn follows wheat, and it should make a good cleaning crop on this small area. Barley follows corn, thus the two grain crops have the advantage of going in after the two cleaning crops of corn and sweet clover respectively.

DAUPHIN

OPERATOR, A. E. FRENCH

There was less rainfall at Dauphin during the growing season of 1929 than any other station from which records were obtained. In spite of this being one of the driest summers in the history of Dauphin district, the wheat crop came well up to the average. Yields on all of the station fields were surprisingly good and returns from all crops excepting that of sixty-day oats for hay were up to, or above the average.

The month of April was cool with frequent snowstorms. No seeding was done on the station fields until May 4.

SUMMARY OF YIELDS, VALUE AND COST OF GROWING CROPS AT DAUPHIN

Rotations and crops	Yield per acre, bushels or tons		Value of crop per acre, 1929	Cost per bushel or ton		Profit or (−) loss per acre	
	1929	Average four years		1929	Average four years	1929	Average four years
			$	$	$	$	$
Six-year Rotation—							
*Oats, sixty-day for hay	1·05	1·15	12 60	11 09	8 28	−0 95	2 33
Wheat, Reward following oat hay	30·00	29·56	40 50	0 52	0 51	24 85	19 48
Hay, alfalfa; western rye grass; meadow fescue	1·13	2·16	12 50	8 75	7 72	3 61	7 19
Hay and break	1·63	1·66	19 56	6 12	6 02	9 57	5 01
Wheat, Garnet	33·00	26·11	42 90	0 59	0 59	23 25	20 81
Oats, Banner	40·50	66·91	24 30	0 34	0 34	10 37	12 78
Demonstration Test Plot—							
Alfalfa for hay	2·66	4·25	34 58	3 89	3 43	24 33	36 60

*Two-year average only.

In 1928 it was decided to use sixty-day oats for hay in place of a bare summer-fallow. The soil on the station farm, like other farms in the vicinity, is a rich, deep black loam. In seasons of average rainfall crops on bare summer-fallow land invariably lodge and suffer from stem rust and other evils common to a " down " crop. When the early oats are cut for hay the field is ploughed, an operation which should not be done later than July 20. At this time any sowthistle which has been present in the oat crop will be at its weakest stage and the subsequent cultivation is most effectual as a measure of control. Wild oats are also grown out and cut with the oat hay. It is not yet possible to measure the advisability of growing this early oat crop in place of a summer-fallow, but Reward wheat in the dry season of 1929 yielded thirty bushels per acre on land following the oat hay crop. The greatest weakness in this practice

Garnet wheat after two years' hay at the Dauphin Illustration Station yielded 33 bushels per acre.

does not appear to be in reduced yields of wheat following the early oats, but in the failure of the grass and alfalfa to make a catch, especially under drought conditions. Under western dry-farming conditions grass and clover require a firm, moist seed bed. This can be secured in wet seasons even after successive grain crops, but when a dry season such as that of 1929 intervenes the loss of the newly seeded hay crop is usual. Alfalfa and grass failed to make a stand with the wheat at Dauphin this year.

Garnet wheat following two years in alfalfa and grass hay yielded so well in 1929 that it was a tribute to the careful preparation given the newly broken land in the late summer of 1928. This field is always broken as soon as the hay crop is removed in July and thorough surface tillage with disk harrow and cultivator is given. This operation has cleaned out sowthistle almost entirely, and although the cost of production per acre was higher for this field than for any others there was a larger net profit per acre because of the higher yields. Here is a practical demonstration that it pays to work the land thoroughly.

The Banner oat field was the only one showing sowthistle in 1929. This is evidence that for sowthistle areas a carefully arranged rotation where grain does not follow grain, excepting when justified, is a safe and profitable system of cropping.

DUGALD

Operator, Thos. Roberts

Wheat seeding on this station commenced on April 23. Oats and barley were seeded May 18. Excellent weather conditions prevailed throughout the spring and seeding was accomplished in quick time. The frost on June 12, followed by dry hot weather, had a detrimental influence on all grain crops. The very dry summer caused severe cracking of the soil, which in this district is a typical red river loam. In consequence, straw was short and yields were below average.

SUMMARY OF YIELDS, VALUE AND COST OF GROWING CROPS AT DUGALD

Rotations and crops	Yield per acre, bushels or tons		Value of crop per acre, 1929	Cost per bushel or ton		Profit or (−) loss per acre	
	1929	Average four years		1929	Average four years	1929	Average four years
			$	$	$	$	$
Six-year Rotation—							
Summer-fallow	.....	.....	.....	10 16	.....	.....	.....
*Barley, O.A.C. 21	1·25	.....	12 50	1 02	.....	−0 33	.....
Hay, alfalfa; western rye grass; meadow fescue	0·75	1·25	9 00	12 00	7 80	−0 03	3 15
Hay and break	0·75	1·60	9 00	11 60	6 89	0 24	6 68
Wheat, Reward	14·00	25·95	18 20	0 98	0 89	4 43	10 10
Oats, Victory	35·00	41·00	21 00	0 36	0 27	8 40	9 44
Three-year Rotation—							
Corn, Northwestern Dent	5·50	7·50	22 00	2 65	2 16	7 41	7 57
Barley, O.A.C. 21	30·00	27·00	18 30	0 38	0 50	6 85	4 27
Hay, sweet clover, break up	1·25	1·65	15 00	7 47	5 08	5 66	7 15
Demonstration Test Plot—							
†Alfalfa for hay	1·50	1·88	18 00	5 36	4 55	9 96	7 13

*Seeded to alfalfa and grass; crop weedy and therefore cut for hay.
†Two year average.

In 1927 the six-year rotation was thrown out of proper sequence as a result of flooding. In 1928 there was no summer-fallow field, consequently the proper order was not fully regained this season. The field to be seeded down this year was considered too foul with weeds to grow a wheat crop. It was therefore given late cultivation and barley was used as a nurse crop. Because of wild oats the barley was cut early for hay. The grass and alfalfa made a very good stand.

Wheat following hay was a clean crop but suffered from drought. Hay crops gave light yields but oats were a clean good crop.

The three-year rotation, from the standpoint of sowthistle and wild oat control, proved a disappointment this year. When these two weeds become bad on heavy soil such as that on this station, corn is a difficult crop to keep clean. On dairy farms in this locality where corn is a necessary and desirable crop it would appear advisable to plant the corn on clean land even if that be summer-fallow rather than to have it on dirty land following grain crops. Barley following corn in the three-year rotation yielded well but was weedy. This was not unexpected since the wet season in 1928 made clean cultivation of the corn crop impossible. Sweet clover was a clean crop and yielded an abundance of good quality hay.

ERIKSDALE

Operator, R. G. Cowdery

The spring opened early and dry in this district and seeding was accomplished in record time. Frost to the extent of thirteen degrees on June 12 injured crops somewhat and the dry hot weather which prevailed from that date throughout the summer was the direct cause of very low yields and in some cases complete failures.

The shallow, stony soil common to this interlake district very evidently cannot be expected to give profitable yields from grain crops in a season as dry as that of 1929. On the other hand, sweet clover hay gave fair yields of good quality, which, due to cheapness of production, showed some profit. This is essentially a feed crop and live stock district, and the continued success of sweet clover on the station suggests that this crop will exercise considerable influence on the future agricultural developments within this locality.

SUMMARY OF YIELDS, VALUE AND COST OF GROWING CROPS AT ERIKSDALE

Rotations and crops	Yield per acre, bushels or tons		Value of crop per acre, 1929	Cost per bushel or ton		Profit or (−) loss per acre	
	1929	Average three years		1929	Average two years	1929	Average two years
			$	$	$	$	$
Two-year Rotation—							
Barley, Trebi seeded down	Crop failure	24·00	.....	.....	.....	−8 50	4 29
Hay, sweet clover and break	1·25	1·37	15 00	5 84	5 77	7 70	7 07
Four-year Rotation—							
Barley, Trebi replacing summer-fallow	20·00	.....	12 80	0 75	.....	2 28	.....
Oats, Victory seeded down	23·00	33·25	13 80	0 53	0 39	1 43	6 27
Hay, sweet clover and break	0·88	1·07	10 56	9 46	8 63	2 23	2 49
Barley, Trebi	Crop failure	.....	.....	8 59	.....	−8 59	.....
Demonstration Test Plot—							
Wheat, Reward, seeded to alfalfa	13·25	.....	17 89	1 25	.....	1 20	.....

In seasons of abundant rainfall the two-year rotation of barley, followed by sweet clover hay and break, has given justifiable results. This year the barley crop was a complete failure. Under Eriksdale conditions it is obvious that one year's bare fallow in the course of a cropping system is necessary for the control of sowthistle if for no other purpose. The stony land prevents the thorough handling of this weed between successive crops. It has therefore been considered advisable to extend this to a three-year rotation which will include a bare summer-fallow year.

Barley on summer-fallow in the four-year rotation yielded twenty bushels per acre, but this yield at prevailing prices was not sufficient to offset the cost of preparation for and handling the crop. In the same rotation barley following sweet clover hay and break was a complete failure.

Reward wheat was tried as a nurse crop for alfalfa on a small field of clean summer-fallow. The stand was fair and the quality was excellent but the low yield left only a small margin of profit.

Costs of production are rendered relatively high on this station because the stony, hard nature of the soil slows up operations and several cultivations are necessary to be as effective as one, on the prairie loam soil.

GILBERT PLAINS

OPERATOR, A. W. BEST

Wheat seeding began on this Station on April 25 and oats and barley were seeded on May 11.

The soil on the Station and in the immediate district is a sandy loam, which in the dry season of 1929 produced a crop with short straw and relatively light yields.

SUMMARY OF YIELDS, VALUE AND COST OF GROWING CROPS AT GILBERT PLAINS

Rotation and crops	Yield per acre, bushels or tons		Value of crop per acre, 1929	Cost per bushel or ton		Profit or (−) loss per acre	
	1929	Average three years		1929	Average three years	1929	Average three years
			$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
Five-Year Rotation—							
Summer-fallow	.....	.....	.....	13 53	12 07	.....	.....
Wheat, Reward	20·00	21·67	27 00	0 71	0 79	12 82	6 17
Barley, O.A.C. No. 21, seeded down	6·00	23·67	3 84	2 32	1 10	−10 12	5 45
Hay, sweet clover and brome	0·75	2·08	9 00	12 20	6 54	− 0 15	11 04
Oats, Banner	23·00	60·00	13 80	0 53	0 36	1 42	6 91
Demonstration Test Plot—							
Alfalfa for hay	2·00	2·31	26 00	4 57	4 76	17 06	13 11

*Two-year average.

Reward wheat on summer-fallowed land did well and the quality of the threshed grain was excellent. Barley following wheat was an extremely light crop. One end of this field has a light sandy soil and on this the grain was almost a failure, but on the other end where soil is heavier the crop gave a good average yield. Sweet clover and brome grass were seeded with the barley; the clover made a fairly good stand but the grass appeared to be thin and weak.

Alfalfa yielded a heavier crop than the previous year. This is somewhat difficult to account for when the drought of this year is compared with the wet summer of 1928. A possible explanation is that with an additional year of growth the root system had penetrated deeply enough to be able to make use of the moisture stored in the deeper subsoil. This is one advantage enjoyed by alfalfa when left down as a permanent crop.

GUNTON

OPERATOR, ELLWOOD FRASER

The spring opened slightly earlier than is usual for this district. Wheat seeding began April 25, and oats and barley were seeded on the Station fields, May 7.

Wild oats and sowthistle are the principle harmful weeds in this locality. They are prevalent on the Station, consequently crop management has continually to be directed towards their control.

SUMMARY OF YIELDS, VALUE AND COST OF GROWING CROPS AT GUNTON

Rotation and crops	Yield per acre, bushels or tons		Value of crop per acre 1929	Cost per bushel or ton		Profit or (−) loss per acre	
	1929	Average four years		1929	Average four years	1929	Average four years
			$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
Six-year Rotation—							
Summer-fallow	.....	.....	.....	8 15	7 12	.....	.....
Wheat, Reward, seeded down	16·00	25·50	21 60	0 96	0 75	6 16	15 16
Hay, Alfalfa, Western Rye Grass (meadow fescue)	1·25	1·44	15 00	7 48	5 43	5 64	7 24
Hay and break	0·28	1·30	3 36	20 18	8 49	− 2 29	4 68
Wheat, Mindum	14·00	13·67	17 22	0 88	0 97	4 78	6 11
*Oats, Banner	1·50	28·50	15 00	6 70	0 45	4 92	2 75
Demonstration Test Plots—							
Hay, Alfalfa, Western Rye Grass, Meadow Fescue	0·50	1·56	6 00	13 00	6 90	− 0 50	7 13
Oats and peas for hay	2·00	.....	20 00	6 76	.....	6 48	.....

*Cut for sheaf feed, 1929. Bushel yield just two-year average.

Wheat following two years of hay gave higher than average yields this year, but it continues to be produced at a greater cost per bushel than wheat on bare summer-fallow. The only field bad with sowthistle was that in oats. This is the last crop in the sequence of the six-year rotation and as such is nearly always the weediest field. The oat crop was short in 1929 and since thistle was quite bad it was cut for green feed. This prevented the thistle from seeding and early fall cultivation of the stubble cleaned out many of the roots of this pest thus making an ideal preparation for the summer-fallow next year.

Alfalfa on a special test plot thinned out to such an extent that the land was broken up immediately the small hay crop was removed. Part of this field will be re-seeded to alfalfa while the remainder will be worked into a three-year rotation.

KAMSACK, SASK.

OPERATOR, F. D. CRAIG

The severe drought was the chief cause for lower than average yields being reaped on this station in 1929. Thin, short stands of grain permitted weed growth to make greater headway than usual. Annual weeds such as wild oats, stink-weed and mustards are common and these have to be seriously considered when handling cultural operations on the six-year rotation.

Wheat seeding began April 24. The spring was dry and fairly cool and spring work was completed in record time.

SUMMARY OF YIELDS, VALUE AND COST OF GROWING CROPS AT KAMSACK

Rotation and crops	Yield per acre, bushels or tons		Value of crop per acre 1929	Cost per bushel or ton		Profit or (−) loss per acre	
	1929	Average four years		1929	Average four years	1929	Average four years
			$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
Six-year Rotation—							
Corn, Northwestern Dent.	3·00	4·13	12 00	3 68	2 84	0 95	1 70
Wheat, Reward, seeded down	20·50	25·69	27 68	0 53	0 60	16 72	16 40
Hay, alfalfa, western rye grass, meadow fescue	0·75	1·22	7 50	11 04	7 35	− 0 78	2 70
Hay and break	0·75	1·06	7 50	10 04	7 48	− 0 03	1 83
Wheat, Reward	17·00	20·00	22 95	0 76	0 68	10 00	10 25
Oats, Victory	40·00	40·44	24 00	0 30	0 36	11 85	13 10

The average results with corn have not been encouraging. This crop has not kept the land free from wild oats and stink weed, as wheat following the corn crop has usually a fair infestation of these weeds. In the light of this experience it may be necessary to replace corn with bare summer-fallow.

KATRIME

OPERATOR, A. E. WALKER

This station was begun in 1928. During that year only two fields on the six-year rotation area were in crop. The remainder was fallowed, which permitted all six fields to be seeded in their proper arrangement. It should, however, be pointed out that the results from several years will have to be obtained before the influence of the six-year crop sequence in connection with production problems, will be evident.

Sowthistle is the worst weed in this district. It is not severe on the station fields, and in a soil with a fairly light texture such as this is, it is hoped that the six-year rotation will without much extra labour, keep the thistle in check.

Seeding began April 27 and all crops were in on the station fields by May 7. As at all other points the drouth was severe; yields were therefore much lower than they might otherwise have been.

SUMMARY OF YIELDS, VALUE AND COST OF CROPS AT KATRIME

Rotation and crops	Yield per acre, bushels or tons	Value of crop per acre	Cost per bushel or ton	Profit or (—) loss per acre
		$ cts.	$ cts.	$ cts.
Six-year Rotation—				
Summer-fallow	.....	.....	7 44	.....
Wheat, Reward, seeded down	18·00	24 30	0 92	7 61
Hay, alfalfa, western rye grass and meadow fescue	1·25	15 00	8 91	3 86
Hay and break	1·75	19 25	6 10	8 56
Wheat, Reward	18·00	24 30	0 72	7 61
Oats, Banner	33·75	19 24	0 47	3 34
Demonstration Test Plot—				
Alfalfa for hay	1·75	22 75	4 91	14 15

Alfalfa, after its first winter maintained an even thick stand but dry weather caused it to be rather short. The yield was quite good however, when the dryness of the weather is taken into consideration. The quality was excellent, and this with the prevailing high prices for alfalfa hay, brought the per acre profit higher than for any other crop grown on the station.

Reward wheat did fairly well, but was shorter strawed than several Marquis fields adjoining. The Reward however, ripened a very fine sample before rust damage came, while several heavy fields of Marquis in the immediate vicinity were fairly badly rusted.

PELLY, SASK.

OPERATOR, W. J. BETTINSON

Work was well started on this new station this spring when all fields on a five and three-year rotation were seeded in proper order. In addition to the rotation area a test plot was seeded to Grimm alfalfa having Reward wheat as a nurse crop.

The larger part of the area occupied by the station plots was summer-fallowed in 1928. The Red Back cutworm has in recent years done some damage to crops on bare summer-fallow in the locality. It was present this year and although doing little damage to the stands of grain it thinned, severely, all catches of clover and alfalfa. Part of these fields may require reseeding. Wherever legumes were seeded following a grain crop the damage was very slight. Should this larva continue its attacks, it may be necessary to rearrange the five-year rotation so that the seeding down may be done following a grain crop rather than on bare fallow land.

The soil common to this district is a deep black loam made friable by the high quartz content present. Not only do all cultivated crops thrive well in such a soil but many common farm weeds find in it an ideal medium for growth. Wild oats are particularly bad, Canada thistle is also prevalent and sowthistle is beginning to spread.

SUMMARY OF YIELDS, VALUE AND COST OF CROPS AT PELLY

Rotation and crops	Yield per acre, bushels or tons	Value of crop per acre	Cost per bushel or ton	Profit or (−) loss per acre
		$ cts.	$ cts.	$ cts
Five-year Rotation—				
Summer-fallow	.....	.....	8 13	.....
Wheat, Marquis, seeded down	23·50	30 55	0 72	13 54
Oats, Banner, replacing hay	50·00	27 50	0 33	10 85
Wheat, Marquis	23·75	30 88	0 75	13 11
Oats, Alaska	41·25	22 69	0 39	6 63
Three-year Rotation—				
Wheat, Reward	23·50	30 55	0 75	12 81
Sixty-day oats for hay, seeded down	1·50	16 50	8 80	1 68
Hay, replaced by fallow in 1929	.....	.....	7 71	.....
Demonstration Test Plot—				
Reward wheat seeded to alfalfa	17·50	23 63	0 96	5 78

The three-year rotation of wheat followed by sixty-day oats cut for hay, then clover hay and break is being tried as a profitable cropping arrangement, by which wild oats may be eradicated and thistles as well as other prevalent weeds kept in check. This rotation is so planned, that wheat comes on land made clean by the removal of the clover for hay followed by cleaning tillage. The wheat stubble in turn, is disked or shallow ploughed in the fall. It is then deep ploughed about the middle of May in preparation for the early oats, seeded to sweet clover. These oats are cut for hay before any wild oats have reached a viable stage and in fact before any of the worst weeds are seeding. The following spring the sweet clover stubble is disked lightly to cover any surface weed seeds so that they may grow and be cut with the clover. This field is ploughed as soon as possible after the removal of clover hay, thus providing a partial fallow which when worked down soon after ploughing has a killing effect on Canada thistle and sowthistle and if left dormant then until fall will bring along a crop of wild oats and other annuals to be killed by fall cultivation or winter frosts.

The five-year rotation is being demonstrated as a system of cropping which balances well the acreage of the usual crops grown on prairie farms so arranged, that cultural practices designed to keep weeds in check and maintain the fertility of the land can be carefully planned.

PETERSFIELD

Operator, Wm. Michael

An average spring season was experienced in this district. During the month of May several heavy rains fell. The precipitation at this time was undoubtedly largely responsible for the very satisfactory yields harvested, although, it can safely be said that the excellent tilth of the fields extended no small influence towards maintaining average yields in what was a severely dry summer.

Wheat seeding began April 28 and oats and barley were seeded May 11.

SUMMARY OF YIELDS, VALUE AND COST OF GROWING CROPS AT PETERSFIELD

Rotation and crops	Yield per acre bushels or tons		Value of crop per acre 1929	Cost per bushel or ton		Profit or (−) loss per acre	
	1929	Average three years		1929	Average three years	1929	Average three years
			$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
Six-year Rotation—							
Summer-fallow	.....	.....	.....	10 19	11 70	.....	.....
Wheat, Reward, seeded down	28·50	36·75	34 48	0 72	0 60	17 93	21 66
Hay, alfalfa, western rye grass and meadow fescue	2·75	3·12	33 00	5 47	4 14	17 94	13 99
Hay and break	1·50	1·83	18 00	6 53	5 02	8 11	9 46
Wheat, Reward	20·00	24·00	27 00	0 78	0 66	13 41	10 58
Oats, Victory	20·00	18·33	12 00	0 57	0 50	0 55	− 4 54
Three-year Rotation—							
Corn, Northwestern Dent	7·00	7·83	28 00	3 00	2 97	6 97	4 60
Barley Trebi	35·00	34·33	21 00	0 37	0 47	8 05	7 18
Hay, sweet clover and break	2·75	1·83	30 25	3 62	6 00	20 28	7 46
Demonstration Test Plot—							
Alfalfa in rows for seed	434 lb.	.....	141 90	0 48	.....	120 78	.....

*Two-year average.

Wild oats and sowthistle become less aggressive on this station each year. Only in the oat field on the six-year rotation area were thistles in evidence. This is the last crop in the rotation and the oat stubble was cultivated early in the fall which with dry weather killed much of this thistle. Fallowing in 1930 should completely clean up this field.

On the three-year rotation the corn crop was given a liberal amount of horse and hand hoeing which kept it entirely free from weeds. It brought good net returns per acre when valued on the basis of green silage corn. Trebi barley and sweet clover were both clean and yields were quite profitable.

Reward wheat following two years of hay on the Illustration Station at Petersfield, Man. Yield, 20 bushels per acre; net profit, $13.41. The total rainfall for the growing season was 3.5 inches.

The area occupied by the three-year rotation is now comparatively free from weeds and there is ample justification for the deduction that if the corn crop were kept clean from year to year that this short rotation is well planned to fight the worst of our annual and perennial weeds. An indication of the progress being made in weed control on this station can be had by a comparison of the references to the cleanliness of the fields made in 1929 with the following extract from the report of 1925 dealing with this station the first year of its operations. The report reads: "Owing to the prevalence of wild oats and sow-thistle the grain plots had to be largely cut for green feed. After harvest cultivation was carried out in order to encourage wild oats and to control as far as possible the ever present sowthistle menace".

PIPESTONE

Operator, Wm. Forder

The light, sandy soil on this station and in certain sections of the immediate district dries out very quickly. The dry summer was therefore doubly severe on grain crops and the yields on this station were quite low. Spring opened at an average date and cool weather with several heavy rains in May gave all grain crops a high germination and even start. June, July and August were months of severe drouth.

SUMMARY OF YIELDS, VALUE AND COST OF GROWING CROPS AT PIPESTONE

Rotation and crops	Yield per acre, bushels or tons		Value of crop per acre 1929	Cost per bushel or ton		Profit or (−) loss per acre	
	1929	Average three years		1929	Average three years	1929	Average three years
			$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
Six-year Rotation—							
Corn, Northwestern dent	3·00	4·50	12 00	2 93	2 47	3 19	4 57
Wheat, Ceres, seeded down	7·50	11·66	9 75	0 78	1 05	2 40	0 74
Hay, sweet clover and brome	0·50	1·00	6 00	13 06	9 94	− 0 53	3 17
Wheat, Mindum	6·50	10·20	8 00	1 53	0 89	− 1 98	− 0 73
Oats, Victory	7·00	18·42	4 20	1 17	0 74	− 3 99	− 3 41
Three-year Rotation—							
Wheat, Mindum	9·50	11·67	11 67	1 15	1 06	0 69	0 69
Oats, Victory seeded down	4·00	18·33	2 56	1 69	0 89	− 4 19	− 1 15
½ (Hay, sweet clover and break, sweet clover ploughed down)	0·50	0·92	6 00	11 04 6 20	7 44	0 48	2 94

Couch grass which was the most prevalent weed when the station was established in 1927 was less in evidence this year. Other weeds were negligible so that all fields presented a clean appearance. Moisture, not weeds, is the limiting factor in crop production on this station.

Corn was clean, and being an intertilled crop was better able to withstand the dry weather than the small grains. The yield was low but little work was required to keep it clean, a factor which contributed to the low cost of production. Ceres wheat, following corn in the five-year rotation gave a small acre profit, but clover hay, Mindum wheat and oats in the same rotation gave such low yields that losses were sustained. Results from the oat crop are fair evidence of the fact that on dry light soils in this region, grain following grain cannot be expected on the average to yield profitably.

Sweet clover in the three-year rotation is being utilized, one-half of the field for hay and the other half is ploughed down as green manure, during the latter part of June. This cultural trial was begun in 1928 but the influence of the two treatments on the Mindum wheat was very similar this year. The experiment will be continued until fairly definite results have been obtained.

PLUMAS

OPERATOR, F. BUSCHAU

This was the first of the Manitoba stations to begin seeding in 1929. Wheat seeding began April 15. The summer was very dry but despite this yields of grain and hay on the station fields were well up to the average.

SUMMARY OF YIELDS, VALUE AND COST OF CROPS AT PLUMAS

Rotation and crops	Yield per acre, bushels or tons		Value of crop per acre 1929	Cost per bushel or ton		Profit or (−) loss per acre	
	1929	Average three years		1929	Average three years	1929	Average three years
			$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
Six-year Rotation—							
Summer-fallow	.....	.....	.....	8 66	7 59	.....	.....
Wheat, Mindum, seeded	23·00	22·50	28 29	0 77	0 75	10 56	7 01
Hay, sweet clover and brome	2·10	1·90	25 20	4 38	4 35	16 00	11 87
Hay and break	0·50	0·90	6 00	10 70	6 91	0 65	2 71
Wheat, Mindum	17·50	22·70	21 53	0 85	0 76	6 65	9 04
*Oats, Banner	20·40	29·45	12 24	0 49	0 40	1 09	4 36
Three-year Rotation—							
Corn, Northwestern dent	6·50	7·17	26 00	2 22	2 27	11 56	7 41
Wheat, Mindum, seeded	20·00	15·67	24 60	0 60	0 83	12 48	5 13
Hay, western rye grass	Failure	0·89	.....	5 19	4 13	− 5 19	2 00
Demonstration Test Plot—							
Wheat, Reward, seeded to Alfalfa	24·00	.....	.....	0 77	.....	15 06	.....

*Two-year average.

Sowthistle is prevalent and the cultural work connected with the preparation of the land for crop has necessarily to be directed with the control of this weed in mind. The thistle has diminished on the six-year rotation area but it continues to be a detriment to the oat crop, which makes necessary special cultivation for oat land. In the fall of 1928 a portion of wheat stubble field to be prepared for oats, was skim-ploughed as soon as possible after wheat was cut. The shallow fall ploughed piece was harrowed early in the spring and then it was ploughed about 5 inches deep on May 20 together with the part left over in stubble. The side which received both early fall and spring ploughing yielded 23·5 bushels per acre at a net per acre profit of $2.21 while that part which was not ploughed until spring yielded only 12·5 bushels at a net per acre loss of $1.62. Sowthistles were reduced from 40 to 70 per cent on the side of the field which was ploughed both in fall and spring.

The three-year rotation is giving more immediate results as a cleaning system than the longer rotation. Corn has done well over a four year period. The soil and climate in this district are well suited to corn growing. The crop has been kept clean and therein lies the reason which has made it a paying as

well as a cleaning crop. After a cycle of years corn in the rotation now goes in on reasonably clean land which means that no excessive amount of labour is required to keep it clean.

Reward wheat was tried on this station for the first time. It was a very fair crop of high quality, and, for some time to come it should be a suitable variety to use on well worked summer-fallow land in this district.

ROBLIN

Operator, Arnott Bros.

Marked progress was in evidence on this station. Fields were much freer from weeds than in previous years and good average yields were secured from grain crops.

This district has usually a late spring and early fall frosts are not uncommon, but in this respect the past season was a particularly favourable one. Seeding commenced April 25 and the dry, warm summer rushed crops to early maturity.

SUMMARY OF YIELDS, VALUE AND COST OF CROPS AT ROBLIN

Rotation and crops	Yield per acre, bushels or tons		Value of crop per acre 1929	Cost per bushel or ton		Profit or (−) loss per acre	
	1929	Average two years		1929	Average two years	1929	Average two years
			$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
Five-year Rotation—							
Summer-fallow	.....	.....	.....	8 68	7 91	.....	.....
Wheat, Reward, seeded	28·00	22·12	31 80	0 60	0 75	20 85	10 59
Hay and break, sweet clover and western rye grass	1·12	1·39	11 20	9 11	7 56	0 99	2 11
Wheat, Marquis	26·25	22·63	34 13	0 52	0 66	20 42	11 47
Oats, Banner	19·50	Cut for green feed 1928	11 12	0 52	0 55	0 86	2 85
Three-year Rotation—							
Wheat, Marquis	24·00	32·00	31 20	0 58	0 49	17 16	12 58
Barley, Trebi, seeded	18·00	32·50	10 80	0 57	0 46	0 40	5 96
Hay and break, sweet clover	1·25	1·63	12 50	5 83	5 60	5 21	5 25
Demonstration Test Plot—							
Alfalfa for hay	1·77	3·01	21 24	4 58	4 65	13 13	12 50

Wheat was higher in quality than has been the case for a number of years. This, combined with fair yields and high prices brought better financial returns from grain crops than for the past few years. Wild oats were quite bad when work was begun in this station in 1926. On the three-year rotation area there was a distinct absence of this weed in 1929. This improvement can hardly be entirely due to the influence and cultural practices embodied by the rotation but undoubtedly this factor has had a far reaching effect. Sowthistle is not prevalent on the station fields although plentiful on adjoining areas. With no heavy infestation of this weed the five-year rotation is proving successful as a system for weed control.

Reward wheat was on trial for the first time and showed up well on summer-fallow land. This variety appears well suited to the conditions of soil and climate prevailing in this district. Alaska oats were introduced this year but the dry summer curtailed their growth and the yield was disappointing. This early white oat should be valuable in this district where short growing seasons are usual. Alfalfa for hay yielded profitably. Half the field has now gone through two winters with very little injury.

STE. ROSE DU LAC

OPERATOR, JOS. FITZMAURICE

This district has been rather unfortunate during the last few years from the standpoint of crop yields. Much of the land is light in nature and dries out readily. Sowthistle is extremely prevalent in large sections particularly in that part of the locality situated around the southern shores of Lake Dauphin. This weed has spread extensively throughout the district, and there are occasional idle farms where it is permitted to flourish, and ripen seeds, thus creating a weed menace of no small proportions.

Control of sowthistles is one of the chief concerns in connection with crop rotations on the station. Hopes were entertained that sweet clover would materially assist as a control crop but so far it has either winter killed or been thinned out to such an extent that it has had no opportunity to exert its usual influence in this respect.

Wheat seeding began in 1929 on April 28 and oats were sown May 5.

SUMMARY OF YIELDS AND COST OF GROWING CROPS AT STE. ROSE

Rotation and crops	Yield per acre, bushels or tons		Value of crops per acre 1929	Cost per bushel or ton		Profit or (−) loss per acre	
	1929	Average three years		1929	Average three years	1929	Average three years
			$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
Five-year Rotation—							
Summer-fallow	.....	.....	.....	5 63	5 43	.....	.....
Wheat, Mindum, seeded	10·00	17·00	12 30	1 22	0 91	0 07	3 54
Hay and break, sweet clover	0·75	0·58	9 00	6 38	6 38	4 03	3 08
Wheat, Mindum	10·00	15·67	12 30	1 32	0 91	− 0 88	3 78
Oats, Banner	12·00	25·67	7 56	0 66	0 45	− 0 45	2 02
Test Plot—							
Reward wheat, seeded to alfalfa and western rye grass	17·00	.....	22 95	0 80	.....	9 28	.....

Grain plots although yielding low made a much higher average than was usual on farms in the district.

Reward wheat had an initial trial here in 1929. It was seeded on clean, well prepared summer-fallow and yielded a very fair crop of high quality wheat. Mindum and Kubanka wheats have been grown extensively in this district during recent years and were considered well suited to local conditions. This year,

however, numerous complaints have arisen relative to the poor performance of the durums. If common bread wheats become popular again Reward may find a suitable place especially on well worked summer-fallows.

Rotation fields were quite free from weeds and land was in splendid tilth. These fields are now in such condition that the five-year rotation can be advantageously demonstrated.

WAWOTA, SASKATCHEWAN

OPERATOR, CHARLES PRYCE

An early spring is not usual in this district and the past season was no departure from the rule. Heavy snowfalls in April postponed seeding operations. Wheat seeding began May 5. The spring moisture was, however, welcome, and it had a beneficial influence in relation to growth of the crop in what proved to be a very dry summer.

SUMMARY OF YIELDS AND COST OF GROWING CROPS AT WAWOTA

Rotation and crops	Yield per acre, bushels or tons		Value of crops per acre 1929	Cost per bushel or ton		Profit or (−) loss per acre	
	1929	Average four years		1929	Average four years	1929	Average four years
			$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
Five-year Rotation—							
Summer-fallow	.....	.....	.....	6 84	6 96	.....	.....
Wheat, Reward, seeded down	20·00	20·63	27 00	0 73	0 67	12 27	11 56
Hay and break	1·25	1·31	15 00	6 98	5 66	6 27	4 43
Wheat, Reward	20·00	18·75	27 00	0 70	0 71	13 94	9 97
Oats, Banner	35·00	45·00	22 05	0 29	0 27	11 61	8 67
Test Plot—							
Sunflowers for ensilage	6·50	7·00	17 87	2 50	2 33	1 62	2 13

From the time this station commenced work in 1924 until this year a six-year rotation, having two years of hay, has been demonstrated. The second year hay crop has successively failed to be profitable. The rotation has therefore been reorganized and the hay is now left down for one year only, making a five-year sequence of crops. The hay mixture of alfalfa, western rye grass and meadow fescue used in the six-year rotation was considered too expensive to use when left down but one year as in the five-year system. The hay mixture has therefore been changed to sweet clover and western rye grass. The field left vacant by the reduction from a six to a five-year rotation has been added to an area formerly used for special crop demonstration and on this a three-year rotation is being laid down. The three-year rotation will include barley, seeded to sweet clover, hay and break followed by wheat. This short rotation is particularly designed as a system for weed control and also for soil improvement as part of the sweet clover crop will be ploughed down as green manure while the other part will be cut for hay in comparison.

Reward wheat did well for the second successive year. The sample graded a good No. 1 Northern, being bright and plump. An early wheat of this type but even more resistant to rust, would fill a needed place in the Wawota district.

CO-OPERATIVE TRIALS ALONG THE LINE OF THE HUDSON BAY RAILWAY

CEREALS

This is the fifth successive year for cereal trials along the southern part of the railway and the first year north of Mile 185. Richard Jarvis, Hudson Bay Junction; MacKay Indian School, The Pas, and Jas. Turnbull, Mile 42, completed their fifth year of co-operation, while those co-operating for the first time were H. E. Wells, Mile 185, Wesley G. Harpe, Mile 214, R. Carson, Mile 237 and L. B. Kenny, situated on the Sherritt-Gordon Branch line from the Flin Flon, and Tom Allen, Mile 327.

The season of Northern Manitoba was scarcely as dry as in the prairie regions but that is usual in these latitudes. At The Pas little more precipitation fell during the growing season than was recorded at Brandon. The dry weather helped to rush the grain to maturity despite the late seeding in most cases. Excellent samples were threshed, from The Junction, The Pas and Mile 42, and, had these from Mile 185 been harvested the samples would have been of very high order. North of Mile 185 land is quite new and at Mile 214 the soil on which the plots were located was broken just prior to seeding. The whole season here was backward and severe frost and snow about September 2 brought a finish to growth. The same conditions existed at Mile 237.

Varieties under test included two early sorts each of wheat, oats and barley, with two or more later maturing varieties of these grains. The later maturing ones gave an index as to the length of season available for the maturing of grains.

Not much emphasis can be placed on the yield per acre when appraising the value of a variety. Rather, the quality and date of maturity give a fair measure of suitability, since in this region the chief essential is to have a variety which will mature a satisfactory sample before frost damage. The plots are invariably attacked by birds and rodents, as they are ripening, and this factor accounts for the unreliability of the yields.

Five year results at The Pas, and Mile 42 have shown all grains under trial to have matured good samples without frost injury. At Hudson Bay Junction, all samples were frozen in 1928 but they all matured free from frost in the other four years.

H. E. Wells, Mile 185.—All varieties matured at this point but none were harvested. Stands and quality were particularly good.

Robert Carson, Mile 237.—Seeding at this point was quite late and no varieties matured before frost at end of August. Wheats averaged twenty inches in height with Mindum reaching thirty-five inches. Oats were all a good stand but did not mature before frost, although they were much further advanced than the wheat.

Tom Allen, Mile 327.—Reward wheat, Alaska oats and Trebi barley were tried at this far northern point. The growth during the summer was surprisingly good and at the end of August when killing frosts came these grains were approaching the dough stage. Straw was quite short and stunted in appearance.

SUMMARY OF CO-OPERATIVE TESTS ALONG THE LINE OF THE HUDSON BAY RAILWAY

Variety	Hudson Bay Junction, R. Jarvis				McKay School, The Pas				Mile 42, J. Turnbull				Mile 214, Wesley G. Harpe			
	Stem rust	Yield per acre	Weight per bushel	Commercial grade	Stem rust	Yield per acre	Weight per bushel	Commercial grade	Stem rust	Yield per acre	Weight per bushel	Commercial grade	Stem rust	Yield per acre	Weight per bushel	Commercial grade
	per cent	bush.	lb.		per cent	bush.	lb.		per cent	bush.	lb.		per cent	bushel	lb.	
Wheat—																
Reward	10–20	24·12	65	1 Nor.	Slight	.....	66·5	1 Hard	tr–15	45·82	64	1 Nor.	Nil	not sufficient for yields	58	Frozen Feed.
Garnet	25–65	31·06	65	2 Nor.	Cons.	28·05	63·5	2 Nor.	5–30	44·07	63	2 Nor.	Nil		56	Frozen Feed.
Marquis	12–20	23·24	64	2 Nor.	Slight	35·10	63·5	1 Nor.	tr–25	37·78	63	1 Nor.	Nil		.....	
Ceres	8–15	20·92	65	2 Nor.	Nil	26·25	63·5	1 Nor.	0–tr	39·42	61	2 Nor.	Nil		.....	
Mindum	0–tr	25·86	66	2 Dur.	Nil	24·65	65	1 Dur.	Nil	28·48	56	3 Dur.	Nil		.....	
Oats—																
Banner	Nil	78·60	42	1 Feed	Oats destroyed by birds				Slight	68·00	36	1 Feed	Oats seeded too late to mature.			
Victory	.....	74·20	43	2 C.W.					Slight	70·00	40	1 Feed				
Alaska	.....	66·90	40	2 C.W.					Nil	67·90	38	1 C.W.				
Gopher	.....	87·75	42	1 C.W.					Nil	78·80	37	1 C.W.				
Barley—																
O.A.C. 21	Nil	65·99	48	3 extra C.W.	Nil	60·18	49	2 C.W.	Nil	60·55	50	2 C.W.	Nil	None of the barleys matured before frost.		
Trebi	.....	85·28	51	1 Trebi	Nil	68·85	52	1 Trebi	.....	77·84	48	2 Trebi	Nil			
Duckbill	.....	63·76	53	1 C.W.	Nil	34·75	53	2 row 1 C.W.	.....	30·88	51	2 C.W.	Nil			
Himalayan	.....	74·29	64	1 Hulless	Nil	48·50	65	No. 1 Hulless	.....	57·88	64	1 Hulless	Nil			

L. B. KENNY, SHERRITT-GORDON BRANCH.—Reward and Garnet wheat came to full maturity in this trial. The season here was very dry and in new soil the crop had a hard time. Stands were very short and thin and heads had but few kernels in them.

Alaska and Gopher oats, two early varieties, were tried and these did well, maturing before frost.

Trebi barley was tried and it did better than either the oats or wheat, making a vigorous stand and coming to full maturity.

FODDER CROPS AND VEGETABLES

Grasses and alfalfa have been under trial for the past four years as far north as mile 185. These grow very successfully in this region. Western rye grass, timothy and meadow fescue do particularly well.

Vegetables were grown in 1929 as far north as Hershmer (Mile 412). All frost hardy vegetables do well from Mile 42 to 214. North of this only the very hardiest are successful. At Mile 237, lettuce, radish, onions, beets and peas did well. Potatoes were tried here but they did not grow larger than marbles and from 15 hills only three pounds were picked. At Mile 327, excellent lettuce, radish, onions and peas were grown in a semi-hot bed, while the same vegetables grown in the open did not do well. Potatoes here were almost a complete failure. At Mile 412 lettuce, radish and peas made some growth but at the end of August were scarcely ready for use.

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DOMINION OF CANADA
DEPARTMENT OF AGRICULTURE
DOMINION EXPERIMENTAL FARMS

TOBACCO DIVISION

REPORT OF THE OFFICER IN CHARGE

N. T. NELSON, Ph.D.

FOR THE YEARS 1927, 1928 and 1929

Main Office, Laboratory and Warehouse Building of the Tobacco Division, Central Experimental Farm, Ottawa, Canada.

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TABLE OF CONTENTS

TOBACCO DIVISION

REPORT COVERING THE PERIOD 1927-1929

N. T. NELSON, Ph.D., and T. G. MAJOR, M.Sc.*

INTRODUCTION

During the past ten years the Canadian tobacco-producing industry has undergone a very considerable development. Not only has there been a large increase in the volume of production since 1921, but both the domestic and export markets have been greatly expanded. There have been recurring periods of expansion, over-production and retrogression, especially in the Burley and dark districts of Ontario. Since 1928 there has been a rapid expansion in the growing of bright flue-cured tobacco, particularly in Norfolk county, Ontario. In that area tobacco growing has developed along the lines of corporation farming, somewhat paralleling the shade cigar wrapper industry in the Connecticut Valley. In Quebec the domestic cigar binders have become firmly established as a product of high quality. The situation in British Columbia is still unsettled, but recent developments indicate the possibility of the establishment of a local outlet within the province. In general the industry probably now stands on a firmer footing than has ever been the case in the past. Limitations and potentialities are now better understood, improvements are taking place in varieties and in methods of production, and the adaptability of certain areas to certain types is more clearly defined. The future would appear to hold much promise.

The activities of the Tobacco Division extend from New Brunswick to British Columbia, but the most extensive experiments are conducted at Ottawa and Harrow, Ontario; Farnham and l'Assomption, Quebec; and Summerland, British Columbia. The principal projects actively in progress include the following:—

(1) Fertilizer requirements of the cigar, Burley, dark and flue-cured types of tobacco.
(2) Testing and breeding for earlier maturity, disease resistance, and better quality.
(3) Cultural treatments, including the effects of topping, degree of suckering, maturity at harvest, and spacing of plants in the row.
(4) Distribution of seed from select varieties.
(5) Curing and fermentation studies.
(6) Statistics and tobacco market surveys.
(7) Disease survey.
(8) Co-operation with provincial departments of agriculture in educational phases.
(9) Special consideration of factors affecting the quality of tobacco.
(10) Seed-bed studies.
(11) Factors influencing nicotine production.
(12) Miscellaneous items such as paper mulch, etc.

During the past three years several changes have occurred in the staff directly concerned with tobacco experimentation. Among these were the resignations of C. M. Slagg, Chief of the Tobacco Division, Ottawa; H. A. Freeman,

* Chief of Division, and Tobacco Specialist, respectively.

5639—2½

Superintendent at Harrow; and Conrad Turcot, who were replaced, respectively, by N. T. Nelson in August, 1928; H. F. Murwin in May, 1929; and N. A. MacRae early in 1930. A. J. Mann was appointed tobacco specialist in British Columbia in March, 1928.

From a depleted staff of seven in 1928 it was increased to eleven early in 1930. There is still one unfilled vacancy and two or more new positions to be created in the near future. With this enlarged staff of trained men, who have shown unusual willingness to co-operate, some exceedingly interesting and valuable information should be secured within a short period.

New facilities were provided at Ottawa to promote the work at the Central Experimental Farm. A new barn was built in 1928, and in 1929 about 10½ acres were set apart for tobacco plots. This field is located on new land purchased to enlarge the Central Experimental Farm. Although somewhat variable in fertility and type, the greater portion is a medium sandy loam which is fairly satisfactory for growing cigar tobacco. On this field extensive fertilizer treatments were applied in 1929. Although the field was badly infested with mustard and couch grass, interesting results were obtained at once and are included in this report.

In 1929 a complete reorganization of the fertilizer work at Harrow and Farnham was made and new work along similar lines was begun at Ottawa and the new station located in l'Assomption. All comparisons and trials were devised for direct comparison with a basal treatment which serves as a check treatment. These basal treatments or checks were repeated at regular intervals to cover the changes occurring in the natural fertility of the land as well as changes in soil type. Plot technique was standardized, and improved methods for obtaining information on specific qualities were devised.

CROPS AND MARKETS REVIEW

Tobacco Production in Canada (1927-1929)

The Canadian tobacco crop of 1927 was the second largest in the history of the industry, being exceeded only by that of 1920, when a total of 48,088,500 pounds were grown. In the following year, 1921, the crop amounted to only 13,248,962 pounds, the reduction being due to the overproduction and low prices of 1920. The succeeding years saw a general increase until, in 1927, 43,916,700 pounds of tobacco were produced. This again was far in excess of market requirements, especially in the Burley and dark air-cured types, and the growers experienced great difficulty in disposing of the crop even at very low prices. In 1928 the production was reduced to 41,956,375 pounds and in 1929, still further to 29,886,350 pounds.

The seasons of 1927 and 1928 were quite favourable to tobacco production, the average yield per acre amounting to approximately 997 and 949 pounds respectively. In 1929, however, the tobacco growers experienced one of the worst seasons on record, especially in southwestern Ontario where the weather was excessively dry. In consequence the yield per acre was reduced to only 790 pounds. The crop in many districts was late in maturing and severe frosts about the middle of September destroyed approximately 10 per cent of the crop. The crop production in 1929 was, therefore, much less than was anticipated early in the season.

In the following tables are summarized the statistics of production since 1920.

TABLE 1.—PRODUCTION OF CANADIAN TOBACCO 1920 TO 1929

Year	Production in pounds	Year	Production in pounds
1920	48,088,500	1925	29,266,000
1921	13,248,962	1926	28,824,000
1922	25,947,570	1927	43,916,700
1923	21,297,000	1928	41,956,375
1924	18,710,740	1929	29,886,350

TABLE 2.—ACREAGE AND PRODUCTION OF VARIOUS TYPES 1927 TO 1929

Type	1927	1928	1929
Bright flue-cured	7,570 acres 6,247,750 pounds	10,905 acres 8,726,100 pounds	15,085 acres 10,500,000 pounds
Burley	20,490 acres 22,581,000 pounds	15,981 acres 17,787,250 pounds	8,205 acres 7,806,000 pounds
Cigar leaf	5,786 acres 4,900,300 pounds	5,935 acres 5,197,625 pounds	5,004 acres 5,003,850 pounds
Dark air-cured	3,615 acres 4,338,000 pounds	2,125 acres 2,422,500 pounds	400 acres 400,000 pounds
Dark fire-cured	2,135 acres 2,669,650 pounds	3,516 acres 4,219,200 pounds	2,970 acres 2,600,000 pounds
Large pipe	3,120 acres 2,496,000 pounds	3,268 acres 2,810,000 pounds	2,900 acres 2,610,000 pounds
Small pipe	1,272 acres 636,000 pounds	1,218 acres 609,200 pounds	1,400 acres 770,000 pounds
Miscellaneous	40 acres 48,000 pounds	190 acres 194,500 pounds	346 acres 196,500 pounds
Totals	44,028 acres 43,916,700 pounds	43,138 acres 41,956,375 pounds	36,310 acres 29,886,350 pounds

TABLE 3.—ACREAGE AND PRODUCTION BY PROVINCES 1927 TO 1929

Province	1927	1928	1929
British Columbia	360 acres 470,000 pounds	116 acres 164,200 pounds	100 acres 87,850 pounds
Ontario	33,650 acres 35,622,400 pounds	32,654 acres 33,265,850 pounds	26,910 acres 21,418,500 pounds
Quebec	10,018 acres 7,824,300 pounds	10,368 acres 8,546,325 pounds	9,300 acres 8,380,000 pounds

TABLE 4.—AVERAGE FARM PRICES PER POUND 1927 TO 1929

Type	1927	1928	1929
	cts.	cts.	cts.
Bright flue-cured	33·9	31·0	29·0
Burley	17·8	11·1	18·0
Cigar leaf	19·0	11·3	15·0
Dark air-cured	16·4	13·8	17·0
Dark fire-cured	22·0	18·7	19·0
Large pipe	17·0	8·2	12·0
Small pipe	27·0	27·8	24·0

The outstanding feature of the past three years has been the increase in the acreage devoted to bright flue-cured tobacco. The bulk of this increase has taken place in Ontario in Norfolk, Elgin and Oxford counties, constituting the eastern or "New Belt" of Ontario flue-cured tobacco. In 1927 the "New

Belt" acreage amounted to 1,700 acres, in 1928 to 5,518 acres, and in 1929 to 10,800 acres. Had it not been for the dry season and early frost the flue crop in 1929 would undoubtedly have been close to twelve million pounds instead of ten and a half millions.

Burley has shown a marked decrease, both in acreage and production, since 1927. This is undoubtedly due to the large overproduction and low prices in 1927 and 1928. The same is true in regard to dark air-cured tobacco, the demand for which is not as great as previously. About 100 acres of Turkish tobacco were grown near Leamington, Ont., in 1929.

Conditions in Quebec have been remarkably stable during the period under review. The production of cigar leaf, and large and small pipe tobaccos has fluctuated only within narrow limits.

The situation in British Columbia remains uncertain. A considerable portion of the 1927 crop, grown chiefly in the Okanagan Valley, remains unsold. In 1929 practically no tobacco was grown in that area, but a fairly extensive trial was made in the Sumas district of the Lower Fraser Valley. An attempt is being made to utilize this leaf for pipe and cigarette purposes by a Vancouver concern.

EXPORTS OF CANADIAN LEAF TOBACCO 1927 TO 1929

The volume of the export trade in leaf tobacco has continued to expand. A large share of exports continue to go to Great Britain, but the year 1929 saw a notable development of Canadian trade with other European countries. A survey of the market in Great Britain was carried out in the winter of 1929, and, as a direct result, further efforts are being made by the government and commercial agencies to place larger quantities of the various types of Canadian leaf in that country. At present most of the exports to the United Kingdom consist of heavy red leaf grades of Burley with smaller quantities of dark-fired wrappers and dark fillers. In 1929 small lots of bright flue-cured and cigar leaf were exported. The market in Belgium has developed as a result of the need for disposal of the low-grade leaf left after the cream of the crop is taken up for the domestic and British markets.

In the following table is given an analysis of the exports of Canadian-grown leaf since 1927.

TABLE 5.—EXPORTS OF UNMANUFACTURED TOBACCO FROM CANADA, 1927 TO 1929

County	1927	1928	1929
Barbados			890 pounds
			$ 153
Belgium		61,004 pounds	1,165,870 pounds
		$ 4,434	$ 86,102
Denmark			56,316 pounds
			$ 6,348
Germany			78,509 pounds
			$ 5,739
Netherlands	937 pounds		84,501 pounds
	$ 187		$ 6,032
Spain			44,858 pounds
			$ 3,454
St. Pierre and Miquelon			100 pounds
			$ 25
United Kingdom	5,859,120 pounds	6,133,481 pounds	5,809,207 pounds
	$ 2,569,678	$ 1,925,049	$ 1,641,981
United States	7,422 pounds	5,428 pounds	3,794 pounds
	$ 2,791	$ 2,005	$ 1,464
Totals	5,867,479 pounds	6,194,913 pounds	7,244,045 pounds
	$ 2,572,656	$ 1,931,488	$ 1,751,298
Average price per pound	43·84 cents	31·17 cents	24·17 cents

IMPORTS OF RAW LEAF TOBACCO INTO CANADA

Imports into Canada have an important bearing both on the domestic and export trade. In the limited space available it is not possible to analyze the statistics in detail but certain of the outstanding features of the trade should be brought to the attention of Canadian producers.

In 1929 imports amounted to about 18 million pounds as compared with 25 millions in 1920. Of the total importation in 1929, 92 per cent came from the United States and 85 per cent of this was of the bright flue-cured type. Dark fire-cured comes next in importance and has tended to increase in recent years, chiefly as the result of low prices in the United States. Imports of Burley and dark air-cured tobaccos have steadily decreased, practically no leaf of these types entering the country in 1929. The large Canadian crops of 1927 and 1928 coupled with high prices in the United States have undoubtedly contributed to this desirable change in the trade.

The bulk of the imported cigar leaf comes from Cuba and the Dutch East Indies, that from the former country consisting of high-grade fillers, while the latter furnishes wrapper leaf. Betwen 200,000 and 300,000 pounds of Turkish or Oriental tobaccos are imported annually, coming mainly from Greece and Turkey. Smaller quantities of various types of leaf are brought in from Brazil, Mexico, San Domingo, France, etc.

CONSUMPTION OF TOBACCO PRODUCTS IN CANADA

Certain changes are taking place in the consumption of manufactured tobacco which have an important bearing on the future of the Canadian production industry. In the following tables statistics are presented showing the trends during recent years.

TABLE 6.—PER CAPITA CONSUMPTION OF VARIOUS TOBACCO PRODUCTS

Product		1919	1921	1923	1925	1927	1928	1929
Cigars	No.	24·3	18·5	19·3	16·0	18·0	19·1	20·3
Cigarettes	No.	349·5	296·2	230·2	291·8	379·5	437·5	518·8
Chewing tobacco	lb.	0·87	0·71	0·67	0·63	0·60	0·54	*
Smoking tobacco	lb.	1·78	1·46	2·04	1·96	2·12	2·29	*
Snuff tobacco	lb.	0·08	0·08	0·09	0·09	0·09	0·10	0·11
Totals	lb.	3·17	3·28	3·29	3·25	3·50	3·68	*

* Data not available on March 31, 1930.

TABLE 7.—TOTAL QUANTITIES OF TOBACCO USED FOR VARIOUS PURPOSES

Year	Cigars	Per cent	Cigarettes	Per cent	Smoking and chewing tobaccos	Per cent
	lb.		lb.		lb.	
1926	4,508,683	12·3	8,030,489	21·9	24,084,732	65·8
1927	3,162,364	8·5	9,242,510	24·9	24,764,800	66·6
1928	3,540,404	8·9	10,745,149	27·1	25,291,918	64·0

In general the trend is undoubtedly toward the cigarette, although the consumption of smoking tobacco continues to increase. More cigars are being smoked but the size of the average cigar is decreasing. Chewing tobacco is rapidly declining in popularity while increases are noted in the use of snuff.

Inquiries among the trade indicate that the taste of the cigarette-consuming public is also changing. The popularity of the "blended" cigarette in comparison with the so-called "Virginia" cigarette (made entirely from bright flue-cured tobacco) is becoming increasingly apparent. This will undoubtedly have an important bearing on the future domestic market for Burley and bright flue-cured tobacco.

MARKET INVESTIGATIONS

During the past five or six years, the Tobacco Division has assisted materially in promoting a market for Canadian tobacco in Great Britain. On several occasions, through co-operation with Canadian packers, representative commercial samples have been exhibited in London and elsewhere in an effort to expand our export trade in tobacco. These samples included tobacco produced in Ontario, Quebec and British Columbia; and Bright flue-cured, Burley, Dark and Cigar types were displayed. In 1927 this work was done by C. M. Slagg, and in 1929 by T. G. Major.

SURVEY OF BRITISH MARKET IN 1927

At the Seventh International Tobacco Exposition, held at Olympia in 1925, Canada was the only one of the overseas dominions showing an exhibit of leaf tobacco. At the 1927 Exposition excellent leaf exhibits were shown from South Africa, India, Nyasaland, Northern Rhodesia, Southern Rhodesia, Cyprus, and Mauritius. All of these countries are encouraging tobacco culture and are very actively interested in increasing their exports to the United Kingdom. India, Nyasaland, and Rhodesia have been successful in effecting large increases in their tobacco exports. Canada has also made notable progress in this direction. Our exports of leaf tobacco have increased from 200,000 pounds in 1921 to more than 5,000,000 pounds in 1926. In this connection we cannot do better than quote from page 29 of the catalogue issued by the Olympia Exhibition Committee, London: "Canada's output is one of the most notable examples of successful catering for this market. Her soils and climatic conditions render the leaf specially suitable for blending with the U.S.A. product, and is in itself of excellent quality. The word 'progress' in Canada is thoroughly well acted upon in the case of tobacco as in other departments. Canada has a considerable advantage over some other portions of the Empire, inasmuch as she has a splendid market for her tobacco production at home as well as for export to this country."

In 1927, an exhibit consisting almost entirely of commercial samples was displayed at the Eighth International Tobacco Exhibition held in London, England. This exhibit was a fair representation of the quality of Canadian tobacco which might readily be purchased on the open market.

A summary of the situation as found in England by Mr. Slagg, together with observations and suggestions after interviewing the British tobacco trade, follow:—

1. Only clean, well-graded, high-quality tobacco should be placed on the English market.
2. Canadian prices are somewhat too high to be attractive.
3. Canadian tobacco is most useful in blends because of its similarity to American tobacco.
4. The greatest demand is for bright flue-cured and dark-fired, with a fair demand for Burley and dark air-cured, and only a very limited market for cigar binders and fillers.
5. Empire mixtures have advantage of cheapness, but the quality might be improved to advantage.

SURVEY OF BRITISH MARKET 1929

Again in February, 1929, an exhibit of Canadian tobacco was shown at the British Industries Fair, London. This exhibit was also made up partly of samples prepared by the Tobacco Division, and partly of those forwarded by various packers and growers in Ontario and Quebec. Bright flue-cured, dark-fired, Burley and cigar leaf were included. As Canadian flue-cured had been comparatively little known in England, this type was especially featured. In view of this, Mr. Major deemed it advisable to specially invite representatives from various British firms to visit the Fair and view the exhibit.

The general public evinced much surprise at the size of the Canadian tobacco-producing industry, and one feels that efforts should be continued to educate the British consumer in regard to Canadian tobacco, apart altogether from activities in connection with the trade itself. Such publicity would aid the British manufacturer in his efforts to change the taste of the consumer from foreign to Empire-grown leaf.

ATTITUDE TOWARDS CANADIAN TOBACCO

Of American tobacco exported to the United Kingdom in 1927, 75 per cent was flue-cured. Besides this, large additional quantities were exported from Rhodesia and Nyasaland. In 1928 the per capita consumption of cigarettes in Great Britain was estimated at 1,460 per year, as compared with 820 in the United States and 437 in Canada. England is a great cigarette-smoking nation. Of the total quantity of tobacco consumed according to estimates made by various firms interviewed, the cigarette trade accounts for approximately 75 per cent of the total.

QUALITY OF LEAF DESIRED

FLUE-CURED.—Verbal evidence furnished by leaf dealers and manufacturers was verified by personal examination of casks in storage and tobacco actually in the process of manufacture. All observations indicated that what the trade particularly required was flue-cured tobacco suitable for cigarette manufacture.

Cutter and leaf grades of a medium lemon to orange colour were in greatest demand. Too light a lemon colour was not satisfactory because it is usually associated with an undesirable greenish tinge. Green and dark veins were discriminated against. Since the English smoker prefers a very mild cigarette, the aroma should be mild and sweet and the flavour smooth and pleasant. In addition the leaf should be thin and stretchy but of sufficient body to avoid shattering in transit.

Due to its characteristic mildness and sweetness of aroma the most desirable leaf at present comes from the "New Belt" in the United States. No Empire-grown leaf has yet been found which could wholly replace this tobacco, but the general consensus of opinion appears to be that Canadian flue is the closest to the American leaf of any grown in the Empire. Because of the distinctive flavour of Canadian flue, careful blending is necessitated. The Rhodesian product, while very mild, has an even more distinctive flavour and "tang" than Canadian. The soundness and burning qualities of the Canadian-grown flue appears to be fairly satisfactory.

In addition there is a limited demand for the heavier flue grades for use in plug and mixtures. Since the heavy, mottled orange grades constitute 10 per cent to 20 per cent of the total trade in pipe tobaccos, an opportunity exists for these grades produced in Canada.

DARK TOBACCO.—In view of the fact that dark tobaccos are used mainly in the manufacture of twists, rolls and plugs, there is an excellent demand for the wrapper grades. Leaf of good size without being heavy in the veins is in

demand provided it has a rich dark brown colour, a medium heavy body, plenty of stretch and gum and an open grain. Since wrappers are used extensively in spinning, stretch and gumminess are of great importance. After being spun, the twists are subjected to a process from which they emerge a rich shiny black. The ability of the wrapper to retain this shiny black colour without turning dull or gray, appears to depend on the original colour, gumminess, and grain. Manufacturers have observed that leaf lacking in gum or having a greenish cast is difficult to blacken and soon fades out.

Owing to price considerations, only the very best matured filler grades can compete with Indian tobaccos. For snuff purposes, there is a small but steady demand for clean, good quality leaf of this lower grade.

BURLEY.—Practically none of the light fluffy cigarette type is exported from Canada. Red Burley grades of somewhat heavy body are in the greatest demand in Great Britain. Burley, however, is only of very minor importance, constituting less than one half of one per cent of the total tobacco imported into the United Kingdom.

CIGAR LEAF.—This portion of the British tobacco industry is languishing, cigars comprising but little more than one per cent of the total consumption. The leaf is obtained from all parts of the world, including Cuba, Mexico, Brazil, Dutch East Indies, British North Borneo, India, Canada, and the United States. The Havana type is most sought for, and consequently Empire-grown leaf which closely approximates the aroma and flavour of that type, has the best opportunity.

In binders, the demand appears to be mainly for good burning, light coloured, mild leaf from 20 to 22 inches in length. Filler leaf should be mild but full-flavoured, and with the characteristic aroma of Cuban tobacco. Strong, poorly fermented, immature leaf can find no sale in Great Britain. Owing to the small size of the industry, and the high price of the manufactured product, high quality is an essential factor in a successful invasion of the market.

COMMENTS ON QUALITY

FLUE-CURED.—Twenty-four British firms, including leaf importers, brokers and manufacturers, were interviewed to obtain their opinions on Canadian flue-cured.

Of those commenting on colour, 60 per cent criticised the greenish tinge, 20 per cent complained of too dark a colour, and the remainder were well satisfied. About half the firms expressed varying degrees of satisfaction, with the general quality of Canadian flue-cured, either for cigarettes or pipe mixtures. The chief criticisms were: (1) midribs too prominent; (2) leaf somewhat harsh; (3) coarse; (4) lacking in flavour; (5) too much sand, dirt and scrap; (6) poorly graded. The conclusion to be drawn from these comments appears to be that while Canadian flue-cured tobacco is not entirely satisfactory, yet it is sufficiently good for use in either cigarette blends or smoking mixtures.

DARK FIRE-CURED.—There was found to be a wide variation in the attitude of various manufacturers and leaf dealers, toward Canadian dark-fired. The majority, however, expressed varying degrees of satisfaction. Of all those interviewed, only three stated definitely that all grades lacked sufficient quality to be used. In most instances, however, some fault was found, and undoubtedly the most outstanding trouble is in connection with the colour of the wrapper leaf. In at least ten out of twenty-eight interviews, it was specifically emphasized that Canadian dark wrappers were difficult to blacken satisfactorily for use in twists and were usually associated with a subsequent loss of colour. Nobody was clear as to the cause of this trouble, some asso-

ciating it with a lack of gumminess, others with a coarse grain, while still others considered it due to immaturity. Three manufacturers have been able to overcome the difficulty by a modification of their process of colouring. It has been found that in the 1928 crop this tendency is not so marked as in previous crops.

Insufficient stretch was another cause for complaint resulting in much breakage in the spinning process, and also when dried. Other complaints included a tendency to a whitish venation, too heavy a midrib, too heavy firing, and excessive moisture.

The dark fillers, both fired and air-cured, have met with little approval. They are usually immature, light in colour, badly broken, and dirty. The brokers find difficulty in disposing of them, owing to much cheaper and equally good or better leaf being supplied by India and Nyasaland.

In general, it may be said that Canadian dark-fired wrapper leaf is well liked by the trade. If these various problems can be satisfactorily solved, a steady market seems assured.

BURLEY.—The more coloury, heavy grades of Burley appear to be well liked for use in twists and plugs. Practically no complaints were made as to the quality of the leaf itself. The chief objections were on packing methods.

CIGAR LEAF.—It was not possible, in the limited time available, to canvass the cigar leaf trade as thoroughly as might be desired. However, a surprising unanimity of opinion was found to exist as to the good quality of both the binders and fillers. The only complaint offered had to do with the high percentage of moisture in the cases coming from Canada. This is a matter which the Canadian packers should be able to rectify.

CANADIAN GRADING AND PACKING

The British tobacco trade is by no means satisfied with the Canadian leaf as packed for export. Throughout the course of the investigation, complaints either as to grading, moisture content, or extraneous material were received from about 45 per cent of the firms having experience with Canadian leaf. In the following paragraphs the chief criticisms are discussed.

GRADING.—The chief essential in the matter of grading is that each cask or case shall be uniform throughout. The tobacco should be graded according to colour and size. Canadian tobacco in the past has not compared favourably with leaf from the United States and Rhodesia in this respect. As might be expected in the poorer, lower priced lots, the grading was not entirely uniform, but one of the most noticeable features of both American casks and Rhodesian bales was their uniformity in colour and length. In one particular lot of the Canadian 1928 crop, an examination of the official samples of flue-cured, medium lemon cutters, showed that they contained green, grayish brown, and a few scrap leaves. Even in samples of No. 1 dark-fired wrappers, for which quite a high price was being asked, a certain percentage of shorts and immature leaf was found. In another instance, a lot of fired wrappers were so short, and contained so much grayish green and broken leaf that they had to be utilized for filler purposes. Similar though fewer complaints were encountered in regard to the grading of Burley. In the case of cigar leaf, the grading apparently was satisfactory, as no complaints were made.

MOISTURE CONTENT.—The full importance of the moisture content of a cask or case of tobacco is possibly not fully appreciated by the Canadian packer. In the first place, tobacco containing excessive quantities of moisture is particularly liable to spoilage during transhipment and storage. In the second place, a considerable proportion of the manufacturer's margin of profit is

dependent on an adjustment of the water content of the leaf. He is accustomed to receiving flue-cured, dark, and Burley from the United States and other sources, with a moisture content in the vicinity of 12 per cent to 14 per cent, and cigar leaf from various sources containing from 16 per cent to 18 per cent at most. Much, although not all, of the Canadian tobacco of all types is stated to have a content ranging up to 25 per cent. The British Government permits 32 per cent moisture in the manufactured product, and the manufacturer in consequence raises the content from 13 per cent at which he received it, to about 30 per cent, a spread of 17 per cent. Supposing, however, that a cask of Canadian tobacco is being used, and is found to contain 18 per cent moisture, the spread is reduced to 12 per cent, and the margin of profit correspondingly cut down. In addition, he has had to pay duty on this excess moisture, which in this case, with a 1,000 pound cask, amounts to 50 pounds of water on which a duty of about $1.63 per pound, or a total of $81.50 is collected. If, in addition, the cask contains an excess of 3 per cent to 8 per cent of extraneous material, it is not difficult to understand why repeat orders do not follow. Whether this complaint of high moisture content is justified can only be positively determined by a large number of actual tests of cases as they are received in the bonded warehouses of the various British ports.

Extraneous Material.—Such material as lumps of clay, sand, chicken feathers, hen manure, straw and even sealing wax do not make good smoking tobacco. Yet all these substances were found mixed with the tobacco in Canadian casks. The condition of recent shipments has been much better, but there is still much room for improvement. The British Customs allows a drawback of duty on 2 per cent extraneous material; the duty must be paid on amounts in excess of this. One manufacturer found as high as 10 per cent dirt in casks of dark fillers and Burley. Percentages in the vicinity of 5 per cent were frequently mentioned. In one instance a manufacturer found 190 pounds of various kinds of dirt in a lot of five casks. In one instance, on lifting a handful of leaves from a half-used cask of dark air-cured fillers, a gentle shaking resulted in a stream of dirt and a cloud of dust. Naturally, the British manufacturer will not tolerate such conditions, and he is not to be blamed, when it is considered that he has to pay a duty of $1.63 per pound. Furthermore, he knows that such large amounts of waste material are quite unnecessary. The producer must adopt methods of handling his crop that will reduce such conditions to the minimum, and the packer would be well advised to screen tobacco which is dirty before packing for shipment to the United Kingdom. The stemming of primings might also be advisable, as much of the sand is removed from the leaves in this process.

PRICE CONSIDERATIONS

The question of price is one of major importance, and one on which it is difficult to reach a definite conclusion owing to the wide variation of opinion held by different branches of the industry. The question was discussed with the majority of the firms interviewed, and it was found that the British trade, in general, considers the prices asked for Canadian tobacco of all types are higher than market conditions and the quality of the product warrant. It is also noted that these high prices are, in some measure, acting as a deterrent to the further use of Canadian leaf. The British dealers feel that Canadian producers (and the same, in some degree, applies to other parts of the Empire), have endeavoured to take too large a proportion of the Imperial Preference granted by the British Government.

Statements were obtained from the various dealers as to what they considered reasonable prices for the different types of Canadian tobacco. From these it would appear that, taking seven cents as an average cost for grading,

packing and transportation to Great Britain, a price of 45 cents to 48 cents per pound c.i.f. British ports for the cigarette cutter grades of flue tobacco would be generally acceptable to the British trade. Other grades would be proportionately lower.

In regard to dark-fired tobacco, good quality Canadian dark wrappers are selling around 48 to 52 cents, and finding a fairly ready sale. From the opinions expressed, however, it would seem that there would be an even greater demand if the price range were from 40 to 44 cents. It is in the filler grades, however, that price considerations are of greatest importance in governing our export expansion. At present, dark Nyasaland fillers can be sold at a price level about 8 to 10 cents higher than Canadian, and Indian fillers are obtainable for as little as 9 cents per pound. The quality of the Canadian product is such that many manufacturers prefer to pay a slightly higher price for Nyasaland, or to buy the inferior but much cheaper Indian product. More careful packing and grading of the dark filler grades, therefore, would be advantageous to their increased disposal.

The British manufacturer appears to be fairly well satisfied with the prices he is paying for Burley tobacco. In regard to cigar leaf, none of the firms interviewed were prepared to quote exact figures. This was mainly due to a lack of familiarity with the leaf. Some few who had used Canadian binders and fillers expressed the opinion that if the price were a few cents lower they would be able to utilize larger quantities.

CO-OPERATIVE SURVEY OF OTHER MARKETS

In addition to the efforts made towards the development of the British market, it has been thought advisable to enquire into the possibilities of promoting trade with other countries, both Empire and foreign. In this survey the Tobacco Division has been very glad to co-operate with the Commercial Intelligence Service of the Department of Trade and Commerce. Through the courtesy of the different trade commissioners, reports have been received on the possibilities of developing markets for Canadian leaf tobacco in British Guiana, British Honduras, British West Indies, Australia, India, New Zealand, Union of South Africa, Argentina, Czechoslovakia, Denmark, Germany, Italy, Japan, Netherlands, Netherlands East Indies, Norway and Sweden. These reports have been published in the *Commercial Intelligence Journal,* issued by the Department of Trade and Commerce, and, it is anticipated, will be continued from time to time in the future. Anyone desiring further information regarding trade opportunities in foreign countries may receive the same from the Commercial Intelligence Service of the Dominion Department of Trade and Commerce at Ottawa.

TOBACCO INQUIRY COMMISSION 1928

As a result of difficulties encountered by the growers in the sale of the 1926 and 1927 crops a commission was appointed by the Honourable the Minister of Agriculture on February 27, 1928, to investigate and report on conditions in connection with the tobacco producing industry. This Commission consisted of Dr. E. S. Archibald, Director, Dominion Experimental Farms, Chairman, E. P. Tellier, Belle River, Ont., and H. B. Archibald of the Cooper Leaf Tobacco Co., Wallaceburg, Ont. Hearings were held throughout Southwestern Ontario and Quebec, at which evidence was taken from representative growers, packers and manufacturers.

Inasmuch as the findings of the commission have been published in detail, only a brief summary is presented here.

The domestic and British markets constitute the best outlets for Canadian grown leaf. On both these markets leaf quality is a most important factor and

consequently every effort should be made to improve the quality of the Canadian product. The growers should use the type suitable to their soil and adopt the best known rotation and cultural practices. Special attention should be paid to the question of maturity in the crop. Early planting, proper fertilization, early and low topping, priming of dark varieties, and delaying harvest until the leaf is fully mature are all important factors in the production of high quality leaf.

In addition the Commission recommended the establishment of standard stripping grades and suggested the possibility of trying out the auction floor method* of marketing tobacco. Furthermore, it was deemed advisable that the federal government should undertake the compilation and publication of pertinent statistics on world tobacco production and markets.

EXPERIMENTAL WORK

FERTILIZER EXPERIMENTS

As mentioned in the introduction, the fertilizer work was formulated on the basis of a basal ration. Experiments and practical experience in Canada and the United States have indicated that 160 pounds of nitrogen (N), 160 pounds of phosphoric acid (P_2O_5), and 200 pounds of potash (K_2O) are sufficient to grow a satisfactory crop of cigar tobacco. The following table outlines the fertilizer mixture used as a basal ration in the fertilizer experiments begun in 1929.

TABLE 8.—BASAL FERTILIZER RATION

Material	Quantity per acre	Nutrients per acre		
		N	P_2O_5	K_2O
	lb.	lb.	lb.	lb.
Nitrate of soda	210	32	.....	.....
Sulphate of ammonia	160	32	.....	.....
Cottonseed meal	1,420	96	40	27
Superphosphate	750	.....	120	.....
Sulphate of potash	360	.....	.....	173
Total	2,900	160	160	200

It may be observed in the above fertilizer mixture that $\frac{2}{5}$ of the nitrogen is derived from water soluble materials and the balance from the organic source, cottonseed meal. The water-soluble nitrogen is equally divided between nitrate of soda and sulphate of ammonia. Although the relative quantity of water-soluble nitrogen is higher than is generally recommended in the United States, it was thought that it would be more satisfactory, due to less active nitrification in the cooler climate of Canada, as well as possible beneficial effects on maturity and early growth from more readily available forms of nitrogen.

PLOT TECHNIQUE

Unless specifically mentioned the treatments were conducted in quadruplicate plots of five rows. Records were taken on the inner four rows of each plot. The fifth, or border row was eliminated at harvest because it was planted on the

*In 1929 there was no active demand by Ontario growers for this method of marketing. The various packing firms in Canada were approached on several occasions as to the adaptability and feasibility of this method under Canadian conditions. The general opinion of members of these firms was not entirely favourable. Accordingly, the matter has been dropped for the present.

boundary between two plots and hence was subject to two treatments. In size each plot was 0·0276 of an acre.

Resistant Havana (142) was transplanted in rows 38 inches apart, and spaced 18 inches within the row. All plots of a comparison or series were transplanted on the same day. The fertilizer was mixed and spread by hand on a calm day, a week before transplanting. The fertilizer was immediately disked in crosswise.

Extreme care was exercised at harvest and stripping to avoid errors. All lath were labeled at harvest and counted. Counts were again made at stripping as a further check. In addition, the plants on each plot were counted before harvesting so that proper adjustment could be made in determining the yields on an acre basis. Great precaution was taken to ensure accuracy in the results.

QUALITY EVALUATION

After stripping and before fermentation the tobacco from each plot was assorted into commercial grades, prices were assigned to each grade and the average value per pound of the tobacco was determined. This computed average price per pound has been termed the "grade index" and is used as such in all references in the text. The "grade index" is, therefore, based on the percentage of assorted grades and the relative commercial value of each grade.

REGARDING FIRST YEAR'S RESULTS

The summary of the data on fertilizers include only the averages of the results of various treatments. It was deemed advisable to reserve the more detailed material for publication in separate bulletins, which will deal with correlated work over a period of years on specialized aspects of the problem. Furthermore, the first year's results should be regarded as preliminary and the conclusions derived as only tentative.

SOURCES OF WATER SOLUBLE NITROGEN

In these tests different forms of water-soluble nitrogen were tested in equivalent amounts of nitrogen supplied and replaced the water-soluble nitrogen in the basal formula. All plots, therefore, received 160 pounds nitrogen, 160 pounds phosphoric acid and 200 pounds potash. The only changes in the basal formula were the replacement of nitrate of soda and sulphate of ammonia with other water-soluble materials.

The results on single sources of readily available nitrogen are given in table 9.

TABLE 9.—2/5 WATER-SOLUBLE NITROGEN FROM SINGLE SOURCES

Treatment No.	Source of nitrogen	Quantity of water-soluble N.	Yield per acre	Grade index
		lb.	lb.	
N2	Urea	64	1,772	24·7
N3	Sulphate of ammonia	64	1,567	22·2
N5	Nitrate of lime	64	1,512	19·7
N6	Nitrophoska No. 3	64	1,590	19·7
N7	Calurea	64	1,544	22·4
N1	Basal formula	64	1,656	22·5

These results indicate the superior value of urea as a source of water-soluble nitrogen. Nitrate of lime and nitrophoska No. 3 both resulted in lower yields and inferior quality. Sulphate of ammonia and calurea as single

sources produced as good quality, on the basis of the grade index, as the basal treatment which contained both nitrate of soda and sulphate of ammonia.

Water-soluble nitrogen from two sources were also compared. These results follow in table 10.

TABLE 10.—2/5 WATER-SOLUBLE NITROGEN FROM TWO OR MORE SOURCES

Treatment No.	Sources of nitrogen	Quantity of water-soluble N.	Yield per acre	Grade index
		lb.	lb.	
N1	Sulphate of ammonia	32		
	Nitrate of soda	32	1,656	22·5
N4	Sulphate of ammonia	13		
	Nitrate of potash	51	1,564	20·4
N8	Sulphate of ammonia	32		
	Diammonium phosphate	27	1,785	24·3

Nitrate of potash applied at the rate indicated in treatment N4 had somewhat detrimental effects on both yield and quality. On the other hand, diammonium phosphate gave most promising results. It was better in yield and quality than the basal treatment (N1).

SOURCES OF ORGANIC NITROGEN

In these tests cottonseed meal, tankage and dried blood were compared as sources of organic nitrogen. Table 11 contains the results obtained in 1929 when these materials were used to the extent of supplying 64 pounds of nitrogen per acre. The balance of the nitrogen was equally divided between nitrate of soda, sulphate of ammonia, and urea. The total amount of nitrogen added per acre was the same as in the basal formula, namely 160 pounds.

TABLE 11.—SOURCES OF ORGANIC NITROGEN

Treatment No.	Sources of nitrogen	Quantity of organic N.	Yield per acre	Grade index
		lb.	lb.	
ON3	Tankage	64	1,277	19·4
ON2	Cottonseed meal	64	1,596	22·4
ON5	Dried blood	64	1,660	24·0

These results show that in the first year's test, dried blood not only gave the highest average yield per acre but also the highest average value (grade index) per pound. Tankage proved to be the poorest source of organic nitrogen, and cottonseed meal was intermediate.

Another comparison made in the organic nitrogen series was to test out the value of different quantities of organic nitrogen and the value of urea in replacing a portion of the organic nitrogen when cottonseed meal and dried blood were used. These results appear in table 12.

TABLE 12.—QUANTITY OF ORGANIC NITROGEN

Treatment No.	Sources of organic nitrogen	Quantity of organic N.	Yield per acre	Grade index
		lb.	lb.	
ON2	Cottonseed meal	64		
	Urea	32	1,596	22·4
ON1	Cottonseed meal	96	1,546	22·5
ON5	Dried blood	64		
	Urea	32	1,660	24·0
ON4	Dried blood	96	1,601	22·7

When used as a substitute for a portion of the cottonseed meal and dried blood in the basal formula, urea increased the yields approximately 50 pounds per acre. The grade index in the case of cottonseed meal was not affected, but with dried blood it was increased. Under Canadian conditions, in this first year's trial on cigar tobacco at the Central Experimental Farm, urea gave promising returns in replacing a portion of the organic nitrogen when cottonseed meal or dried blood were used.

In referring back to the section on water-soluble nitrogen from two sources, table 10, it will be noted that when urea was added to nitrate of soda and sulphate of ammonia with cottonseed meal as the organic source, the triple combination of water-soluble nitrogen (ON2) is at least as good, in so far as general quality is concerned, as when only two sources (N1) are used. The yield, however, was reduced about 60 pounds in this comparison, when urea was used as a portion of the organic nitrogen instead of cottonseed meal.

QUANTITY OF PHOSPHORIC ACID

Trials to determine the importance of phosphoric acid to the tobacco soils of Canada were also started in 1929. In these tests different quantities of phosphoric acid in the superphosphate form were varied in the basal formula mixture. Nitrogen and potash relations were maintained constant. Four comparisons were made as are indicated in table 13.

TABLE 13.—QUANTITY OF PHOSPHORIC ACID

Treatment No.	Treatment	Quantity of P_2O_5	Yield per acre	Grade index
		lb.	lb.	
P3	No. mineral P_2O_5	40*	1,323	19·4
P2	Half basal formula	80	1,603	21·9
P1	Basal formula	160	1,633	23·3
P4	Double basal formula	320	1,880	22·0

* From cottonseed meal used in mixture.

The evidences of phosphoric acid deficiency were strikingly evident even in the first year. This was reflected both in yield and quality. Quantities of phosphoric acid above 80 pounds per acre did not give commensurate returns excepting in the case of treatment P4 when 320 pounds of P_2O_5 were applied per acre. The four plots receiving this heavy application outyielded all of the other plots in this series. It will be interesting to note if this condition persists in succeeding years.

SOURCES OF PHOSPHORIC ACID

Different phosphorus containing materials were substituted in the basal formula to test their merits as sources of phosphoric acid for cigar tobacco. Among the materials used were treble superphosphate and diammonium phosphate. Both of these materials are of high analysis, approximately 46 per cent and 53 per cent P_2O_5 respectively. Diammonium phosphate contains 21 per cent nitrogen in addition to the phosphoric acid.

The results of these tests on quadruplicate plots are given in table 14.

TABLE 14.—SOURCES OF PHOSPHORIC ACID

Treatment No.	Sources of phosphoric acid	Quantity of mixed P_2O_5	Yield per acre	Grade index
		lb.	lb.	
P5	Treble superphosphate	120	1,713	25·0
P1	Superphosphate	120	1,451	23·3
N8	Diammonium phosphate	120	1,785	24·3
P6	Diammonium phosphate	80		
	Superphosphate	40	1,630	22·2
N6	Nitrophoska No. 3	120	1,590	19·7

The treble superphosphate and the diammonium phosphate gave excellent results in 1929 as reflected in both the quality and the yield. These two treatments outyielded all other sources and also had the highest grade index. Nitrophoska No. 3 produced the poorest tobacco although the yield was as good as the basal treatment (P1).

Diammonium phosphate, in particular, is a very promising fertilizer material because of its high analysis. It contains over 72 per cent of plant nutrient material. In addition, it gave high yields and high quality.

QUANTITIES OF POTASH

In a similar manner the quantitative relationship of potash to the growth and quality of tobacco is being investigated. Varying quantities of potash in the form of sulphate were used in the basal formula. Each of these treatments was repeated six times in 1929, and the results appear in table 15.

TABLE 15.—QUANTITIES OF POTASH

Treatment No.	Treatment	Quantity of K_2O	Yield per acre	Grade index
		lb.	lb.	
K3	No mineral potash	27*	1,635	21·7
K2	Half basal formula	100	1,776	23·9
K1	Basal formula	200	1,745	23·7

*From cottonseed meal used in mixture.

The omission of mineral potash (K3) depressed the yield and impaired the quality the first year. No detrimental effects were noted when the potash ration was reduced to half that in the basal formula. In view of the results obtained in the Connecticut Valley during the past five years, when reduced yields and poorer quality were obtained after the first year on the half-potash plots, it will be of interest to note if similar results will be obtained on Canadian soils.

SOURCES OF POTASH

These tests on quadruplicate plots included the single sources of nitrate, sulphate, and carbonate of potash. The average yield and grade index of these plots are given in table 16.

TABLE 16.—POTASH FROM SINGLE SOURCES.

Treatment No.	Sources of potash	Quantity of mineral K_2O	Yield per acre	Grade index
		lb.	lb.	
K5	Carbonate of potash	173	1,519	20·9
N4	Nitrate of potash	173	1,564	20·4
K1	Sulphate of potash	173	1,745	23·7

Nitrate and carbonate of potash were not as efficient carriers of potash as sulphate. The yield and grade index in both instances were less than that obtained with the sulphate.

For further comparison, combinations of sulphate of potash with each of the other potash carriers were tested in quadruplicate. These data are included in table 17.

TABLE 17.—POTASH FROM TWO SOURCES

Treatment No.	Sources of potash	Quantity of mineral K_2O	Yield per acre	Grade index
		lb.	lb.	
K6	Sulphate of potash	65		
	Nitrate of potash	108	1,876	22·7
K7	Sulphate of potash	153		
	Muriate of potash	20	1,736	22·9
N6	Sulphate of potash	95		
	Nitrophoska No. 3	78	1,590	19·7

In these tests, when used with other potash salts, nitrate of potash showed up to greater advantage than when used alone. This comparison can be made by referring to treatment K1 in table 16, and treatment K6 in table 17. A small addition of muriate of potash did not improve either the yield or the quality. Burn tests have not yet been made. Nitrophoska No. 3 gave the poorest results when considered as a source of potash.

EFFECT OF LIME ON CIGAR TOBACCO

In 1925, 1926 and 1927 a study of the effect upon cigar tobacco of lime in combination with manure and commercial fertilizers was conducted at the Farnham Experimental Station. The horse manure was applied at the rate of 15 tons per acre, the commercial fertilizer mixture at the rate of 1,500 pounds per acre, and air slaked lime at the rate of 2,000 pounds per acre. All plots were run in triplicate. Since this experiment will be discussed more fully elsewhere, complete details of plan and treatment will not be given here. The summarized data for the three years are shown in table 18.

TABLE 18.—EFFECT OF LIMING ON CIGAR TOBACCO

Limed Plots

Treatments	Yield per acre			
	1925	1926	1927	Average
	lb.	lb.	lb.	lb.
Commercial fertilizer*	938	788	1,385	1,037
Manure	1,101	901	1,635	1,214
Commercial fertilizer and manure	1,245	883	1,673	1,267
Average of limed plots	1,095	858	1,565	1,173
Unlimed Plots				
Commercial fertilizer	1,046	945	1,462	1,151
Manure	1,146	838	1,713	1,233
Commercial fertilizer and manure	1,340	1,283	2,110	1,578
Average of unlimed plots	1,173	1,022	1,762	1,321
Average loss due to lime	78	164	197	146

*The commercial mixture consisted of 350 pounds sulphate of ammonia, 400 pounds superphosphate and 150 pounds sulphate of potash per acre.

In considering the summarized data, it is at once apparent that the yields of cured leaf have been uniformly lowered wherever lime was applied. Judging by the results, manure appears to have tempered somewhat the effect of liming, those manured plots receiving lime yielding only slightly less than the corresponding unlimed plots. Under conditions of full fertilization with 15 tons of manure and 1,500 pounds of commercial fertilizer per acre, the decrease in yield caused by the additional application of 2,000 pounds of air slaked lime has averaged 311 pounds per acre over the three year period. Over the three years of the experiment all limed plots in the series yielded an average of 146 pounds per acre less than those not receiving lime.

It is of interest to note that the harmful effects of lime appear to be progressive, the average decrease due to lime being 78 pounds per acre in 1925, 164 pounds in 1926, and 197 pounds per acre in 1927. With the fully fertilized plots, the decrease due to lime averaged 95 pounds per acre in 1925, 400 pounds per acre in 1926, and 437 pounds per acre in 1927.

In addition to the direct effect of lime on the tobacco another factor, namely, disease, was found to be of importance. Before the experiment was commenced the field was apparently free from the black root-rot fungus, *Thielavia basicola*. After the 1927 crop was harvested the roots of 24 plants from each plot were carefully examined for lesions caused by this fungus. It was found that the injury was much more severe on the limed plots than on the unlimed. The results are summarized in table 19.

TABLE 19.—THE PERCENTAGE OF BLACK ROOT-ROT INJURY RESULTING FROM CONTINUED APPLICATIONS OF LIME

Treatment	Healthy	Slight	Moderate	Severe
	%	%	%	%
Lime	0	20·3	63·9	15·8
No lime	2·3	57·4	37·0	2·3

In the light of these results it must be concluded that continued applications of lime at the rate of one ton per acre have detrimental effects on cigar leaf tobacco.

"VITA GLASS" VS. ORDINARY GLASS FOR SEED-BED SASHES

In 1928 a comparative trial was undertaken of the relative value of "Vita Glass" and ordinary glass for seed-bed sashes. Five sashes were glazed with "Vita Glass" and five with ordinary glass. Five different varieties of tobacco were grown in each case. Data were taken on the date of germination, general appearance of the beds four weeks after seeding, average size of largest leaf after six weeks, and number of transplantable plants.

In the following table the data obtained in 1928 and 1929 is summarized.

TABLE 20.—"VITA GLASS" VS. ORDINARY GLASS

Variety	Time of germination	Appearance after four weeks	Average size of largest leaf	Number of transplantable plants
	"Vita Glass"			
	days		cm.	
Belge 3007	9½	Fair	8·14	600
Connecticut Havana 38	9½	Good	8·95	770
Greenwood	10	Fair	10·02	650
Station Standup Burley	10	Good	7·32	550
Warne	10	Fair	8·54	620
	Ordinary Glass			
Belge 3007	9½	Fair	7·54	500
Connecticut Havana 38	9½	Very good	8·57	610
Greenwood	10	Fair	7·76	550
Station Standup Burley	10	Fair	6·86	450
Warne	9½	Fair	9·08	620

In 1929 the Belge 3007 and Station Standup Burley beds in each series were severely burned and consequently no data were taken on the number of plants of transplantable size. These data are, therefore, for 1928 only. From the information obtained in the two years' trials, it would appear that the plants produced under "Vita Glass" tend to be larger than those under ordinary glass. Further tests will be necessary before final conclusions can be drawn.

PAPER MULCH TESTS

In 1929 a new project was undertaken with the object of testing the effects of growing cigar tobacco under paper mulch. The paper, known under the trade name of "Gator Hide", was furnished through the courtesy of the International Paper Co. The project will be continued for at least two more years before definite conclusions will be drawn. Similar experiments are being conducted at the Harrow, Farnham and l'Assomption stations.

Five 0·0276 acre plots are devoted to the trials, three under paper and two checks. The Resistant Havana variety was used and the plants set out with the machine planter in rows 38 inches apart and 18 inches in the row. Immediately following transplanting strips of paper 18 inches in width were placed on both sides of each row. Except for the fact that the mulched plots were not cultivated all plots received the same cultural treatments and were harvested and cured together.

Owing to the fact that the soil was somewhat lacking in fertility, and that unfavourable weather conditions necessitated abnormally low topping, the crop on all plots was lacking in yield and was of somewhat poor quality. In the following tables, however, is presented a summary of the 1929 results.

Soil temperature readings were taken daily at 7.30 a.m., 12.30 p.m., and 3.30 p.m. (standard time), on two mulched plots and two check plots. The averages of these readings from July 10 to August 15 are given in table 21.

TABLE 21.—SOIL TEMPERATURES ON MULCHED AND UNMULCHED PLOTS

Time	Mulched	Unmulched	Difference
	°F.	°F.	°F.
7.30 a.m.	62·98	61·39	1·59
12.30 p.m.	73·51	70·92	2·59
3.30 p.m.	75·43	72·34	3·09

It is recognized that these data are incomplete and that in order to fully study the temperature effects recording thermometers must be used. It is interesting to note, however, that the soil temperatures under the paper mulch were consistently higher than those in the check plots. The difference also increases as the day progresses, a fact which may be of importance in regions where the nights are cold.

In table 22 are given the yield and quality data of the tobacco grown on these plots.

TABLE 22.—YIELD AND QUALITY ON PAPER MULCH PLOTS

Treatment	Yield per acre	Grade index	Gross return per acre
	lb.	cts.	$
Paper mulch	1,337	14·1	188 52
"	1,500	20·7	310 50
"	912	19·6	178 75
Check	1,014	18·4	186 58
"	628	10·9	68 45
Average paper mulch	1,250	18·1	226 25
Average check	821	14·7	120 69

It will be noted that somewhat wide variations in yield were obtained on the different replicates. Also, since these are the results of but a single year's work no specific conclusions should be drawn, although the results were much in favour of the plots covered with paper mulch.

EXPERIMENTAL WORK ON BRANCH STATIONS

Experimental work in various phases of tobacco culture, soils and fertilizers and curing problems have been conducted at several branch stations. This work has undergone considerable reorganization during the period under review and, in the majority of cases, the projects are not sufficiently complete to warrant a review of the results in this report. The reader is referred to the annual reports of the l'Assomption and Farnham Stations in Quebec, Harrow in Ontario, and Summerland in British Columbia for details of the experimental work under way at those points.

Brief analyses of the results of varietal tests conducted at Fredericton, N.B., Morden, Man., Swift Current, Sask., Beaverlodge, Alta., Invermere, Agassiz and Sidney, B.C., are presented in the ensuing paragraphs.

FREDERICTON, N.B.

With a view to determining the variety of tobacco best adapted to conditions at Fredericton a varietal test has been conducted at that station since 1926. Three varieties representative of the main types of air-cured leaf were chosen, namely Connecticut Havana 38 (cigar leaf), Belge 3007 (large pipe) and Station Standup Burley. Twenty-five plants of each variety were grown and records taken of the rate of growth and yield. The quality of the leaf was determined at Ottawa. In the following table, 23, is shown a summary of the yields per acre during the four-year period 1926 to 1929.

TABLE 23.—VARIETY TESTS AT FREDERICTON, N.B.

Variety	Yields per acre				
	1926	1927	1928	1929	Average
	lb.	lb.	lb.	lb.	lb.
Belge 3007	1,184	2,112	956	1,741	1,498
Connecticut Havana 38	1,333	2,324	1,454	1,468	1,650
Station Standup Burley	1,503	1,981	1,531	1,494	1,627

In regard to leaf quality the Station Standup Burley has given the most satisfactory results. The leaf is of a uniform bright colour, thin and fluffy, good size, with a mild pleasant aroma and a good burn. In general quality it closely approximates the requirements of Burley leaf for cigarette purposes. Belge 3007 has produced a leaf of good quality, mahogany brown in colour, fair body and burn, and a very pleasing aroma. The Connecticut Havana 38 has not given good results in regard to quality, there being a noticeable tendency to thin papery body, considerable green colour and a poor burn.

WHITE'S COVE, N.B.

In addition to the varietal trials conducted at the Fredericton Station, similar co-operative tests were carried out in the Grand Lake district. The soils in this area are lighter than those at Fredericton. The yields obtained in 1928 and 1929 are given in table 24.

TABLE 24.—VARIETY TESTS IN THE GRAND LAKE DISTRICT, N.B.

Variety	Yields per acre		
	1928	1929	Average
	lb.	lb.	lb.
Belge 3007	1,211	.....	1,211
Connecticut Havana 38	1,700	1,926	1,813
Station Standup Burley	1,687	1,867	1,777

In 1929 owing to a shortage of plants of the Belge 3007 variety it was found necessary to drop that variety from the co-operative trials. The plots were of the same size as those at the Fredericton Station and all operations were conducted under the supervision of the station staff.

The Station Standup Burley was of very good size, light colour and thin body. Belge 3007 was of fair size and medium light colour, medium body and good burn. Connecticut Havana 38 has not proven to be adapted to this region, being large, immature, coarse in texture, and poor in colour. Both the Station Standup Burley and Belge 3007 appear to be very promising.

AGASSIZ, B.C.

Varietal tests have been conducted at this station since 1926. The chief varieties used have been Connecticut Havana 38 (cigar leaf), Belge 3007 (large pipe), Greenwood (dark air-cured), and Station Standup Burley and Judy's Pride Burley. The yields per acre of these varieties are given in table 25. In addition to the above single year tests have been made with Cuban 4160, Canelle, Hickory Pryor, Warne and Broadleaf Burley. As none of these latter varieties showed any special advantages they were dropped from the tests.

TABLE 25.—VARIETY TESTS AT AGASSIZ, B.C.

Variety	Yields per acre				
	1926	1927	1928	1929	Average
	lb.	lb.	lb.	lb.	lb.
Belge 3007	1,722	1,882	1,742	872	1,554
Connecticut Havana 38	2,338	2,718	1,307	1,242	1,901
Greenwood	.....	.....	1,743	1,367	1,555
Judy's Pride Burley	.....	.....	2,178	1,196	1,687
Station Standup Burley	2,411	3,196	1,369	969	1,986

In 1928 and 1929 the leaf was forwarded to Ottawa for observations on quality. In table 26 are presented the sorting records on the different varieties, in percentages of assorted grades.

TABLE 26.—PERCENTAGES OF ASSORTED GRADES IN VARIETY TESTS AT AGASSIZ, B.C.

Variety	Crop	Fillers	Seconds	Darks	Tips
		%	%	%	%
Belge 3007	1928	15	38	27	20
	1929	39	13	33	15
Connecticut Havana 38	1828	11	28	46	15
	1929	70	0	19	11
		Lugs	Bright leaf	Wrappers	Tips
Greenwood	1928	13	45	29	13
	1929	9	24	22	45
		Lugs	Bright leaf	Red leaf	Tips
Judy's Pride Burley	1928	17	28	35	20
	1929	20	15	25	35
Station Standup Burley	1928	12	44	27	17
	1929	26	32	25	17

Station Standup Burley has proven to be the best variety for the Agassiz district both in regard to yield and quality. It has a better shaped leaf and better general quality than Judy's Pride. Both varieties yielded a thin, smooth leaf of fair size and bright colour. The red grades have not been satisfactory,

tending somewhat towards a papery texture and body. Belge 3007 is of fair quality. Connecticut Havana 38 is very poor, being rough in texture with variegated colours. No first-class binders were produced. Greenwood produced too high a percentage of poor tips, was too red in colour, and lacked body. When properly topped, suckered and matured, it should have the best leaf on the top of the plant. It is this portion of the plant which produces wrappers when satisfactorily grown. There should be no tip grades.

BEAVERLODGE, ALTA.

As the result of a demand from the farmers in the Peace River country for information regarding the best variety of tobacco to grow for their own use, varietal trials were conducted in 1925, 1926 and 1928. In all, five varieties were tested, namely, Canelle, Miel, Parfum d'Italie, Petit Belge and Petit Havane. These are all of the small, aromatic pipe type and are comparatively early maturing. Each year, however, killing frosts in the early part of September destroyed the plants before they were sufficiently ripe to harvest. The Canelle variety showed the most promise, however, and it seems probable that if the plants could be set out between June 20 and 25 they could be matured before the frost.

SIDNEY, B.C.

Varietal tests on irrigated and non-irrigated plots were conducted at this station in 1925, 1926 and 1927. Owing to the unsatisfactory quality obtained in all varieties, the work was discontinued. The results of the trials are given in the following table:—

TABLE 27.—VARIETAL TESTS AT SIDNEY, B.C.

Irrigated plots

Variety	Yields per acre			
	1925	1926	1927	Average
	lb.	lb.	lb.	lb.
Belge 3007	.....	1,365	2,420	1,892
Connecticut Havana 38	1,833	2,668	2,238	2,246
Station Standup Burley	1,705	1,799	1,996	1,833

Non-irrigated plots

Belge 3007	.....	1,147	1,331	1,239
Connecticut Havana 38	1,365	2,233	1,270	1,623
Station Standup Burley	1,179	1,458	938	1,192

The value of irrigation was brought out not only in the increased yields but in the somewhat better quality, except in the case of the Station Standup Burley. With that variety the irrigated plots produced a heavy, coarse leaf, with a harsh texture. Connecticut Havana 38 showed the most promise.

SWIFT CURRENT, SASK.

Varietal trials were carried out with Belge 3007, Connecticut Havana 38 and Station Standup Burley in 1927. The crop showed some promise in the field, but all varieties were completely destroyed by frost before being harvested.

MORDEN, MAN.

In addition to varietal tests a commereial trial of Station Standup Burley has been eondueted at this station. The tests are diseussed in detail in the station reports for 1925 to 1929 and consequently only a summary of the results is here presented. The data on yield tests are given in table 28.

TABLE 28.—VARIETAL AND COMMERCIAL TRIALS AT MORDEN, MAN.

Variety	Yields per acre			
	1926	1927	1928	Average
	lb.	lb.	lb.	lb.
Belge 3007	1,492	777	1,920	1,396
Connecticut Havana 38	1,959	730	2,180	1,623
Broadleaf Burley	.....	.....	2,520	2,520
Judy's Pride Burley	.....	.....	1,860	1,860
Station Standup Burley	3,105	756	1,803	1,888

In 1929, owing to extremely adverse weather eonditions, no yield data were taken. Eaeh year samples from the different plots were forwarded to Ottawa for quality tests. The results of the tests on the 1928 erop are given in table 29 and, in general, are indieative of the quality of the tobaeeo grown at this station.

TABLE 29.—SORTING RECORDS OF BURLEY VARIETIES 1928—PERCENTAGES OF GRADES

Variety	Stripping Grades	Trash	Lugs	Bright No. 1	Bright No. 2	Red No. 1	Red No. 2	Tips
		%	%	%	%	%	%	%
Judy's Pride	Sand	18·7	9·9	.....	.....	.....	.....	.....
	Middle	.....	2·2	18·1	17·6	8·8	.....	.....
	Top	.....	.....	.....	.....	14·8	6·6	3·3
Broadleaf	Sand	3·2	19·5	12·3	.....	.....	.....	.....
	Middle	.....	.....	20·8	13·0	11·0	1·9	.....
	Top	.....	.....	.....	.....	14·3	.....	3·9
Station Standup	Sand	21·8	4·5	.....	13·5	.....	.....	.....
	Middle	.....	3·7	.....	37·6	6·0	9·8	3·1
	Top	.....	All tip grades					

Neither the Belge 3007 nor Conneetieut Havana 38 were worth sorting. On the whole the Burley varieties have shown up best in the Morden station tests.

NICOTINE CONTENT OF TOBACCO

For some time it has been reeognized that the nieotine eontent of tobaeeo is affeeted by various factors, ineluding heredity, soil, elinate, topping, suekering, position of leaf on the plant, and maturity. Since 1924 experiments have been eondueted at Harrow, Farnham and Ottawa to determine the extent to whieh a grower ean eontrol the nieotine eontent in the eured leaf by topping, suekering and maturity. The analyses were made in the laboratory at Ottawa by the Tobaeeo Division staff.

The following table 30 outlines the relation of variety or type to the nicotine content of the cured leaf:—

TABLE 30.—NICOTINE CONTENT OF TOBACCO LEAF AND STALK AS INFLUENCED BY VARIETAL CHARACTERISTICS

Variety	Where grown	Year grown	Nicotine content*		Yield of nicotine per acre		
			Leaves	Stalk	Leaves	Stalks	Total
			%	%	lb.	lb.	lb.
Little Dutch (Ragondorf)	Farnham	1926	1·25	0·23	18·69	5·7	24·39
Warne	Harrow	1924	2·69	.....	24·73	.....	.....
Cuban 4160	Ottawa	1924	2·98	.....	24·94	.....	.....
White Burley	Harrow	1924	3·29	.....	45·11	.....	.....
Hickory Pryor	Harrow	1924	3·40	.....	28·61	.....	.....
Con. Havana 38	Farnham	1924	3·15	.....	42·07	.....	.....
Comstock Spanish	Farnham	1924	3·17	.....	38·68	.....	.....
Blue Pryor	Ottawa	1924	4·07	.....	56·25	.....	.....
Greenwood	Ottawa	1924	4·76	.....	65·87	.....	.....
Con. Broadleaf	Ottawa	1926	2·84	1·60	43·82	14·50	58·32
Ephrata (U.S.D.A.)	Harrow	1925	6·96	2·07	133·90	25·90	159·80
Big Makhorka 106	Harrow	1925	10·80	2·00	87·50	8·10	95·60
Big Makhorka 108	Harrow	1925	9·79	1·94	120·50	9·20	129·70

* On basis of 25 per cent moisture in leaves and stalks.

It is evident in examining the above data that certain varieties normally have a low nicotine and other varieties consistently have a high nicotine content. *N. rustica* varieties (Ephrata, Big Makhorka) and the dark varieties (Greenwood, Blue Pryor) have high nicotine contents, and the cigar, Burley and flue-cured varieties have a medium to low nicotine analysis. Included in the low nicotine tobaccos are Little Dutch, Maryland and Turkish types.

The position of the leaf on the plant is a determining factor on the nicotine content of the leaf. This relation is brought out in table 31, in which the analyses of leaves from different regions of the plant are given.

TABLE 31.—INFLUENCE OF LEAF POSITION ON THE PERCENTAGE OF NICOTINE IN THE CURED LEAF OF CONNECTICUT HAVANA 38, WHEN HARVESTED AT DIFFERENT STAGES OF MATURITY, FARNHAM, 1924

Leaf position	Percentage of nicotine in cured leaf		
	At topping	Fourteen days after topping	Twenty-eight days after topping
	%	%	%
Upper leaves	1·10	2·98	4·31
Middle leaves	1·07	2·24	3·40
Lower leaves	1·17	1·70	1·60

At the time of topping, late bud to early bloom stages, there was very little variation in the nicotine content of the leaves from different portions of the plant. The immediate response following topping and suckering was an increased nicotine content in the leaves as they became more mature. This was particularly true in the upper and middle leaves. The most pronounced increases were obtained in the upper leaves. This possibly may have been due to the increased nitrogen translocation effects which were induced by topping and suckering.

In continuation of these results to determine in more detail the specific effects of topping, suckering and maturity on the nicotine metabolism in the

tobacco plant, additional tests were conducted in 1926 on two varieties, Little Dutch (Ragondorf) and Connecticut Broadleaf. The nicotine content of the leaves and stalk were determined in 1927, at Ottawa. The percentages of nicotine are computed on the basis of nicotine sulphate.

TABLE 32.—EFFECTS OF TOPPING, SUCKERING AND MATURITY ON THE NICOTINE CONTENT OF LEAVES FROM DIFFERENT PORTIONS OF THE PLANT. 1926

A.—Little Dutch (Ragondorf)

Time of sampling	Percentage of nicotine in the cured leaf					
	Bottom leaves		Middle leaves		Top leaves	
	Not topped, not suckered	Topped and suckered	Not topped, not suckered	Topped and suckered	Not topped, not suckered	Topped and suckered
	%	%	%	%	%	%
At topping	0·46	.....	0·26	.....	0·17	.....
Fourteen days after topping	0·43	0·79	0·33	1·00	0·31	1·32
Twenty-eight days after topping	0·46	0·90	0·31	1·22	0·26	1·62

B.—Connecticut Broadleaf (Williams)

Time of sampling	Percentage of nicotine in the cured leaf					
	Bottom leaves		Middle leaves		Top leaves	
	Not topped, not suckered	Topped and suckered	Not topped, not suckered	Topped and suckered	Not topped, not suckered	Topped and suckered
	%	%	%	%	%	%
At topping	0·62	.....	0·65	.....	0·51	.....
Fourteen days after topping	0·66	1·26	1·00	1·53	0·69	2·01
Twenty-eight days after topping	1·15	2·79	1·74	2·73	1·50	3·01

Again, in these tests, topping and suckering promoted the development of nicotine in the tobacco plant. The most pronounced results were obtained in the top leaves with advanced maturity.

The nicotine content of the stalk in both varieties, also increased as a result of topping, suckering and increased maturity as shown in table 33.

TABLE 33.—PERCENTAGE OF NICOTINE IN THE STALKS

Variety	At topping	Not topped or suckered		Topped and suckered	
		Fourteen days later*	Twenty-eight days later*	Fourteen days later*	Twenty-eight days later*
	%	%	%	%	%
Little Dutch	0·09	0·07	0·09	0·16	0·23
Connecticut Broadleaf	0·18	0·17	0·28	0·35	0·57

* After topping stage.

From the results of this experiment it may be noted that the nicotine content in both the leaf and stalk were increased with maturity in both varieties tested when the plants were topped and kept free of suckers. Plants of the Little Dutch variety when allowed to grow undisturbed made no increase in nicotine content after flowering, but plants of the Connecticut Broadleaf variety showed increases in the nicotine content of both stalk and leaves with more advanced maturity, although the nicotine content was much less when the plants were not topped or suckered.

It is of considerable interest to note that at blossom time (stage of topping), the most nicotine was present in the lower leaves. After topping, nicotine accumulates much more rapidly in the upper leaves. Under ordinary methods of culture the Connecticut Broadleaf type appears to be capable of developing approximately twice as much nicotine as the Little Dutch variety.

It does not appear financially advantageous, with present prices, to grow tobacco entirely for nicotine manufacture even with the high percentages of nicotine which can be obtained from certain tobacco varieties. Poor quality leaf and scrap of the higher nicotine varieties might be utilized in a side-line manufacture of nicotine by the larger tobacco manufacturing firms. This would meet with greater success than with establishing an independent nicotine manufacturing company.

The possibilities in this field are indicated by the data presented in table 34, which includes the amounts and prices of nicotine imported to Canada. Parallel to this are placed the exports of tobacco stems, cuttings, etc., from Canada over a similar period.

TABLE 34.—CANADIAN IMPORTS OF NICOTINE AND EXPORTS OF LOW GRADE TOBACCO AND STEMS FROM THE COUNTRY (1919–29)

Fiscal year	Nicotine imports		Exports of stems, cuttings, etc.	
	Amount	Price per pound	Amount	Price per pound
	lb.	$	lb.	cts.
1919–20	7,940	1 11	1,440,432	0·5
1920–21	8,288	1 13	633,136	1·1
1921–22	10,654	1 25	829,920	4·5
1922–23	35,448	1 10	600,096	2·1
1923–24	25,939	1 18	452,816	3·7
1924–25	31,612	1 09	870,688	2·3
1925–26	28,243	1 00	548,864	1·8
1926–27	63,610	1 11	541,968	2·2
1927–28	45,767	1 04	495,152	1·8
1928–29	120,492	0 95		

TOBACCO DISEASE SURVEY

1927

BLACK ROOT-ROT *(Thielavia basicola)*.—This disease caused quite severe losses in the l'Assomption-Montcalm district of Quebec owing to the heavy rainfall and cool weather during August. There was less damage than usual in the Yamaska Valley of Quebec and in Southwestern Quebec.

WILDFIRE *(Bacterium Tabacum)*.—No cases have been reported outside of the Yamaska Valley of Quebec, where it was first found in 1925. Due to the dry weather in August the damage was comparatively light. It has spread to only two additional farms from those where it was originally found.

ANGULAR LEAF SPOT *(Bacterium angulatum)*.—Considerable damage was caused in certain localities in Ontario and Quebec.

MOSAIC *(Virus)*.—This trouble was present in the Yamaska Valley in widely varying percentages on different farms. Only a few instances were noted in the l'Assomption-Montcalm district. About the usual amount was observed in Southwestern Ontario. In British Columbia the disease was very common, causing considerable damage.

FRENCHING.—This condition was somewhat more prevalent than usual especially in British Columbia, where it was quite general, a few fields being very seriously damaged.

CURLY DWARF.—Appreciable damage was caused in British Columbia.

SUNBURN.—Burning of the leaves by the sun was fairly common in British Columbia.

RUST.—Various leaf spots of undetermined cause were noted, particularly on the Canelle variety, which appears to be particularly susceptible.

1928

BLACK ROOT-ROT *(Thielavia basicola)*.—Quite general in the cigar binder districts of Quebec owing to the cool weather conditions. The disease is now so generally distributed that the almost exclusive use of the Resistant Havana (142) will be necessary in the future. In Ontario some loss resulted in the Burley and dark-fired sections.

WILDFIRE *(Bacterium Tabacum)*.—The disease was found on over thirty farms in Rouville Co., Quebec, as compared to six in 1927. Most of the infections were traced to one large producer of plants. One case of the disease was reported in Montcalm Co. north of Montreal.

ANGULAR LEAFSPOT *(Bacterium angulatum)*.—Considerable damage was caused in the Ontario and Quebec districts, the disease being more prevalent than usual.

MOSAIC (*Virus*).—Less loss from this source than has been the case for several years.

HOLLOW STALK (*Bacillus carotovorus*).—A few isolated cases were observed.

SORE-SHIN *(Rhizoctonia Solani)*.—A single case was reported from Kent County, Ontario.

DAMPING-OFF *(Pythium de Baryanum)*.—Considerable loss in Quebec owing to faulty methods of seed-bed management.

LEAF-DROP (Cause unknown).—Quite heavy losses on the bottom lands in the Okanagan Valley, British Columbia.

FRENCHING (Cause unknown).—About the usual amount of damage.

1929

BLACK ROOT-ROT *(Thielavia basicola)*.—Although this disease is quite general in the tobacco districts of Quebec the damage was less than in 1928. In Ontario the damage was less than the average due to a hot dry mid-summer. The Dark and Burley varieties grown on the heavier soils were most seriously affected. Practically no black root-rot was observed in the Norfolk section.

WILDFIRE (*Bacterium Tabacum*).—Shortly after transplanting, an outbreak of wildfire occurred in the Yamaska Valley. The disease was checked by the

drought and very little damage resulted. No wildfire was observed in Ontario or British Columbia.

ANGULAR LEAFSPOT *(Bacterium angulatum)*.—Tobacco of the Belge variety seemed more seriously affected than the other varieties grown in Quebec. Very little damage was done to the cigar tobacco. In Ontario infection was only about a third as prevalent as in 1928.

MOSAIC (*Virus*).—Damage from mosaic was very slight throughout all of the tobacco districts except in British Columbia.

DAMPING-OFF (*Pythium de Baryanum*).—Very common in the section north of the St. Lawrence River, due to heavy watering and insufficient ventilation of the seed beds.

NUTRITIONAL DISTURBANCES.—No cases of sand drown, drought spot or potash starvation were noted.

MISCELLANEOUS.—No frenching, curly dwarf, sore-shin, or leaf drop were observed in the Ontario districts. In Quebec only a few isolated cases of frenching, hollow-stalk, and brown root-rot were noted. Leaf drop again was observed in the Okanagan Valley, B.C.

EDUCATIONAL WORK

Throughout the year a considerable portion of time by various members of the staff is devoted to educational work. This work includes field inspection on individual farms, special meetings and demonstrations, judging tobacco at fairs, preparing timely articles in relation to tobacco culture and special reviews relating to the industry as a whole.

ONTARIO.—In the winter of 1928-29 a series of meetings with the growers in Western Ontario was held in which topics such as fertilizers, grading, varieties, rotations, diseases and cultural operations were discussed. Meetings were held in all of the important areas of that section and included Essex, Kent, Elgin, Norfolk, Lambton and Middlesex counties. In all fifty-three meetings were held with an average attendance of about thirty.

All meetings were made as informal as practicable. The morning and a portion of the afternoon session were spent at grading and discussion of the same, and then such subjects as fertilizers, varieties, and cultural problems in general were given over to free and open discussion.

During the grading demonstrations, it was pointed out that the tobacco plant could be easily divided into three or four main regions, namely trash, lugs, leaf and tips. On close analysis of the grades from these regions, several points were illustrated: proper topping, balanced fertilization, maturity effects, careful handling at harvest, and attention in the curing barn. At practically every meeting the tobacco graded indicated too high topping. Due to the responsive nature of the tobacco plant, timely attention of all cultural operations was emphasized. When operations of other crops conflicted with proper attention to the tobacco crop, growers were advised either to discontinue growing tobacco, or cut their acreage to a point where the work would be properly done in season.

In some cases grading was kindly taken to, but this was among the newer growers who had difficulty in disposing of their tobacco, such growers voicing the opinion that any system would be an improvement on the present one. The older and more successful producers were not particularly interested in grading, but were keener on other questions relative to diseases, fertilizers, and varieties.

At practically every meeting growers remarked that those who already had the reputation of producing good quality leaf, and put it up in good marketable condition, generally got first bid and always a quick sale for the product. They

also expressed the opinion that many growers were entirely to blame themselves for the depressed market situation at that time.

A question naturally arose with respect to what extra remuneration the grower would get if he did go to the extra expense of sorting his crop into three or four grades. No guarantee could be given to the individual, owing to the present system of buying. It was emphasized, however, that the educational value from sorting would more than make up the extra cost, because the industry would eventually be placed on a quality producing basis.

In summing up conclusions drawn from the demonstrations, the general feeling was that under the present "barn-run" system of buying, grading would be of little or no value. The flue-cured growers do not seem to be in favour of grading under any system. The Burley and dark-fired growers will, no doubt, be keen on following some system, but it will have to be very simple and even then considerable educational work will have to be done to obtain uniformity of the slightest degree.

QUEBEC.—Similar work has been in progress in the province of Quebec. Substantial results have been obtained but still there is a great opportunity for further progress. With the ultimate object of improving the crop and standardizing the product, several lectures, demonstrations and individual farm visits were made. The meetings as a rule were well attended.

The outstanding problems discussed were centred around the subjects of growing healthy plants, proper seasonal attention, fertilizers and curing.

To illustrate the improvement made the results on the use of chemical fertilizers may be cited as an example. In 1926 practically no commercial fertilizers were sold to the north shore Quebec growers; the next year 316 tons were purchased, and for the 1928 crop about 1,000 tons of fertilizer were used. The grower has discovered the advantage of supplementing his barnyard manure with a commercial mixture either mixed on the farm or purchased ready mixed.

BRITISH COLUMBIA.—Talks were given before the Boards of Trade and interested growers at both Vernon and Kelowna. Samples of tobacco from British Columbia, Ontario, and United States were placed on the table for direct comparison. They all realized that they had considerable to learn, and that the quality of British Columbia tobacco was decidedly below that of Western Ontario. They all wished, if possible, to see the tobacco industry put on a more stable basis in British Columbia but were convinced that much improvement is necessary.

SEED DISTRIBUTION

For many years it has been the policy of the Tobacco Division to distribute, free of charge, one-quarter ounce packages of seed to any bona fide tobacco grower. There has been a considerable demand for this service, particularly from the province of Quebec. In the following table 35 are given the amounts of seed of the different varieties distributed during the period 1927 to 1929.

TABLE 35.—FREE SEED DISTRIBUTION 1927 TO 1929

Variety	1927	1928	1929
	oz.	oz.	oz.
Comstock Spanish	133	141	35
Connecticut Havana 38	330	329	314
Resistant Havana	.....	53	80
Connecticut Broadleaf	.....	.....	7
Belge 3007	143	208	171
Little Dutch	1	1	5
Obourg Vincent	18	2	26
Parfum d'Italie	11	5	35
Canelle	123	152	138
Petit Havane	1	5	49
Totals	760	896	860

In addition, a few ounces of Burley, dark and flue varieties are distributed. One of the most interesting facts brought out by this table is the growing demand for Resistant Havana and the large decrease in Comstock Spanish. Connecticut Havana 38 still remains the most popular cigar tobacco, while Belge 3007 and Canelle are the most generally grown of the large and small pipe types respectively. Petit Havane has become more popular recently.

SUMMARY

Statistics on Canadian tobacco production, prices and consumption are outlined covering the period from 1927 to 1929.

An intensive survey of the British market was made in 1929 and suggestions in regard to the expansion of our export market are made.

Variations in a basal ration, supplying 160 pounds of nitrogen, 160 pounds of phosphoric acid and 200 pounds of potash are used to determine comparative effects of different fertilizers.

Urea and diammonium phosphate were superior as sources of water-soluble nitrogen; nitrate of soda and sulphate of ammonia also ranked high; but nitrate of potash and nitrate of lime and nitrophoska No. 3 gave lower yields and poorer quality.

Cottonseed meal and dried blood produced higher yields and better quality than tankage.

Urea can be used advantageously as a substitute for organic nitrogen in the form of cottonseed meal or dried blood.

Evidences of phosphoric acid deficiency were strikingly evident the first year of the experiment.

Diammonium phosphate and treble superphosphate gave excellent results as reflected in both the quality and the yield. Ordinary superphosphate also gave good returns.

The omission of mineral potash depressed the yield and impaired the quality the very first year. An addition of 73 pounds of potash was sufficient to maintain the yield and quality for the first year.

Sulphate of potash was found to be the best source of potash when compared with the carbonate and nitrate forms. No benefit was derived by substituting a portion of the potash in the form of muriate. Nitrate of potash produced satisfactory results when not too much was used.

Annual applications of one ton of lime progressively depressed the yields over a period of three years.

Paper mulch elevated the soil temperature, increased the yield, and improved the quality of the tobacco.

Two years' results indicate that larger plants and a greater number are produced with "Vita Glass" than under ordinary glass.

In New Brunswick, Alberta, Manitoba and certain parts of British Columbia the Burley type has indicated the greatest promise.

The nicotine content of the tobacco plant increases with advanced maturity after topping and suckering. Upper leaves, with these treatments, contain more nicotine than lower leaves. Nitrogen translocation effects induced by topping and suckering apparently determine the nicotine content of the various leaves on a tobacco plant. Certain varieties normally have a higher nicotine content than other varieties. The nicotine content of the stalk is consistently lower than that in the leaves.

It does not appear financially advantageous, with present prices, to grow tobacco entirely for nicotine manufacture even with the high percentages of nicotine obtained with certain varieties of tobacco.

An outline of observations on tobacco diseases during 1927, 1928 and 1929 is included.

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