DOMINION OF CANADA

DEPARTMENT OF AGRICULTURE

DOMINION EXPERIMENTAL FARMS

EXPERIMENTAL STATION

LETHBRIDGE, ALTA.

REPORT OF THE SUPERINTENDENT

W. H. FAIRFIELD, M.S.

FOR THE YEAR 1926

About one hundred farmers and farmers' wives were in daily attendance at the third Annual Short Course in Irrigation Farming, held February 1st to 5th, 1926, at the Lethbridge Station, under the joint auspices of the Provincial Department of Agriculture and the Experimental Station.

Printed by authority of the Hon. W. R. Motherwell, Minister of Agriculture, Ottawa, 1927

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DOMINION EXPERIMENTAL STATION, LETHBRIDGE ALBERTA

REPORT OF THE SUPERINTENDENT, W. H. FAIRFIELD, M.S.

THE SEASON

There were two outstanding things in connection with the season of 1926. It was preceded by an unusually open winter, in which soil drifting was serious, and closed with a long period of rainy weather beginning the last of August, that not only interfered with threshing and other farming operations, but caused some loss.

The winter soil drifting referred to, which was general in most districts in southern Alberta, and which was worse than it had been for four or five years, resulted from the fact that the surface soil went into the winter in a wet condition. When this thawed out during mild spells and then dried, the particles of soil at the surface became very fine and loose and were easily moved by the wind. Had the winter been less open and the soil remained frozen, or had there been even a light covering of snow, the unusual drifting would not have occurred.

Although the winter was mild, work on the land was not general until April 12. Germination on spring ploughed land was not satisfactory in many instances, due to the very light rainfall from seeding time until the middle of June. During this period there were only 0.76 inches of precipitation received. This unfavourable condition was particularly noticeable on the irrigated land where, of necessity, the major portion of the grain fields was seeded on spring prepared land. On the summer-fallow on the dry land this was of course not noticeable. The rainfall during June was satisfactory. The yields of grain were on the whole fair on dry land and good on irrigated land. August and September were wet and threshing was delayed unduly. All grain was badly weathered and considerable sprouting occurred, so that the season on the whole was very trying for the grain farmer. On the irrigated farms much difficulty was met with in saving the second cutting of alfalfa, although the first cutting, which was heavy, was put up in excellent condition. The wet fall weather again delayed the sugar beet harvest, but the crop was finally lifted and delivered to the factory with no material loss.

The last frost in the spring occurred on May 8, when a temperature of thirty degrees was recorded. Although on May 27, and also on June 9, a temperature of thirty-two degrees was recorded, there was no damage to vegetation observable. The first frost in the fall was on September 11, and the first killing frost on September 20, followed on the 23rd by the very low temperature of nine degrees above zero.

METEOROLOGICAL RECORDS AT LETHBRIDGE, 1926

Month	Temperature F.			Bright sunshine	Wind			Evaporation from free water surface	Precipitation	
	Highest	Lowest	Mean		Hourly Mean	Greatest mileage in one hour			1926	Average 25 yrs.
						Miles	Direction	Inches	Inches	Inches
January	51·0	−7·0	28·3	93·8	14·0	50·0	S.W.	.....	0·24	0·64
February	60·0	−6·0	29·6	102·2	15·3	51·0	S.W.	.....	0·76	0·65
March	67·0	8·0	35·2	184·2	11·3	53·0	S.W.	.....	0·11	0·70
April	84·0	−2·0	44·3	239·8	11·4	59·0	W.	.....	0·34	0·92
May	77·0	28·0	53·3	244·6	13·5	43·0	S.W.	6·24	0·64	2·38
June	90·0	32·0	57·8	292·9	11·1	43·0	S.W.	5·37	4·67	2·82
July	92·0	39·0	65·8	343·7	8·2	28·0	W.	5·60	1·15	1·81
August	93·0	37·0	59·1	246·3	7·8	33·0	S.W.	4·58	2·31	1·76
September	73·0	9·0	43·1	160·1	7·5	27·0	N.	1·77	4·62	1·76
October	73·0	22·0	45·5	196·9	12·3	50·0	S.W.	3·05	0·31	0·83
November	66·0	−14·0	26·8	97·5	7·8	42·0	S.W.	.....	0·52	0·59
December	51·0	−21·0	19·6	103·2	15·1	52·0	S.W.	.....	0·56	0·62
Total	.....	.....	.....	.....	.....	.....	.....	26·61	16·23	15·48
Average	73·1	10·4	42·4	192·1	11·3	44·3	.....	.....	.....	.....

Latest spring frost occurred on May 8 ..... 30·0°
First fall frost occurred on September 11 ..... 30·0°
Total precipitation for the four growing months of April, May, June and July .... 6·80″
Twenty-five year average for the four growing months of April, May, June and July 7·93″

A number of farmers in the district, as well as Illustration Station Operators over the province, are supplied with rain gauges and they have been good enough to report their observations of precipitation monthly to this office. The table that follows gives the locations and the names of the observers who have sent in complete returns for the twelve calendar months of 1926.

Station and Observer	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total, 1926	Year's total for			Four years' average
														1923	1924	1925	
	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.
Acadia Valley—E. C. Hallman	0·60	1·40	0·35	0·18	0·87	0·98	1·08	0·93	1·30	1·28	0·61	0·79	10·37	12·75	9·06	11·88	11·01
Alsask, Sask.—Andrew Anderson	2·0	1·20	0·20	Nil	1·91	0·94	1·92	2·04	0·70	0·40	0·30	0·60	12·21	.....	10·65	11·46	
Barons—Jos. Lee	0·27	0·82	0·20	0·28	0·45	5·69	0·74	1·73	4·23	0·39	0·30	0·10	14·20	16·59	14·61	17·20	15·65
Bindloss—J. Barnes	0·60	1·00	0·00	Nil	1·32	0·62	1·53	1·49	0·97	0·03	0·55	0·15	8·26	.....	.....	13·18	
Cardston—J. F. Parrish	0·02	0·50	0·58	1·12	0·46	3·61	1·46	1·96	5·96	0·15	0·60	1·00	17·42	18·35	19·44	20·66	18·97
Carmangay—H. S. Gibson	0·15	0·65	Trace	0·10	0·29	4·85	0·60	2·67	3·55	0·61	0·72	0·25	14·44	15·89	11·44	16·36	14·53
Claresholm—School of Agriculture	0·41	0·20	0·67	0·86	0·11	6·24	1·51	2·99	6·18	0·50	0·38	0·25	20·30	20·84	13·32	20·67	18·78
Coaldale—N. F. Priestley	0·49	0·86	0·13	0·39	0·52	4·71	0·89	1·70	4·92	0·26	0·38	0·35	15·60	15·75	14·25	16·72	15·58
Delacour—A. H. Fennessey	0·60	1·60	0·60	0·15	0·22	4·85	1·45	1·88	7·47	0·60	1·80	0·90	22·12	.....	.....	19·11	
Empress, Sask.—Wm. Rowles	1·00	1·00	0·22	Nil	1·18	0·36	1·58	1·88	0·57	0·22	0·85	0·40	9·26	.....	.....	12·43	
Foremost—T. H. Frankish	0·20	0·25	Nil	Nil	0·55	1·55	Nil	3·45	0·80	Nil	2·20	0·40	9·40	14·12	10·73	13·20	11·86
Glenwoodville—Glen Wood	0·20	0·31	0·29	0·50	0·14	3·48	1·48	2·54	4·25	0·36	0·25	0·44	14·24	.....	.....	16·50	
Grassy Lake—J. E. James	0·22	0·76	0·19	0·27	1·04	1·00	0·25	2·62	1·98	0·09	0·64	0·29	9·34	13·99	11·23	12·81	11·84
High River—B. F. Kiser	1·00	Nil	Nil	0·50	0·06	5·36	1·06	2·93	4·28	0·40	0·60	1·10	17·29	21·00	16·44	15·49	17·56
Jenner—Clide Besse	1·07	1·10	0·48	0·46	0·97	1·01	1·58	0·85	1·11	0·44	1·30	0·65	11·02	.....	.....	13·49	
Kippenville—L. C. Halmrast	1·00	0·50	0·16	0·20	1·01	2·25	0·98	4·00	2·06	Nil	0·60	0·40	13·16	13·63	10·99	14·35	15·53
Kipp—C. M. Nicol	0·50	0·64	0·10	0·51	0·26	4·56	1·98	1·81	4·42	0·34	0·30	0·80	16·22	.....	.....	19·48	
Lethbridge—R. E. Everest	0·25	0·51	0·15	0·38	0·61	5·08	0·85	2·43	4·91	0·30	0·53	0·54	16·54	.....	16·89	21·22	
Lethbridge—Experimental Station	0·24	0·76	0·11	0·34	0·64	4·67	1·15	2·31	4·62	0·31	0·52	0·56	16·23	16·40	16·00	18·76	15·35
Lucky Strike—S. L. Halmrast	0·23	0·52	0·07	0·15	0·88	1·43	0·79	3·29	2·16	Nil	0·70	0·60	10·82	.....	.....	12·15	
Macleod—Norman Grier	0·30	0·30	0·20	0·60	0·07	3·98	1·72	1·95	4·10	0·25	0·40	0·80	14·68	18·59	15·51	20·37	17·29
Manyberries—J. F. Evenson	1·17	0·75	0·85	0·40	0·60	1·10	0·40	2·75	1·57	Nil	0·70	0·40	10·69	.....	.....	10·77	
Milk River—Jos. Wachtler	0·50	0·20	0·17	0·10	0·61	1·86	0·34	1·89	3·00	Nil	0·20	0·45	9·32	18·56	16·83	.....	
Munson—R. R. Fraser	0·30	1·55	0·80	1·50	0·89	1·95	1·31	3·03	2·77	0·40	1·63	0·65	16·78	12·62	12·34	16·30	14·51
New Dayton—R. W. Risinger	0·80	0·50	0·00	0·00	1·04	2·87	0·42	2·62	3·48	0·50	0·40	0·90	13·53	15·88	17·91	16·09	15·85
Nobleford—E. L. Woodbury	0·35	0·65	0·28	0·78	0·24	5·46	1·05	2·25	4·58	0·56	0·45	0·43	71·08	15·99	16·83	21·19	17·77
Orion—Geo. Wagar	0·46	0·34	0·42	Nil	0·74	0·66	0·48	3·19	1·57	0·16	0·65	0·30	8·97	12·69	9·84	14·45	11·49
Pincher Creek—Andrew Christie	0·25	0·54	0·89	1·14	0·17	5·23	0·63	2·83	7·17	0·45	0·36	0·80	20·46	28·61	19·62	20·52	22·30
Raymond—School of Agriculture	0·67	0·31	0·20	0·67	0·57	4·03	0·72	1·13	2·61	Nil	0·76	0·68	12·40	.....	.....	.....	.....
Sunnynook—R. Montgomery	0·35	0·45	0·15	0·15	1·05	1·27	3·08	1·93	1·80	0·15	1·80	0·30	12·48	.....	.....	14·53	
Taber—T. W. Green	0·09	0·11	Nil	0·42	0·74	2·26	0·54	2·09	1·89	0·34	1·60	0·90	10·98	.....	.....	.....	
Wainwright—G. C. Boyd	0·45	1·10	0·25	0·35	1·94	3·34	1·86	2·48	1·41	0·20	0·80	1·30	15·48	12·11	11·30	10·31	12·05
Whitla—R. H. Babe	Nil	Nil	0·40	0·20	1·33	1·53	1·93	2·50	1·23	0·25	0·80	0·40	10·57	17·20	13·71	15·53	14·25
Youngstown—G. S. Coad	0·80	0·80	0·00	0·19	1·24	1·33	3·13	2·42	0·84	0·30	1·52	0·50	13·07	15·60	12·29	13·58	13·63

ANIMAL HUSBANDRY*

HORSES

There are on the Station twenty-five horses in all. Of these three are promising pure-bred Percheron fillies, one a two-year-old gelding, and the rest mature horses, including three pure-bred Percheron mares, and three pure-bred Clydesdale mares.

CATTLE

STEER FEEDING EXPERIMENT

The object of the experiment was to ascertain, if possible, the most profitable quantity of grain to feed with alfalfa hay as the main roughage, as well as in combination with other roughage, in finishing steers.

Forty head of steers were purchased at the Calgary Stocker and Feeder Show in October, 1925. Including purchase price, loading, freight and commission, the steers cost in the feeding corrals $5.20 per cwt.

The steers were grouped as follows:—

Group 1—Alfalfa hay and full grain ration.
Group 2—Alfalfa hay and two-thirds grain ration.
Group 3—Alfalfa hay, one-half grain ration and silage.
Group 4—Alfalfa hay and one-half grain ration.

Group 1 was feed all the grain they would eat and not go off feed. The amounts of the other grain rations were based on the amount consumed by Group 1. The grain ration consisted of oats and barley equal parts at the beginning, the ratio of barley being increased throughout the feeding trial.

Steer feeding experiments are conducted in open corrals with straw sheds for shelter.

* Work with live stock is under the supervision of Arthur Newman, B.S.A., and he has assisted materially in the preparation of the report coming under this heading.

The steers were fed in open corrals, the only shelter being a seven-foot board fence and a straw shed open to the south. They were started on feeding trial on December 1, and were fed in accordance with the above outline for sixty-one days, or until January 30, when they were all fed liberally on grain in order to fit them for export on March 16.

NOTE.—One steer in Group 2 with two-thirds grain ration bloated very badly and though he recovered from the bloat, apparently he incurred some internal injury. He lost considerable weight and as a result the group averages are not reliable from the standpoint of the feeding trial and will not be given here.

STATEMENT OF COSTS OF FEED AND GAINS DURING FEEDING PERIOD.

—		Group 1 — Alfalfa and full grain ration	Group 3 — Alfalfa half grain ration corn silage	Group 4 — Alfalfa and half grain ration
Number of steers in group		10	10	10
Number of days on trial		61	61	61
Average initial cost per steer at $5.20 per cwt	$	47·58	47·54	48·62
Average initial weight per steer	lb.	915	914	935
Average final weight per steer	lb.	999	988	1,004
Average gain per steer	lb.	84	74	68·9
Average daily gain per steer	lb.	1·38	1·21	1·13
Average cost of feed per steer	$	12·08	9·38	10·19
Average cost to produce one pound gain	$	0·143	0·126	0·147
Average value of steer appraised at 6c. per pound	$	59·94	59·28	60·24
Average initial cost plus cost of feed	$	59·66	56·90	58·81
Profit per head	$	0·28	2·38	1·43
Quantity of feed and value:—				
Average amount of hay fed	lb.	1,424	940	1,543
Value at $10 per ton	$	7·12	4·70	7·71
Average Amount of grain fed	lb.	397	198·4	198·4
Average cost of grain at $25 per ton	$	4·96	2·48	2·48
Average amount of silage fed	lb.	.....	880	.....
Value of silage at $5 per ton	$	.....	2·20	.....
Average cost of feed for period	$	12·08	9·38	10·19

The following table gives the amount of feed of the various classes and indicates some of the factors influencing the result of the experiment:—

—		Group 1	Group 3	Group 4
Barley required per pound gain	lb.	2·36	1·37	1·41
Oats required per pound gain	lb.	2·36	1·37	1·41
Alfalfa hay required per pound gain	lb.	16·95	13·05	22·00
Corn silage required per pound gain	lb.	.....	12·22	.....
Dry matter required per pound gain	lb.	19·77	17·16	22·66
Total digestible nutriments required per pound gain	lb.	11·92	10·22	13·12
Nutritive ratio		1 : 4·4	1 : 5·5	1 : 4·1
Average daily gain	lb.	1·38	1·21	1·13
Cost to produce one pound gain	$	0·144	0·126	0·147
Spread between buying and selling price	$	0·80	0·80	0·80
Profit per steer appraised at 6c	$	0·28	2·38	1·43
Average cost of feed per steer	$	12·08	9·38	10·19

The foregoing table indicates quite plainly some of the fundamental factors in profitable steer feeding and in this regard substantiates the general findings of several years' work at this Station.

Gains are most expensive and slowest when half grain ration is fed with alfalfa hay; slightly cheaper and much more rapid gains were made where a full grain ration was fed with alfalfa hay. Group 3, where corn silage was fed

in conjunction with alfalfa and one-half grain ration, produced much cheaper gains and returned a greater profit per steer. It has been our experience in steer feeding that where the nutritive ratio is widened, and variety is supplied by the addition of some roughage other than alfalfa hay, gains are produced more cheaply.

In comparing Group 1 with full grain ration and alfalfa hay with Group 4, the latter returns a profit per steer of $1.43, as against 28 cents in the case of Group 1, and this despite the fact that Group 1 made greater gains at a lower cost per pound. In analysing this we find that the average cost of feed per steer in Group 4 is $1.89 less than in the case in Group 1, due to 2.82 pounds of grain at 1.25 cents per pound having been replaced by approximately 5 pounds of alfalfa at ½ cent per pound, per pound gain.

Following is a table covering the entire feeding operation until the steers were exported or sold locally. This unforunately shows a loss due to the weakening market. It is generally considered doubtful if steers can be fed profitably on less than a 2-cent spread, i.e., the selling price of the finished steers should be 2 cents more per pound than the cost price, while we were in this case operating on a spread of 0.66 cent, which was the difference between the buying price of 5.20 cents and the selling price of 5.86 cents, whereas the necessary spread to cover cost of feed would be exactly 1.1 cents.

Number of steers on feed			40
Number of days on feed	20 head		103
Number of days on feed	20 head		146
Total initial weight Dec. 3	40 head	lb.	36,779
Average initial weight per head	40 head	"	919
Final total weight March 16	20 head	"	22,750
Final average weight per head March 16	20 head	"	1,137·5
Final total weight April 28	18 head	"	20,542
Final average weight per head April 28	18 head	"	1,141
Final total weight April 28	2 cut backs	"	2,266
Final average weight per head April 28	2 cut backs	"	1,133
Final total weight when sold	40 head	"	45,558
Final average weight per head when sold	40 head	"	1,138·9
Total gain for period		"	8·779
Average gain per steer for period		"	219
Average daily gain per steer		"	1·76
Quantity of silage fed per period		"	46,885
Quantity of alfalfa fed per period		"	80,040
Quantity of oat chop fed per period		"	12,603
Quantity of barley chop fed per period		"	22,885
Quantity of molasses fed per period		"	2,700
Quantity of salt fed per period		"	95

VALUE OF FEED

Alfalfa hay at $10 per ton		$	400 20
Silage at $5 per ton		$	117 21
Oat chop at $27.50 per ton		$	173 29
Barley chop at $22.50 per ton		$	257 45
Molasses at $18 per ton		$	24 30
Salt at $30 per ton		$	1 43
Total cost of feed		$	973 88
Average cost of feed per steer		$	24 35
Cost of feed per head per day		c.	19·6
Cost of feed to produce one pound gain		c.	11·1
Initial cost of steers including commission, freight, etc		$	1,913 40
Initial cost of steers per 100 lb		$	5 20
Average cost per steer		$	47 84
Total cost of steer plus cost of feed		$	72 19
Appraised value of 20 head sold March 16 at $6		$	1,365 00
Appraised value of 18 head sold April 28 at $5.75		$	1,181 16
Appraised value of 2 cut backs April 28 at $5.60		$	126 89
Total value of 40 head		$	2,673 05
Total loss on 40 head		$	214 23
Average loss per head		$	5 35

EXPORTING CATTLE

The steers on feeding trials 1925-26 were, with the exception of two which were sold locally, exported to Great Britain, landing at Glasgow.

Two shipments were made, one on March 16 of twenty head which averaged from the feed lots 1,137 pound, and the second on April 18 of eighteen head which averaged from the feed lots 1,141 pound.

Owing to the general strike and consequent poor demand, and also an outbreak of foot and mouth disease in the vicinity of the port of debarkation which necessitated a period of quarantine of all cattle within the port area and consequently a very high marketing cost, these steers were exported at a loss.

The quality of the cattle shipped, i.e., cattle weighing 1,050 pound when landed at Glasgow or 1,140 pound cattle here, with a shrink of approximately 8 per cent, with only fair finish and not particularly breedy, is not the best to export. It has been indicated by experimental shipment that either genuine feeders of good breeding, or else cattle carrying a high finish is what the British market demands.

DAIRY CATTLE

Progress in the dairy herd has been quite satisfactory during the year. From the standpoint of health we have been very fortunate, all cows of breeding age having produced healthy calves within the year. A few minor cases of mastitis were our only troubles of a pathological nature with the exception of one case of lump jaw (Actinomycosis).

The Station herd on December 31, 1926, numbered in all twenty-five, twenty-three of which were pure-bred Holsteins. Three bulls were sold to farmers during the year. Within the year beginning October 1, 1925, and ending September 30, 1926, eight of the nine cows of breeding age produced normal healthy calves, thus giving a breeding co-efficient of 88.8 per cent. During this period the nine cows produced 98,065 pounds of milk, which contained 3,430.85 pounds of butterfat.

Average milk per cow per year	10,873·60
Average fat per cow per year	381·20
Average per cent fat in milk	3·5
Average value of fat from each cow at 40c	152 48
Average value of skim milk from each cow at 25c. per cwt	24 71
Total revenue per cow	$177 19

It is not the policy of the Station to sell whole milk but to dispose of the cream to local creameries at current butterfat prices. The returns from the herd are therefore based on a market that is open to farmers generally. During the calendar year of 1926 of the cream delivered, 82.6 per cent graded "table;" 17.23 per cent graded "special," and 0.17 per cent graded No. 1."

Comparison of production cost for a winter month and a summer month.

AVERAGE DAILY RATIONS PER COW FOR FEBRUARY, 1926

(Lactation advanced Three Months)

Alfalfa hay—16·6 lb. at $10 per ton	c.	8·3
Corn silage—29 lb. at $5 per ton	c.	7·25
Barley—9·1 lb. at $22.50 per ton	c.	10·24
Oats—9·1 lb. at $27 per ton	c.	12·28
Average cost of feed per day	c.	38·07
Average daily production of milk	lb.	58
Average percentage of fat	%	3·46
Average daily production of fat	lb.	2·007
Average cost to produce a pound of fat	c.	18·97

AVERAGE DAILY RATIONS PER COW FOR JUNE, 1926

(Lactation advanced Seven Months)

Pasture at daily cost of 5c.		
Barley—5·8 lb. at $22.50 per ton	c.	6·52
Oats—5·8 lb. at $27 per ton	c.	7·83
Silage—12 lb. at $5 per ton	c.	3·00
Average cost of feed per day	c.	22·35
Average daily production of milk	lb.	44
Average percentage of fat	%	3·12
Average daily production of fat	lb.	1·37
Average cost to produce a pound of fat	c.	16·31

PRICE OF CREAM IN FEBRUARY

Grade of cream	Table	Special	No. 1	No. 2
Price received for cream ... cts.	42·0	41·0	39·0	36·0
Cost of feed ... "	18·97	18·97	18·97	18·97
Profit over feed ... "	23·03	22·03	20·03	17·03

PRICE OF CREAM IN JUNE

Price received for cream ... cts.	40·0	33·0	31·0	28·0
Cost of feed ... "	16·31	16·31	16·31	16·31
Profit over feed ... "	23·69	16·69	14·69	11·69

These figures will enable one to draw conclusions as to the relative remuneration of winter vs. summer dairying. One must keep in mind that the above figures were obtained from cows comfortably housed and well fed.

CARE OF CREAM

Possibly one of the greatest and most regrettable sources of loss to the dairy industry of southern Alberta is the low grade of the cream produced.

A few figures are submitted in the table following which will point out the loss to the Lethbridge district through low grade cream during 1926. They indicate the increased cash returns that would result from better care of the cream and show the necessity of keeping milk and cream clean and cool, which can be done with very little additional cost where a supply of ice is stored and reasonable care and cleanliness are practised.

TABLE giving percentage of the various grades produced in the district and delivered to the two creameries in Lethbridge with the value per pound during January and July respectively in 1926 and also the average percentage during the entire year.

—	Grade Table	Price	Grade Special	Price	Grade No. 1	Price	Grade No. 2	Price	Off Grade
	p.c.	cents	p.c.	cents	p.c.	cents	p.c.	cents	p.c.
January	4·2	42	20·0	41	37·0	39	38	36	0·8
July	3·3	40	1·7	33	20·0	31	64	28	11·0
Average for entire year	3·75	41	10·85	37	28·5	35	51	32	5·9

There were approximately 178,500 pounds of No. 2 cream sold in Lethbridge last year. If this cream had been sufficiently good to grade special, the revenue of the farmers would have been increased by $11,710 or an increase in returns of 18.7 per cent for 51 per cent of the cream produced.

The chief causes for low grade cream are high acid content induced by high temperatures, and off flavours due to any of several causes, some of which are: rusty cans, unclean cans, flavours from feed such as French weed, or dirty methods of milking, and unclean, poorly ventilated places for storing cream.

In the milk house on the Station, cream has been stored for periods of ten days and yet grades "table" at the end of that time. The facilities provided by this house can be economically secured on any farm where ice is stored and where boiling water is available for sterilizing utensils. Reasonable sanitation must, of course, be practiced.

SHEEP

LAMB FEEDING EXPERIMENT

The object of the experiment was to ascertain the most economical amount of grain to feed to fattening lambs in combination with alfalfa hay, also to secure information *re* the value of corn silage for fattening lambs.

Two hundred lambs were divided into four groups of fifty each and fed as follows:—

Group 1—Alfalfa hay—one-half grain ration.
Group 2—Alfalfa hay—two-thirds grain ration.
Group 3—Alfalfa hay—full grain ration.
Group 4—Alfalfa hay—one-half grain ration, corn silage.

The lambs were divided into groups as uniform as possible as to size and type. They were all wether lambs from the Station flock.

The lambs were started at a small daily ration of grain (oats and barley, whole). This was increased as rapidly as feasible in the case of Group 3 until they were receiving about two pounds per day, which was all they would clean up. The other groups were fed according to the above outline.

The lambs were started on feeding trial on November 27, 1925. On February 25, 1926, one hundred head of the best finished lambs were taken from the four groups. These were shipped to Toronto where they sold for $14 per cwt. Including freight, attendant's charges, marketing fees, commissions, decking charges, and three deaths, which included in the shrink gives a shrink to Toronto under Lethbridge weights of 14.67 per cent, and brings the cost of shipping and selling at Toronto to 3.39 cents per pound. This reduces the net receipts at Lethbridge to 10.61 cents. The lambs remaining in the group were appraised at 10.25 cents per pound, and the following figures are worked on a basis of 10.61 cents for the lambs shipped to Toronto and 10.25 cents for those cut back as not being quite finished.

DETAILS OF LAMB FEEDING TRIAL

—		Group 1 — Hay, ½ grain	Group 2 — Hay, ⅔ grain	Group 3 — Hay, full grain	Group 4 — Hay, ½ grain corn silage
Number of lambs at beginning of trial		50	50	50	50
Number of lambs at end of trial		48	49	50	50
Number of days in experiment		90	90	90	90
Total weight at beginning of trial	lb.	3,711·6	3,701·6	3,745·0	3,721·6
Average weight at beginning of trial	"	74·2	74	74·9	74·4
Weight of loss	"	148·4	74		
Weight at beginning of trial deducting loss	"	3,563·2	3,627·6	3,745	3,721·6
Total weight at end of 90 days	"	4,901	5,265	5,540	5,140
Total gain for period	"	1,337·8	1,637·4	1,795	1,418·4
Average gain per day	"	0·31	0·37	0·398	0·32
Feed consumed:—					
Quantity of hay fed	lb.	12,483·7	10,833·85	9·700·0	9,260·0
Quantity of barley fed	"	2,243·71	3,045·41	4,583·30	2,291·65
Quantity of oats fed	"	1,268·97	1,722·02	2,591·65	1,295·82
Quantity of silage fed	"				6,425·00
Value of feed:—					
Alfalfa at $10 per ton	$	62 42	54 16	48 50	46 30
Barley at $22 per ton	$	24 64	33 49	50 41	25 20
Oats at $27 per ton	$	17 13	23 24	34 98	17 49
Silage at $5 per ton	$				16 06
Salt at $30 per ton	$	0 80	0 80	0 80	0 80
Total cost of feed	$	104 99	111 69	134 69	105 85
Original cost of lambs at 10c. per lb	$	371 16	370 16	374 50	372 16
Original cost of lambs and cost of feed	$	476 15	481 85	509 19	478 01
Average selling price per lb	cts.	10·38	10·42	10·52	10·41
Total value of group	$	508 72	548 61	582 97	535 07
Profit per group	$	32 57	66 76	73 78	57 06
Profit per lamb (over feed)	$	0 68	1 36	1 47	1 14
Cost to produce 1 lb. gain	cts.	7·8	6·8	7·5	7·5
Number of lambs sold at 10·61 cents		17	22	37	24
Number of lambs sold at 10·25 cents		31	27	13	26

The one hundred lambs not shipped to Toronto were fed until March 22, and sold locally at 10.5 cents at an average weight of 106.6 pound, having gained an average of 0.36 pound per day, and having eaten in that period of 25 days an average of 50 pounds of grain and 49.6 pounds of alfalfa per head.

During the feeding trial the cheapest gains were made by the group receiving two-thirds grain ration, while the greatest profit was returned by Group 3 receiving full ration of grain, due to the greater number of lambs carrying more finish and consequently bringing a higher price.

PASTURING SHEEP IN FOREST RESERVE

The objects of the experiment were to determine the feasibility of alfalfa growers on irrigated land utilizing the nearby forest reserve in the Rocky mountains for summer pasture of sheep.

On the irrigated farms in the district there is always an abundance of winter feed, but it is difficult to obtain cheap summer pasture on the relatively high-priced irrigated land, while on the forest reserve there is always a vast amount of pasture, peculiarly adapted for sheep, that goes to waste each season.

Owing to the difficulty and probable impracticability of trailing the sheep from the farms in the Lethbridge district to the mountain ranges, one feature of the experiment as planned was to ship the sheep by rail to and from the summer range. This has now been carried out for seven seasons and the results indicate that the plan is both practical and profitable.

During the fall and winter months the band is either run on stubble fields or fed at the Station, the amount of feeding required depending upon the severity of the weather. During the summer months from early June till late in September they are pastured in the Crowsnest forest reserve, being shipped by rail from Lethbridge to Sentinel, near Coleman, and returned by rail again in the fall. The ewes are bred to lamb fairly early; that is, from the middle of March to the latter end of April. In order to accommodate them during the lambing period a shed 140 feet by 64 feet is used. As the grass in the forest reserve, as a rule, is ready for pasturing early in June, it has been the custom to shear the sheep the latter part of May. After shearing they are dipped and branded, these operations being completed in time to allow the sheep to be shipped to the mountains during the first week in June. The sheep have been returned to Lethbridge either the last week in September or during the first week in October. October, 1926, completed the seventh year of the experiment, and the statement that follows gives the details of the expenses and returns during the period from October, 1925, to October, 1926, and shows that a gross profit of $3,013.57 was made during that time.

PASTURING SHEEP ON FOREST RESERVE

Expenses October, 1925, to October, 1926—		
Winter pasture on stubble fields		$ 883 00
Alfalfa hay, 134·25 tons at $10 per ton		1,342 50
Low grade mixed hay, 18 tons at $6 per ton		108 00
Mixed grain, oats, barley, and low grade wheat, 29,500 lb. at 1¼c. per lb.		368 75
Silage, 90 tons at $4 per ton		360 00
Salt, 2 tons at $26.50 per ton		53 00
Summer pasture on Forest Reserve		71 96
Total freight to and from Forest Reserve		749 43
Shearing		157 64
Purchase of bucks		180 00
Labour—12 months		2,000 00
		$ 6,274 28
Inventory, October 1925—		
Number of ewes to be bred, 830 at $13		$ 10,790 00
Number of ewe lambs on hand, 200 at $9		1,800 00
Number of feeder lambs on hand, 205 at $8		1,640 00
Number of bucks on hand, 19 at $25		475 00
		$ 14,705 00
Sales—		
138 aged ewes		$ 1,236 00
787 lambs, net receipts		7,665 67
13 bucks		115 50
Net wool receipts, less dip and supplies		1,452 18
		$ 10,469 35
Inventory, October 1926—		
Number of ewes to be bred, 828 at $13		$ 10,764 00
Number of ewe lambs on hand, 73 at $8.50		620 50
Number of feeder lambs on hand, 207 at $7		1,449 00
Number of bucks on hand, 23 at $30		690 00
		$ 13,523 50
Financial Summary—		
Sales for year	$ 10,469 35	
Inventory, October 1926	13,523 50	
Expenses for year		$ 6,274 28
Inventory, October 1925		14,705 00
Gross profit		3,013 57
	$ 23,992 85	$ 23,992 85

Details of Test from October, 1925, to October, 1926.—The sheep reached Lethbridge from the forest reserve on October 2, 1925, and were put on stubble fields. The lambs were disposed of, except the 207 feeders and the 73 head of

ewe lambs saved for the maintenance of the breeding flock. The band was carried on stubble fields in the neighbourhood rented for the purpose until February 25. Hay was fed only in stormy weather when it was impossible for the sheep to get to the ground. The price paid for the stubble was at the rate of $4.50 per day per thousand head. Days when it was not possible for the sheep to pasture, and they had to be fed hay, were not counted. Shearing was begun on May 4 and finished May 13. The sheep were all dipped, lambs included, on May 26, and on June 1 were branded.

On June 7, 1926, the sheep were shipped to the forest reserve at Sentinel, Alberta. There were included in the shipment 1,030 ewes and 917 lambs. Seven double-deck cars were used, care being taken in loading so that there would be about 73 mature sheep and 65 lambs in each deck. The total losses between the time the sheep were shipped up and shipped back were 36 ewes and 13 lambs. Expressed in percentage the loss in mature sheep was 3.5 per cent, and of lambs 1.4 per cent, or on the entire band 2.5 per cent loss.

The Corriedale breed of sheep was developed originally with a view to combining the quality of fleece and ranging abilities of the Rambouillet with the mutton qualities of the Lincoln and Down breeds. This group of grade Corriedale ewes were produced at the Dominion Experimental Station, Lethbridge, Alberta, by breeding Rambouillet and Lincoln cross bred ewes to a registered Corriedale ram.

For the past seven years the results of each season's experiments have been given in detail in the annual reports, copies of which may be had on application. These included an itemized fiancial statement of the season's expenses and returns. A summary of these is here presented.

FINANCIAL SUMMARY COVERING PERIOD FROM OCTOBER, 1919, TO OCTOBER, 1926

For the Year ending October, 1920

Sales for year	$ 4,864 62	
Inventory, October, 1920	7,431 00	
Expenses for year		$ 6,572 08
Inventory, October, 1919		10,050 00
Loss	4,326 46	
	$ 16,622 08	$ 16,622 08

FOR THE YEAR ENDING OCTOBER, 1921

Sales for year	$ 3,635 07	
Inventory, October, 1921	7,898 00	
Expenses for year		$ 4,452 19
Inventory, October, 1920		7,431 00
Loss	350 12	
	$ 11,883 19	$ 11,883 19

FOR THE YEAR ENDING OCTOBER, 1922

Sales for year	$ 4,248 62	
Inventory, October, 1922	9,839 25	
Expenses for year		$ 4,722 88
Inventory, October, 1921		7,898 00
Profit		1,466 99
	$ 14,087 87	$ 14,087 87

FOR THE YEAR ENDING OCTOBER, 1923

Sales for year	$ 9,980 38	
Inventory, October, 1923	10,357 00	
Expenses for year		$ 5,210 39
Inventory, October, 1922		9,839 25
Profit		5,287 74
	$ 20,337 38	$ 20,337 38

FOR THE YEAR ENDING OCTOBER, 1924

Sales for year	$ 10,530 40	
Inventory, October, 1924	14,515 00	
Expenses for year		$ 5,881 78
Inventory, October, 1923		10,357 00
Profit		8,806 62
	$ 25,045 40	$ 25,045 40

FOR THE YEAR ENDING OCTOBER, 1925

Sales for year	$ 13,035 92	
Inventory, October, 1925	14,705 00	
Expenses for year		$ 6,222 95
Inventory, October, 1924		14,515 00
Profit		7,002 97
	$ 27,740 92	$ 27,740 92

FOR THE YEAR ENDING OCTOBER, 1926

Sales for year	$ 10,469 35	
Inventory, October, 1926	13,523 50	
Expenses for year		$ 6,274 28
Inventory, October, 1925		14,705 00
Profit		3,013 57
	$ 23,992 85	$ 23,992 85

SEVEN YEARS' RESULTS

Total sales	$ 56,764 36	
Increase inventory, October, 1926 over inventory 1919	3,473 50	
Total expenses		$ 39,336 55
Total gross profit		20,901 31
	$ 60,237 86	$ 60,237 86

SWINE

During the year some improvement has been made in the swine herd which on January 1, 1926, numbered thirty-nine and on December 31, 1926, numbered one hundred and three.

The breeding herd has been much improved by the receipt of the Yorkshire boar " Ottawa Beau 17 "—119713—from the Experimental Farm, Ottawa. The Tamworth boar " Amber Freshman "—17346—is kept for the purpose of crossing on the Yorkshire sows for market hogs. He is an outstanding individual, having been bred by the University of Saskatchewan, and was received by this Station from the Experimental Station at Scott, Sask.

The females are all pure-bred Yorkshires and now number eight mature sows of fair quality and eight spring-farrow gilts, all showing excellent length and quality. Two of these were received from the Experimental Station at Scott, Sask.

On December 31 the Station swine herd also had twenty-six feeder hogs of late spring and summer farrowing and fifty-nine October farrowed pigs.

In 1926, sixty-nine head of market hogs were sold, equalling a total weight of thirteen thousand nine hundred and forty pounds and returning a net amount of $1,729.82, and in addition eight head of Yorkshire breeding stock have been sold to farmers in the district at nominal prices.

It is the policy of the Station to distribute any available breeding stock of good quality to farmers at reasonable prices and in this way increase the number of pure-bred breeders, which will ultimately improve the market for pure-bred stock from the private breeders, and incidentally improve the general type of market hogs throughout the district.

EXPERIMENTAL WORK WITH SWINE

Practically all of the experimental work with swine has been done with the object of determining the value of various protein supplements to the grain ration taking into consideration the effect, on the grain required to produce a pound of gain, the variation in market type, and rapidity of gain which may be due to the various feeds.

In order to determine the variations which are due to the feeds used rather than to breeding, a detailed record of each litter during the past winter has been kept of all pigs, and this information follows the feeding tables of the winter trials.

WINTER FEEDING TRIAL—JANUARY 27 TO JUNE 2

The pigs used in this trial were all farrowed from the first to the fourth of November, 1925, thus giving uniformity of age. Litters No. 1 and No. 3 were pure-bred Yorkshires, and litter No. 2 was Yorkshire and Tamworth crossbred. They were weaned January 1st and from then until January 22, 1926, were all fed liberally on skim milk, oats and shorts.

The experimental groups were comprised as follows: two pigs from litters No. 1 and No. 2 in each group; two pigs from litter No. 2 in groups No. 1, 3 and 4; and three from litter No. 2 in group No. 2, this group having only one pig from litter No. 3. Groups No. 1, No. 3 and No. 4 had two each from litter No. 3.

Following is a table giving detailed report of averages for the first sixty-two days of the trial, January 27th until April 1st.

—	Group 1 — Grain only	Group 2 — Grain, alfalfa, meal	Group 3 — Grain, skim milk	Group 4 — Grain, tankage
Number of days of trial	62	62	62	62
Number of pigs on trial	6	6	6	6
Average initial weight lb.	57·60	57·30	55·60	56·50
Average final weight "	105·10	112·30	127·30	114·70
Average gain for period "	47·50	55·00	71·70	58·20
Average daily gain "	0·77	0·89	1·16	0·94
Average grain consumed daily "	3·76	3·76	3·76	3·76
Average supplement consumed daily "	.....	0·65	10·00	0·22
Average quantity of grain required per pound gain. "	4·9	4·24	3·25	4·10
Reduction in grain due to supplement "	.....	0·66	1·65	0·80

As will be noticed from the foregoing table, all of the protein supplements gave favourable results in the first period.

TABLE GIVING DETAILS OF EXPERIMENT FROM APRIL 1 UNTIL JUNE 2, OR FINAL FEEDING PERIOD

—	Group 1 — Grain only	Group 2 — Grain, alfalfa, meal	Group 3 — Grain, skim milk	Group 4 — Grain, tankage
Number of days trial	62	62	62	62
Number of pigs on trial	6	6	6	6
Average initial weight lb.	105·1	112·3	127·3	114·7
Average final weight "	195·1	199·7	205·6	205·0
Average gain per period "	90·0	87·4	78·3	90·3
Average daily gain "	1·45	1·41	1·26	1·46
Average grain consumed per day "	8·82	8·72	8·25	8·77
Average supplement consumed per day "	.....	0·43	7·58	0·43
Average grain per pound gain "	6·10	6·20	6·53	6·00

It is obvious from the foregoing table that from the standpoint of economy of gains, a protein supplement is not nearly so profitable when fed in the finishing stages of hogs as when fed to weanling hogs, particularly when the hogs have had a good start on a protein supplement like skim-milk, as was the case with all the pigs in the above experiment.

TABLE COVERING ENTIRE WINTER FEEDING TRIAL

—	Group 1 — Grain only	Group 2 — Grain, alfalfa, meal	Group 3 — Grain, skim milk	Group 4 — Grain, tankage
Number of days in trial	124	124	124	124
Number of pigs on trial	6	6	6	6
Average initial weight lb.	57·6	57·3	55·6	56·5
Average final weight "	195·1	199·7	205·6	205·0
Average gain for period "	137·5	142·4	150·0	148·5
Average daily gain "	1·11	1·12	1·21	1·20
Feed consumed—				
Oats "	282·3	280·2	270·5	281·1
Shorts "	282·3	280·2	6,540·0	286
Grain required for one pound gain "	5·67	5·43	5·03	5·21

The preceding table which covers the entire experiment, indicates a reduction in grain required per pound gain, where supplements are used over the entire period.

Comparison of grain required to produce one pound of gain:—

1925 SUMMER TRIAL AND 1926 WINTER TRIAL

—	Group 1	Group 2	Group 3	Group 4
1925.....lb.	5·28*	5·35	3·80	4·5
1926..... "	5·67	5·43	5·03	5·21

* No. 1 was fed tankage in the final stage, which reduced the grain requirements.

A perusal of the following table will show that, in this case, the feed was not a strong factor in governing the length of side or other points influencing the grade. It was, however, noticeable that the tankage and skim-milk hogs were less trim of under line than were the hogs in group 1.

MARKETING, GRADING AND DRESSING REPORT

On the completion of the feeding trial the hogs were sold to P. Burns and Company, Calgary, where they were graded alive by the Government hog grader. Dressed weights, as well as a carcass grading, were obtained through the courtesy of the purchasers.

The following tables give in detail the results of these investigations:—

GRADING ALIVE, AS SELECTS, THICK SMOOTHS AND SHOPS

—	Lot 1 — Grain only	Lot 2 — Grain, alfalfa, meal	Lot 3 — Grain, skim milk	Lot 4 — Grain tankage
Selects..... %	50·0	33·3	33·3	
Thick smooths..... %	33·3	50·0	66·3	80·0
Shops (under 160 pounds)..... %	16·6	16·6	.....	20·0
Grading of Dressed Carcasses				
Wiltshire sides..... %	50·0	33·3	33·3	
Cumberland sides..... %	33·3	.....	33·3	20·0
Domestic cuts..... %	16·6	66·6	33·3	80·0
Dressing Percentage				
Number of carcasses.....	6	6	6	6
Final feed lot weight..... lb.	1,171	1,198	1,212	1,029
Dressed weight (with head off)..... "	794	820	946	683
Dressing percentage..... %	67·8	68·4	69·8	66·4
Length of Side First Rib to Hip Joint				
Average length..... in.	29·7	30·08	29·8	30·1

REPORT ON FIRMNESS OF SIDE

Firm ... %	...	...	33·3	...
Medium firm ... %	100·0	100·0	66·6	80·0
Soft ... %	...	...	...	20·0

FINANCIAL REPORT

—	Group 1 — Grain only	Group 2 — Grain, alfalfa, meal	Group 3 — Grain skim milk	Group 4 — Grain, tankage
Number of pigs ...	6	6	6	6
Average initial value of pig at 13 cts ... $	7·48	7·44	7·22	7·34
Average cost of feed ... $	9·36	9·29	9·06	9·32
Average cost of supplement ... $	...	0·62	2·72	1·10
Average cost of pig and feed ... $	16·84	17·35	19·00	17·76
Final feed lot weight of Selects ... lb.	623	430	410	
Less shrinkage of 5·74 p.c ... lb.	587	405	386	
Value at 15·51 cents ... $	91·04	62·82	59·87	
Final feed lot weights of Thick Smooths ... lb.	458	768	802	1,233
Less shrinkage of 9·57 p.c ... lb.	496	695	725	1,115
Value at 14·20 cents ... $	69·93	97·99	102·22	157·21
Total returns for group ... $	160·97	160·81	162·09	157·21
Average return per pig ... $	26·83	26·80	27·01	26·20
Net profit per pig ... $	9·99	9·45	8·01	8·44

REPORT ON COMPARISON OF LITTERS

—	Litter 1	Litter 2	Litter 3
Breed of Dam ...	Yorkshire	Yorkshire	Yorkshire
Breed of Sire ...	Yorkshire	Tamworth	Yorkshire
Number of litter on trial ...	8	9	7
Average initial weight ... lb.	49·7	57·0	63·5
Average final weight ... lb.	180·2	205·2	220·5
Average gain per pig ... lb.	130·5	148·2	157·0
Grain require to produce 1 pound gain ... lb.	5·88	5·20	4·89

GRADING REPORT ALIVE

Number of pigs ...	8	8	7
Selects ... %	12·5	12·5	71·4
Thick smooths ... %	50·0	87·5	28·6
Shops (under 160) ... %	37·5	...	...

DRESSING REPORT

Average final weight in feed lot ... lb.	180·2	205·2	220·5
Average dressed weight in rail ... lb.	118·2	142·2	151·3
*Dressing percentage ... %	65·6	6·93	68·6

GRADING DRESSED

Wiltshire Sides ... %	12·5	12·5	71·4
Cumberland sides ... %	37·5	25·0	...
Domestic cuts ... %	50·0	62·6	28·6

FIRMNESS REPORT

Firm ... %	...	12·5	14·3
Medium ... %	87·5	87·5	85·7
Soft ... %	12·5	...	...

* Dressed with head off.

A comparison of the litters would indicate that the dam is an important factor in influencing rate of gain, economy of gain and type. It will be noticed that both the poorest and the best litter in these respects were from the same boar with the cross bred litter taking second place. The dam of litter No. 3 was a particularly fine yearling sow. Litter No. 2 was farrowed by a good quality yearling sow, and litter No. 1 by a two-year-old sow which was rather rough with a tendency to be coarse.

SUMMER FEEDING TRIALS JULY 8 TO DECEMBER 20

The pigs on this experiment were all farrowed in April, 1926. They were weaned at eight weeks, and allowed to run on alfalfa pasture with a grain ration, until July 8, when, after three daily weights were taken, they were divided into the groups as shown in the table.

The pigs were all from pure-bred Yorkshire sows and with the exception of seven Tamworth-Yorkshire crosses, were all sired by a pure-bred Yorkshire boar.

The pigs were fed twice daily throughout the trial, and watered liberally. All groups had access to a mineral mixture consisting of slacked coal 130 pounds, ground bone 40 pounds, lime 8 pounds, salt 20 pounds, and sulphur 2 pounds.

PERIOD 1.—JULY 8 TO SEPTEMBER 16

—	Lot No.		
	1	2	3
Number of days in period	71	71	71
Number of hogs in experiment	10	10	10
Average initial weight lb.	39·0	38·4	37·6
Average final weight lb.	106·7	94·5	86·3
Average gain for period lb.	67·7	56·1	48·7
Average gain per head per day lb.	0·95	0·79	0·69
Pounds grain to produce one pound gain lb.	3·5	4·3	5·1

Examination of the foregoing table reveals that grain, pasture and skim-milk produce gains in young pigs more economically than grain pasture and tankage, and much more economically than in group 3, where only grain and pasture were fed.

PERIOD 2.—SEPTEMBER 16 TO NOVEMBER 5

—	Lot No.		
	1	2	3
Number of days in period	49	49	49
Number of hogs in experiment	10	10	10
Average initial weight lb.	106·7	94·3	86·3
Average final weight lb.	174·8	162·9	146·3
Average gain per period lb.	68·1	68·6	60·0
Average daily gain lb.	1·43	1·44	1·22
Pounds grain to produce one pound gain lb.	4·84	4·96	5·66

Examination of the table for period 2 will indicate that skim-milk has not the same advantage over tankage, with pigs fairly well advanced, as is the case with younger pigs.

Owing to period 3 being of short duration, the results will not be tabulated. It should be stated though, that in this period the hogs in lot 1 with skim-milk, made the most rapid gains, with practically a two hundred pound lower grain requirement per 100 pounds gain than was the case in lot 3, tankage having again to take the second place.

Following is a summary of the entire feeding trial:—

SUMMARY OF HOG FEEDING EXPERIMENT—ENTIRE TRIAL, JULY 6 TO DECEMBER 20

—		Group 1	Group 2	Group 3
Number of days in experiment		165	165	165
Number of hogs on experiment		10	10	10
Total initial weight	lb.	390	384	376
Average initial weight	"	39·0	38·4	37·6
Total final weight	"	2,121	1,919	1,825
Average final weight	"	212·1	191·9	182·5
Total gain per period	"	1,731	1,535	1,449
Average gain per head	"	173·1	153·5	144·9
Average daily gain per head	"	1·05	0·93	0·86
Feed consumed per head:—				
Oat chop	"	282·3	297·6	314·0
Shorts	"	254·1	254·1	244·1
Barley	"	238·8	251·1	293·9
Skim milk	"	940·2	.....	.....
Tankage	"	.....	47·8	.....
Number of pounds of meal to produce 1 pound of gain	"	4·47	5·23	5·88
Number of pounds of supplement to produce 1 pound of gain	"	5·43	0·31	.....

GRADING AND DRESSING REPORT

The hogs were graded by Mr. Shaw, Manager of P. Burns and Company, Lethbridge, and dressing percentages were obtained as well as length of side. In measuring the length of side, it was taken from the first rib to the hip joint. In comparing dressing percentages reported in summer and winter feeding trials, it is well to remember that the hogs in the winter trials were dressed with heads off, and in summer trials the head was left on.

GRADING AND DRESSING REPORT

—		Group No. 1	Group No. 2	Group No. 3
Number of hogs		10	10	10
Average live weight when marketed	lb.	212·1	193·1	189·8
Average dressed weight	"	157·8	145·2	136·2
Average dressing percentage		74·4	75·2	71·7
Percentage graded as shop hogs		0	10	20
Percentage graded as thick smooth		60	30	50
Percentage graded as selects		40	60	30
Average length of side		30·8	30·2	30·1

MARKETING REPORT

—		Group 1	Group 2	Group 3
Number of hogs		10	10	10
Average initial value of hogs at 15c	$	5·85	5·76	5·64
Cost of grain per hog at $1.23	$	9·53	9·87	10·48
Cost of skim-milk at 25c. per cwt	$	2·35	.....	.....
Cost of tankage at $50 per ton	$	.....	1·19	.....
Average cost of feed and pig	$	17·73	16·82	16·11
Market weights of thick smooth	lb.	1,267	575	978
Market weights of selects	"	854	1,209	600
Market weights of shops	"	.....	155	320
Value of shops and thick smooths at $9.75	$	123·53	71·17	126·55
Value of selects at $10.72	$	91·54	129·60	64·32
Average value per hog	$	21·51	20·07	19·09
Profit over feed	$	3·77	3·25	2·97

FIELD HUSBANDRY

TWO FARMS

Two distinct types of farming are carried on in southern Alberta, irrigation farming and dry farming (farming without irrigation). These two types have distinct problems, often as different as those found in widely separated parts of the country. To meet this condition the Experimental Station at Lethbridge was located where one-half of the farm could be irrigated and the other half operated as a dry farm. This arrangement really makes two farms operated under one management, so in reporting the field investigations the dry land and irrigated land are reported separately.

CROP ROTATIONS

Seven rotations are established on the non-irrigated and two on the irrigated part of the Station. These have been under way for from three to fifteen years and careful cost and return data have been kept each year. In addition to the rotations, one dry-land field has been planted to wheat every year since 1911, and an irrigated field was planted to alfalfa in 1909 and was not broken till 1926.

COST VALUES FOR THE SEASON OF 1925

Rent and taxes dry land	per acre	$ 2 50
Rent and taxes irrigated land	"	8 00
Manure	per ton	1 00
Seed wheat	per bush.	1 50
Seed oats	"	0 85
Seed barley	"	0 96
Seed peas	"	3 00
Seed rye	"	1 12
Seed corn	per lb.	0 08
Alfalfa seed	"	0 30
Rye grass seed	"	0 10
Sweet clover seed	"	0 10
Brome grass seed	"	0 10
Sugar beet seed	"	0 15
Twine	"	0 14
Machinery	per acre	1 00
Manual labour	per hour	0 30
Horse labour, per horse	"	0 10
Threshing wheat and peas	per bush.	0 14
Threshing barley	"	0 12
Threshing oats	"	0 10
Ensiling	per ton	1 30

RETURN VALUES FOR THE SEASON 1926

Wheat	per bush.	$ 1 15
Oats	"	0 45
Barley	"	0 55
Rye	"	0 75
Peas	"	2 50
Alfalfa hay and pea and oat hay	per ton	10 00
Alfalfa seed	per lb.	0 25
Corn ensilage	per ton	3 50
Wheat or pea straw		Nil
Oat or barley straw	"	2 00
Sugar beets	"	7 50

DRY-LAND ROTATIONS

Five rotations were started on the dry land in 1911 and two more in 1921. In addition to the seven rotations a check field has been planted to wheat each year since 1911. The cultural methods employed are similar on each rotation and are the methods that the results of our cultural experiments have shown to be most satisfactory under local conditions.

Wheat is the principal cash crop used in the rotations, but in one, alfalfa in rows for seed has been included to furnish a cash crop as well as to replenish soil fertility. The returns from the alfalfa seed, however, have been disappointing. Wheat so far stands as the premier cash crop on the dry farm. Corn either for silage or for "hogging off" is most promising as a hoed crop, and is gaining in favour among the wheat farmers. This crop has also some possibilities as a cash crop where early varieties are grown for seed. In sections infested with Russian thistle the cost of keeping the crop clean is a serious handicap to corn growing.

The most difficult problem in working out satisfactory rotations in the drier sections is the growing of a grass or legume hay or pasture crop to replenish the fibre of the soil. Sweet clover would so far appear to be the most promising legume, and brome and western rye the most promising perennial grasses, but the difficulty of getting these crops established in dry years has made their growth hazardous. The place that these crops can take is still a matter for experimentation, more perhaps to determine the most successful way to obtain a stand than their place in the cropping system.

All of the dry-land rotations are on land similar both as to soil and topography so the following data on the various rotations are comparable.

SUMMARY OF YIELDS AND PROFITS PER ACRE DRY-LAND ROTATIONS

ROTATION "J"—SIX YEARS' DURATION

Rotation year	Crop	Yields		Profit or loss (−)	
		1926	Average for 5 years	1926	Average for 5 years
				$ cts.	$ cts.
1	Summer-fallow				
2	Wheat	38·33 bush.	27·27 bush.	11 97	4 00
3	Wheat	29·17 bush.	18·17 bush.	18 25	3 79
4	Oats, seeded western rye 10 lb., alfalfa 10 lb.*	2·52 ton	17·39 bush.	7 95	−0 84
5	Hay	1·45 ton	1·10 ton	−1 99	−3 37
6	Hay or pasture	1·22 ton	0·83 ton	2 14	−2 14
	Field average			6 39	0 24

*Cut for hay in 1926.

ROTATION "Z"—FIVE YEARS' DURATION

1	Summer-fallow				
2	Wheat	25·00 bush.	23·94 bush.	−0 56	0 71
3	Wheat	19·00 bush.	21·21 bush.	5 90	−1 36
4	Sweet clover seeded			−10 66	−7 10
5	Hay or pasture	1·80 ton	1·57 ton	7 23	−0 98
	Field average			0 38	−1 75

ROTATION "A"—WHEAT CONTINUOUSLY

1	Wheat	13·65 bush.	Average for 15 years 13·06 bush.	3 85	Average for 15 years 3 99
	Field average			3 85	3 99

ROTATION "B"—TWO YEARS' DURATION

			Average for 15 years		Average for 15 years
1	Summer-fallow				
2	Wheat	29·17 bush.	25·90 bush.	$ 12 81	$ 9 48
	Field average			$ 6 40	$ 4 74

ROTATION "C"—THREE YEARS' DURATION

			Average for 15 years		Average for 15 years
1	Summer-fallow				
2	Wheat	28·22 bush.	24·48 bush.	$ 12 18	$ 8 91
3	*Wheat	29·69 bush.		19 66	6 76
	Field average			$ 10 61	$ 5 22

*Oats for 12 years, Wheat for 3 years.

ROTATION "M"—SIX YEARS' DURATION

			Average for 15 years		Average for 15 years
1	Summer-fallow				
2	Winter wheat	24·53 bush.	24·22 bush.	$ 1 17	$ 3 77
3	Oats	71·06 bush.	39·49 bush.	17 44	4 46
4	Summer-fallow				
5	Peas and oats	3·04 ton	2·11 ton	−3 75	0 01
6	Oats	71·06 bush.	45·74 bush.	17 79	5 81
	Field average			$ 5 44	$ 2 34

ROTATION "S"—NINE YEARS' DURATION

Rotation year	Crop	Yields		Profit or loss (−)	
		1926	Average for 15 years	1926	Average for 15 years
				$ cts.	$ cts.
1	Summer-fallow				
2	Corn	7·41 tons	7·56 ton	−18 43	−3 88
3	*Winter rye	2·29 bush.		6 08	13 03
4	Summer-fallow				
5	Wheat	38·13 bush.	25·42 bush.	16 03	5 00
6	Oats	78·82 bush.	38·13 bush.	17 73	3 96
7	Summer-fallow				
8	Peas and oats	2·87 ton	2·01 ton	−2 97	−2 25
9	*Wheat	28·13 bush.		16 33	−2 72
	Field average			3 86	1 46

*Changed places 1925.

ROTATION "T"—TEN YEARS' DURATION

1	Summer-fallow				
2	Winter wheat	35·11 bush.	26·18 bush.	14·38	5 48
3	Oats	72·10 bush.	42·54 bush.	15 89	5 89
4	Alfalfa seeding			−32 58	−15 99
5	Alfalfa seed	17 lb.	0·56 lb.	−4 95	6 00
6	Alfalfa seed	10 lb.	0·56 lb.	−6 66	8 25
7	Alfalfa seed	6 lb.	0·46 lb.	−8 15	4 66
8	Summer-fallow				
9	Corn	0·90 ton	7·79 ton	−9 86	−3 24
10	Spring wheat	33·66 bush.	21·82 bush.	24 47	11 35
	Field average			−0 75	2 24

CROP ROTATIONS ON IRRIGATED LAND

The maintaining of soil fertility on irrigated lands in Alberta, if the possible alkali and seepage difficulties are disregarded, appears as yet to be principally a matter of supplying organic matter and nitrogen. The growing of a leguminous hay or pasture crop and the returning to the soil of the manure derived from feeding the hay meets this need fully and as alfalfa is without a peer as a legume hay it is included in most rotations.

That alfalfa will keep up the productive power of the soil is shown quite clearly by fifteen years' results obtained from rotation "U", a rotation of alfalfa, grain and hoed crop. There are ten fields in the rotation, six of these are in alfalfa, one in hoed crop, one in wheat, one in oats, and one in barley seeded as a nurse crop with alfalfa.

In the early years of the rotation alfalfa was seeded without a nurse crop but later it was planted with the barley and the following spring an additional five pounds of alfalfa seed were drilled in the stubble to thicken up any thin spots that may have occurred. This method has given a good stand of alfalfa in every case. One field that has been in alfalfa for six years is broken each year for cultivated crop and, as stated, one is seeded to alfalfa each year with barley. The rotation then is six years alfalfa and one year each of a cultivated crop such as potatoes or sugar beets, wheat, oats, barley and alfalfa, making a ten years rotation. Twelve tons of manure per acre are applied to the alfalfa field that is to be broken the following year. The average yearly yields of crops on the rotation for fifteen years are: wheat, 47.33 bushels; oats, 91.13 bushels; barley, 51.39 bushels; potatoes, 14.9 tons (11 years' average); and alfalfa, 3.68 tons. That the production of grains has been maintained is shown by the yields in 1926, the fifteenth year of the rotation, which were: wheat, 55.0 bushels; oats, 108.53 bushels; and barley, 54.80 bushels.

For the last four years sugar beets have been used as the cultivated crop in this rotation. Some difficulty has been experienced in finding a suitable place in the cropping sequence for this crop but it would appear that the best place is immediately following the alfalfa if satisfactory methods can be found for the handling of the breaking that will insure the alfalfa being practically all killed. A practice that has given good results for the last two years is to cut the first and second crops of alfalfa early when the plants start to bloom, then let a third crop start, irrigate, plough about eight inches deep and harrow down immediately. If most of the alfalfa appears to be killed, it is not advisable to replough the following spring as a better stand of beets may be obtained on fall ploughed land if the spring is dry.

If the alfalfa is not effectively killed by the fall ploughing it may be advisable to replough in the spring the same depth as the land was ploughed the previous fall. The spring ploughed land should be worked down immediately to conserve the surface moisture and planted as soon as possible.

Rotation "X" is also a rotation of alfalfa grain and cultivated crops with an additional legume, peas included. Two-thirds of the area of this rotation are in alfalfa and one-third in equal sized fields of wheat, oats, barley, corn and peas. Unlike the usual alfalfa rotation, a field of alfalfa is not broken each year but one-half of the alfalfa area is broken every five years and the same year all the fields used for annual crops are seeded to alfalfa. The annual crops are rotated among themselves in the order shown in the summary table.

This rotation has been established for thirteen years and the crop returns this year, as shown in the table, indicate that the same high state of fertility has been maintained as on rotation "U".

The system of cropping used in these rotations has not only kept up yields to a high level but the alfalfa and cultivated crops have made it possible to

combat weeds successfully; in fact alfalfa has proved to be one of the best exterminators known for such a persistent weed as Canada thistle. The one objection raised to alfalfa as a rotation crop is that it does not fit in well in a short rotation as it takes two years after the seeding year to get the crop well established when a nurse crop is used and as the seed is expensive, the the farmer does not like to break up the alfalfa field until it has been down for a number of years. If the alfalfa is left for six to eight years a large part of the farm must be in alfalfa or the rotation will be too long to be effective in weed control or the proper maintaining of soil fertility.

Judging from results we have had in the growing of sweet clover it would appear that a modification of rotation "U" might be made that would be quite satisfactory and might prove useful in some cases. It would be to sow sweet clover with the barley every other year instead of alfalfa and use it the following year for pasture when it would kill out, being a biennial, and could be followed by other crops as with the alfalfa. This would make a sixteen years rotation as follows: alfalfa, six years; hoed crop, wheat, oats, barley with sweet clover; sweet clover for pasture, seed or hay, wheat, hoed crop, oats, barley with alfalfa. While this rotation appears to be a long one, it will be seen that none of the land would be in grain or cultivated crops more than four years before it would be seeded back to alfalfa or clover. If the farm were so arranged as to make it convenient to fence the clover with a temporary fence each year, this crop could be used as summer pasture. The year or two years following the sweet clover would also make an excellent place in the rotation for sugar beets.

Many other rotations may easily be worked out with alfalfa and sweet clover as a base to fit almost any kind of farming. The important thing is for the irrigation farmer to use these crops in rotation with his other crops so that maximum yields may be obtained every year and his trouble with weeds reduced to a minimum.

SUMMARY OF YIELDS AND PROFITS PER ACRE ON IRRIGATED ROTATIONS

ROTATION "U"—TEN YEARS' DURATION

Rotation year	Crop	Yields		Profit or loss (−)	
		1926	Average for 10 years	1926	Average for 10 years
				$ cts.	$ cts.
1	Alfalfa	3·13 ton	1·86 ton	11 92	7 09
2	Alfalfa	3·04 ton	3·58 ton	10 84	25 06
3	Alfalfa	1·57 ton	3·77 ton	−1 64	28 63
4	Alfalfa	3·42 ton	4·14 ton	14 25	31 70
5	Alfalfa	2·51 ton	4·32 ton	6 43	33 36
6	Alfalfa	3·32 ton	4·49 ton	4 20	34 56
7	*Sugar beets	11·70 ton	10·93 ton	36 01	130 38
8	Wheat	55·00 bush.	47·33 bush.	34 46	28 23
9	Oats	108·53 bush.	91·14 bush.	23 41	17 38
10	Barley	54·80 bush.	52·18 bush.	10 21	11 07
	Field average			15 21	34 75

*Potatoes 11 years, Beets 4 years.

ROTATION "X"—FIFTEEN YEARS' DURATION

			Average for 12 years		
1 to 5	Alfalfa	4·12 ton	2·61 ton	21 53	12 75
6 to 10	Alfalfa	3·72 ton	3·29 ton	17 80	22 64
11	Barley	54·80 bush.	41·70 bush.	5 54	4 40
12	Corn	14·46 ton	7·45 ton	3 98	0 07
13	Wheat	55·33 bush.	35·23 bush.	39 90	17 18
14	Oats	102·06 bush.	62·29 bush.	17 56	5 42
15	Peas	22·67 bush.	19·42 bush.	26 89	13 65
	Field average			19 37	14 51

IRRIGATION EXPERIMENTS*

Special experiments for the purpose of studying the effect of applying water at different stages of plant growth and at varying frequencies have been under way at the Station for from two to five years. Spring wheat, alfalfa, mixed pasture grasses, brome, sunflowers, potatoes, and sugar beets have been used in the tests. (For a description of the plan of the experiment see the Report of this Station for the year 1925.)

WHEAT

Spring wheat of the Marquis variety was irrigated at one or more of the following stages of growth: (1) previous fall, (2) two to three leaves showing, (3) five leaves showing, (4) shot blade, (5) flowering, (6) soft dough, (7) when the crop appeared to need water. Two series of wheat plots have been used, one of these has been seeded on land that had been in wheat the previous year, and the other in a cultivated crop. The first year of the experiment sunflowers was the cultivated crop preceding the wheat, and since that time potatoes have been used.

Fall Irrigation.—Four years' results are available for comparisons of fall irrigation versus irrigating the growing grain crop. In the first three out of the four years plots receiving a fall irrigation gave a yield of from 2.3 bushels to 8.6 bushels per acre more than any plots irrigated but once when the crop was growing, whether this irrigation was applied in the two leaf, five leaf, or shot blade stage. In 1926 the yields were slightly lower on the fall irrigated plots than on comparative plots not irrigated in the fall. It was expected that no benefit would be obtained from irrigating in the fall of 1925 as the precipitation in September and October of that year amounted to 5.94 inches, which is the equivalent of a good irrigation, and wet the soil on these plots to a full six feet or more, as shown by soil moisture samples secured. Just why there should have been a uniformly lower yield on the fall irrigated plots is not apparent, as a heavy application of water for one year only has shown no harmful effects on various other tests unless a water table near the surface was established, a condition that did not prevail in these plots.

Optimum Time for the First Spring Irrigation

The first irrigation of the season applied to the growing wheat crop has been made when the plants were in the two to three leaf, five leaf, shot blade or flowering stages. There was little difference in the yields of the wheat on land that raised a crop of irrigation potatoes the preceding year where the first irrigation was applied in the two leaf, five leaf, or shot blade stages, as the moisture carried over from the preceding year, together with the precipitation, was sufficient to keep the crop on potato ground from suffering for moisture until the plants were in the shot blade. In three years out of the five that this test has been conducted the crop suffered to some extent when the first irrigation was postponed until the plants were flowering, and the five years average production from this treatment was 4.2 bushels per acre less than was obtained when the first irrigation was applied in the shot blade stage.

Where wheat was grown on land that was in wheat the preceding year there was a small increase in yields shown in favour of the early irrigation in the averages of the four years that wheat after wheat has been under test. The four years average yields in bushels per acre for each set of plots receiving one

* Experimental work with irrigation and also with poultry and bees is under the supervision of A. E. Palmer, B.Sc. He has assisted materially in the preparation of the report under these headings.

irrigation at the stage of growth named were: two to three leaves 36.05, five leaves 35.28, shot blade 33.25, flowering 29.39. In two out of four years wheat irrigated in the two leaf stage, which was the earliest irrigation given, yielded more than any other plots receiving only one irrigation. Irrigating in the five leaf stage gave an average of 2.03 bushels more than was received when the first water was applied when the plants were in the shot blade, and a postponement of irrigation until the flowering stage decreased the yields by another 3.89 bushels.

Number of Irrigations Required for Wheat.—Where the land was irrigated the preceding fall before the wheat was planted another irrigation to the growing crop at the flowering stage increased the yields in two years out of four on both the wheat following wheat and wheat following potatoes. In the other two years the additional irrigation was of no benefit, while the average yield for the four years was between one and two bushels more where the summer irrigation was given in addition to the one applied in the fall. A slightly less increase was obtained by giving a second irrigation to the crops irrigated in the spring than was obtained by the additional irrigation to the fall irrigated plots. More than two irrigations gave no uniform increase in yields. Summary:—Possibly the most important deduction that may be drawn from these experiments is that on medium sandy clay loam soil it is entirely safe to start irrigating wheat as soon as the water is available in the canals. The opinion held by many that wheat should not be irrigated until it shades the ground does not appear to be supported by facts. It was noticed in almost every case that where the crops were irrigated in the two leaf stage the plants turned slightly yellow and remained so for a few days, but the crops soon regained a healthy appearance and were equal to the other crops throughout the balance of the year. It is undoubtedly this temporary yellowing of the plants that has caused farmers to think that early irrigation was injurious.

The usually accepted opinion of the value of fall irrigation has been substantiated by these experiments. From present knowledge the proper irrigation practice for wheat would appear to be to irrigate as much of the wheat land as possible the previous fall, and then, as soon as spring planting is finished, make the ditches on the land not fall irrigated, and start to irrigate as early as the water is available. This would insure getting all the crop irrigated before any started to burn, and thus make for a better crop. This practice would make possible the irrigating of a larger acreage with the same water supply than would be possible if irrigation was postponed until the grain was high enough to shade the ground.

IRRIGATION TEST WITH ALFALFA

Four years' data are now available from forty-two plots of alfalfa irrigated at one or more of the following stages of growth: previous fall, first crop four inches and twelve inches high, just before and just after cutting the first crop, second crop twelve to sixteen inches high, and where three crops were cut an irrigation was given just after cutting the second crop.

Fall vs. Spring Irrigation.—Fall irrigation has given about the same results as an irrigation early in May. Where the water was not applied in the spring until the crop was twelve inches high the average yield of hay was decreased one ton per acre as compared to a fall or early spring irrigation.

Number of Irrigations Required.—A fall or early May irrigation gave a good first crop every year, but in three years out of the four there was an increase in yield when another application of water was made after the crop was about twelve inches high. For the second crop, an irrigation applied a

few days before or immediately after the first crop was harvested gave a satisfactory return. Another irrigation when the plants were twelve to sixteen inches high gave a slight increase in yield, and was especially needed in the drier years. Where five irrigations were given the crops showed an evidence of injury from too much water in the fourth year, and the soil and sub-soil in these plots were losing their tilth and becoming refractory.

Speaking broadly it may be stated that, except in special cases such as unusually dry seasons or on certain soils, one good irrigation for each cutting can be depended upon to give satisfactory yields of alfalfa hay.

IRRIGATION TEST WITH POTATOES

The first irrigation of the season for potatoes was applied at one of the following stages of growth, half grown, starting to bloom, in full bloom or ten days after reaching full bloom. Some plots were irrigated the previous fall. Subsequent applications were made at intervals of ten to twenty days. Four acre inches of water per acre were applied where only one irrigation was given, and three inches were applied at each application if the plots were irrigated more than once.

Time of Irrigation.—A fall irrigation gave one-third ton per acre greater average yield for four years than was obtained from a single application made the following summer. An irrigation when the plots were starting to bloom gave the best returns of any single application to the growing crop. Fall irrigated plots given another application of water when the plants were starting to bloom yielded one-half ton more than was received from any two irrigations applied during the growing season.

The crop suffered for water in two of the four years when the first irrigation was postponed until the plants were in full bloom, resulting in yields being reduced 1.64 tons and 1.83 tons per acre respectively as compared with plots irrigated when the plants were starting to bloom.

The most outstanding effect noted of applying the first irrigation at different times was that every year plots irrigated when the plants were but half grown gave a lower yield than was obtained when the first irrigation was postponed until blooming had commenced. This was true of plots receiving both one and two irrigations, the average being 1.20 tons and 1.57 tons per acre less respectively for the early irrigation.

Number of Irrigations Required.—From one to six irrigations were applied to potatoes. Two irrigations gave an average yield of 0.8 tons per acre more than was obtained from one irrigation, while three irrigations gave an average yield of 0.6 tons more than was received from two. There was practically no difference in yields obtained from three, four, five, or six irrigations.

Effect of Irrigation Practice on Quality of Potatoes.—Each year careful observations have been made as to the quality of potatoes receiving the various irrigation treatments, and samples have been submitted to the Department of Household Economics of the University of Alberta and the Central Experimental Farm, Ottawa, for laboratory tests. No correlation whatever could be observed between the quality of the potatoes and the number of irrigations received where four irrigations or less were applied. The potatoes receiving five or six irrigations showed a decided tendency to sogginess and were often mis-shapen and the lenticels were enlarged. It appears that a reasonable application of water does not injure the quality of the potatoes, but an excess of water does.

IRRIGATION TESTS WITH SUGAR BEETS

Sugar beets have been included in the irrigation tests for two years. These plots received their first irrigation at one of the following stages: (1) the preceding fall, (2) before the plants were up in the spring, (3) immediately after thinning, (4) five weeks after thinning, (5) eight weeks after thinning. Subsequent irrigations have been made at varying intervals of two to six weeks. The number of irrigations that plots have received varied from one to five applications in the season.

The results so far obtained indicate that fall irrigation is good practice for sugar beets. As to the best time to apply the first irrigation to the growing crop, it appears that the only precaution necessary is to apply the water before the plants show definite signs of being dry. Two irrigations have given maximum yields both years.

The Canadian Sugar Factories Limited, have co-operated in making sugar tests of beets from the various plots. Two interesting features have been noted so far regarding the effect of irrigation on the sugar content of the beets: (1) that all beets that were allowed to suffer seriously for water and were then irrigated, and (2) all beets that were irrigated heavily (four or more irrigations) were lower in sugar than beets not permitted to suffer for water nor over irrigated.

The irrigation experiments with beets are being continued, and more detailed reports will be made as additional data are accumulated.

SEASONAL USE OF WATER ON THE STATION FARM

The table immediately following gives the number of acre-feet of water used on the Station Farm, in the periods of ten days, for the crop seasons of 1922, 1923, 1924, 1925 and 1926. The chart accompanying the table presents these data in graphic form and shows the seasonal fluctuations in the water requirements of a diversified farm. Each line on the chart represents the water used in one year.

It will be noted that irrigation commenced between the first and fifteenth of May each year but one. In 1922 the water was not used until June 6th, as all of the alfalfa and pasture on the farm were irrigated the previous fall, and, therefore, did not require water until the first crop was well advanced. In three of the five years but little water was used until the first week in June, and the heaviest demand began in the latter part of June or the early part of July. The only season when the maximum amount of water was used in May and early June was in 1926. This year it was decided to irrigate as much of the farm as possible early in the season before the farmers of the district commenced to use much of the water from the canals. This proved very satisfactory as it was possible to secure all the water desired so that large heads were used which facilitated the spreading of the water and made it possible to cover a large acreage in a short time. The chief advantage from the early irrigation, however, was that all crops were irrigated before any suffered at all from drought with the result that yields were uniformly good. *Each year's irrigation results at the Station demonstrate more clearly the advisability of irrigating early, both from the standpoint of improving crop yields and of decreasing the heavy demand for water usually made in July and August.*

An interesting feature shown by the chart is that almost no water was used from the first of August to the first of October. By careful planning of the farm operations, such as stacking early cut grain, it would be possible to start fall irrigation earlier, and thus lengthen out the fall irrigating season. There appears to be a period, however, of about a month, from August 20 to Septem-

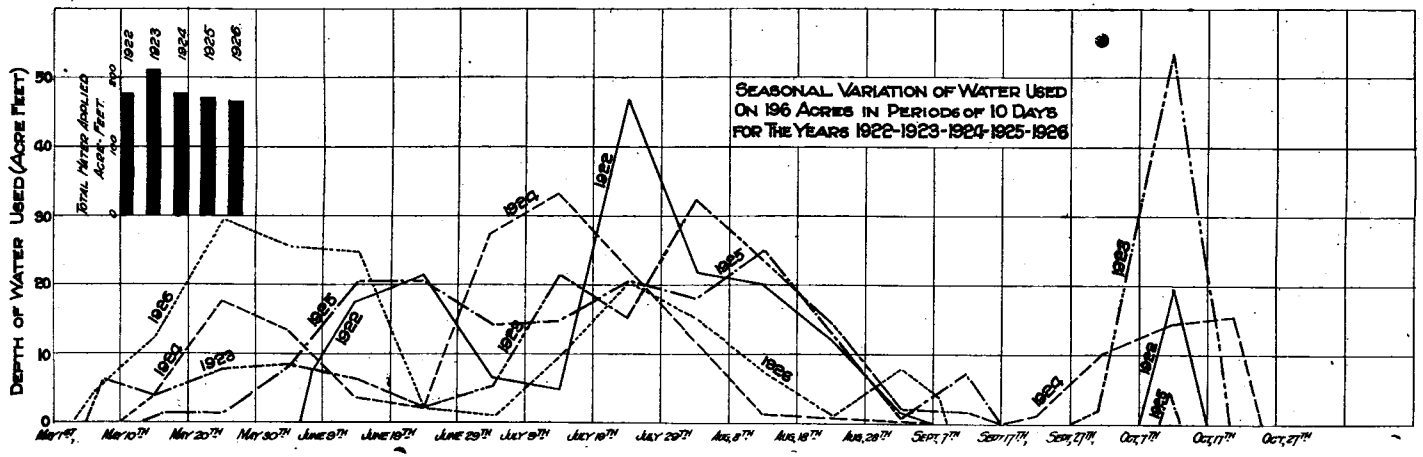
ber 20, not only at the Station, but on all farms in the irrigated area of Alberta, when little use can be made of the water. If it were possible for the project operators to turn the water out of the canals at this time, use the month for repairing the system, and then turn the water in again about September 20 and leave it until early November for fall irrigation, much better use would be made of the water. Experiments conducted at the Station, and the experience of farmers, have proved beyond question the merits of fall irrigation, so that anything that can be done to lengthen out the time that water can be used in the fall will greatly increase the crop producing power of the irrigation system.

Unless there are serious difficulties that may arise from the possible freezing of water in the canals, when they are operated very late in the fall, it would seem that the month from August 20 to September 20 should be used by canal operators for repair work instead of the more valuable time for irrigation after September 28.

FIVE YEARS' USE OF WATER ON 196 ACRES IN PERIODS OF TEN DAYS—LETHBRIDGE STATION

(In Acre-feet)

Period	May 1 to May 9	May 10 to May 19	May 20 to May 29	May 30 to June 8	June 9 to June 18	June 19 to June 28	June 29 to July 8	July 9 to July 18	July 19 to July 28	July 29 to Aug. 7	Aug. 8 to Aug. 17	Aug. 18 to Aug. 27	Aug. 28 to Sept. 6	Sept. 7 to Sept.16	Sept.17 to Sept.26	Sept.27 to Oct. 6	Oct. 7 to Oct. 16	Oct. 17 to Oct. 27	Total
1922	.....	.....	.....	7·28	17·68	21·41	6·91	4·99	46·81	21·94	19·99	11·96	1·30	.....	.....	.....	19·25	.....	179·52
1923	6·02	3·97	7·82	8·58	6·29	2·08	5·21	21·52	15·08	30·23	23·46	14·40	1·91	1·81	.....	2·0	50·34	13·03	213·75
1924	.....	3·64	17·50	13·54	3·72	2·60	27·41	33·04	22·41	11·65	1·36	0·39	0·26	.....	1·22	10·40	14·07	15·36	178·57
1925	.....	1·60	1·50	8·03	20·51	20·64	14·81	15·10	20·85	18·32	25·29	13·10	0·52	7·28	.....	.....	4·68	.....	172·53
1926	4·53	12·04	29·54	25·66	24·93	2·30	1·15	9·89	20·41	15·42	7·81	0·92	8·05	4·10	.....	.....	.....	.....	166·75



HORTICULTURE

It is with genuine regret that the announcement of the resignation of the head gardener, Mr. R. J. C. Paris, is made. He had been a member of the Station staff since 1912 and during that time had made many friends among farmers and townspeople by the advice and counsel he had been able to give them in their garden problems. It is a pleasure to acknowledge his assistance in preparing the report on the horticultural work for the past season.

On the whole the season of 1926 was favourable for garden crops. The "warm season" vegetables, however, suffered owing to cool weather prevailing during the latter part of August and September. Only fair stands were obtained from some of the vegetable seed sown in the spring owing to a week of very windy weather immediately after seeding. Some of the seed germinated and dried out, while the remaining seed could not germinate owing to the surface soil being dried out to too great a depth. Fruit trees and bushes wintered well and, with the exception of plums, were well laden with fruit. The flowering shrubs as well as the perennials and annuals bloomed freely. The last frost in the spring occurred on May 8, when a temperature of thirty degrees was recorded. Although on May 27, and also June 9, a temperature of thirty-two degrees was recorded there was no damage to vegetation observable. First frost in the fall was on September 11, and the first killing frost on September 20, followed on the 23rd by the very low temperature of nine degrees.

In addition to the irrigated garden there is a dry land garden for the purpose of demonstrating the possibilities of gardening for the dry land farmer. It consists of a vegetable garden, small fruits plantation, and an apple orchard.

DRY LAND

VEGETABLE GARDEN

The dry land garden did exceptionally well this year. The vegetable seed was sown on April 15, and it germinated readily and made good growth. The reason for this quick germination as compared to quite different results in the irrigated garden was the excellent tilth of the soil.

As has been mentioned in previous reports it is our practice to put the dry land garden in on summer fallowed land. By this method it is always possible to have the soil in ideal condition to receive the small seeds, as it has moisture close to the surface, is reasonably firm but is still mellow on top. It is next to impossible to have land that is spring or even fall ploughed in an equally good condition. The desirability of having summerfallow on which to plant a dry-land garden cannot be stressed too greatly. To get the best results and particularly to avoid soil drifting, the garden should of course be provided with a windbreak.

One hundred feet of each kind of vegetable was sown. The rows were put three feet apart to allow not only ample room for horse cultivation but to allow the roots of even the smaller growing sorts plenty of room in which to forage for moisture. The garden is protected from the west wind by cottonwood windbreaks, the trees being planted four feet apart in the row. It has been found that these trees now rob the soil of moisture for such a considerable distance out that it is not desirable to plant vegetables closer than thirty to forty feet of them. Other kinds of trees could be used but the native cottonwood seems to be particularly suited to the Lethbridge district. Caragana makes a good windbreak alone although it does not attain the height of the willow, Russian poplar or cottonwood and is slower growing. It is particularly adapted to dry land conditions and crops can be grown relatively close to the Caragana without any noticeable decrease in yield.

BEETS.—The variety sown was Early Wonder. They were of nice table size and good quality. The 100-foot row yielded 110 pounds.

BEANS.—Early White Kidney was the variety used. The beans were of fair size and were all picked green. The 100-foot row yielded 32 pounds.

CABBAGE.—The variety planted was Danish Ballhead which is a late variety. The heads formed were not very large but of splendid quality; 112 pounds were cut from the 100-foot row.

CARROTS.—Half Long Scarlet Nantes was the variety grown. The carrots were of medium size and splendid quality. The 100-foot row produced 78 pounds.

CUCUMBER.—Long Green was the variety grown. The vines made good growth producing an abundance of cucumbers; eight hills were planted and produced 108 cucumbers.

LETTUCE.—The variety grown was Big Boston. Owing to the warm dry weather which followed after the seed germinated the plants ran quickly to seed.

ONIONS FROM SEED.—Yellow Globe was the variety grown. The onions attained a good size and ripened nicely before frost. Sixty-seven pounds were harvested from the 100-foot row. These onions were grown from home grown seed.

PARSNIPS.—The variety grown was Hollow Crown. The parsnips did not grow very large but were of good quality. The 100-foot row produced 82 pounds.

PEAS.—Two kinds were used. Thomas Laxton was the early variety grown. The peas were of fair size and good quality. The weight of green peas from the 100-foot row was 30 pounds. The late variety grown was Stratagem. The peas were of good quality but did not fill evenly. From 100-foot row 21 pounds of green peas were pulled.

POTATOES.—Fourteen varieties were under test. Two rows each 100 feet long were planted of each. During the latter part of the summer a number of hills dug from the ends of each variety to obtain data regarding earliness. Before the potatoes were harvested in the fall the ends of the rows were trimmed evenly so that there was one-hundredth of an acre left of each variety from which to determine the yield. The potatoes were planted May 13, and dug September 30. The following table gives the yield per acre of marketable potatoes and the average yield per acre for the past four years of the ten varieties that have been tested for that length of time.

POTATOES (DRY LAND)

YIELD PER ACRE OF MARKETABLE POTATOES

Variety	1923	1924	1925	1926	Average yield for 4 years	Colour of skin	Earliness
	bush.	bush.	bush.	bush.	bush.		
Sutton Abundance	121	185	403	230	244·7	Creamy white	Late.
Wee Macgregor	176	191	380	223	242·5	Creamy white	Late.
Reeves Rose	146	255	291	220	228·0	Light rose	Late.
Gold Coin	176	140	358	236	227·5	Creamy white	Late.
Irish Cobbler (own seed)	136	170	420	138	216·0	Creamy white	Early.
Netted Gem	149	168	300	193	202·5	Russet brown	Late.
Gold Nugget	141	181	251	170	185·7	Creamy white	Early.
Eight Weeks	118	165	258	155	174·0	Rose	Early.
Early Ohio	89	191	253	135	167·0	Light pink	Early.
Royal Russet	126	116	228	95	141·2	Russet brown	Late.
Cambridge Russet	.....	.....	303	149	.....	Russet brown	Late.
*Netted Gem	.....	.....	200	190	.....	Russet brown	Late.
Rural Russet	.....	.....	241	77	.....	Russet brown	Late.
Great Scot	.....	.....	.....	223	.....	Yellowish	Late.

*Seed from Invermere.

To obtain potatoes for early use the practice of "sprouting" has been found eminently satisfactory. Three or four weeks before planting time seed potatoes of the size of large hens eggs to a small goose egg are selected and placed, with the seed end up, in shallow flats and exposed to light in some place where there is no danger of freezing. By planting time there will be strong green sprouts about a quarter of an inch long starting to form. Our practice is to plant these without cutting, placing them with the seed end up. Irish Cobbler was the variety used for this purpose. The potatoes were planted on the 15th of April and were ready for use on the 15th of June. Seven 100-foot rows were planted and yielded 640 pounds.

PUMPKIN.—The variety grown was Small Sugar. The growth was exceptionally good and produced a good crop of pumpkins. From the five hills 122 pounds were harvested, most of which were mature.

RADISH.—Early Scarlet Turnip was the variety grown but, as already explained with the lettuce, the dry weather which followed germination was the cause of the radishes being small and spongy.

SPINACH.—The variety grown was Victoria. The growth was good but the plants quickly ran to seed; nineteen pounds were cut from the 100-foot row.

SQUASH.—Green Hubbard was the variety grown and produced a good crop. The yield from five hills was 160 pounds.

TOMATO.—The variety grown was Burbank. The early frost was detrimental to the yield of ripe tomatoes as they were ripening nicely up to that time. Sixty-five pounds were pulled from the 100-foot row.

TURNIP.—Purple Top Milan was the variety grown. The turnips were pulled while young and were of splendid quality. Forty pounds were lifted from the 100-foot row.

VEGETABLE MARROW.—The variety grown was White Bush and produced a good crop of marrows. One hundred and ninety-one pounds were harvested from five hills.

SMALL FRUITS (DRY LAND)

The small fruits on the dry land are protected on the west by a caragana windbreak. The rows are eight feet apart, which allows for horse cultivation for a number of years after the bushes are set out. An occasional top dressing of manure is very beneficial in maintaining vigour. No weeds should be allowed to grow as they rob the soil of moisture.

The yields from the dry land small fruits were very good again this year although the fruit was only of medium size. The following are the yields from twelve bushes of each variety:—

BLACK CURRANTS.—Saunders, 37 pints; Merveille de la Gironde, 32 pints; Eagle, 28 pints.

RED CURRANTS.—Cumberland, 144 pints; Red Grape, 138 pints; New Red Dutch, 121 pints.

WHITE CURRANTS.—Large White, 87 pints; White Grape, 72 pints; White Pearl, 70 pints.

RASPBERRY.—Herbert, 210 pints from a 210-foot row.

GOOSEBERRY.—Houghton, 17 pints from 35 plants.

IRRIGATED LAND

VEGETABLES

The irrigated garden was ploughed in the fall as this permits of earlier seeding in the spring.

The vegetable seed was sown on April 16, but owing to the seven days following seeding being so windy, the soil dried out to a greater depth than the seed was sown. Some of the seed germinated and died, while the remainder of the seed was late in getting started. Potato beetles and aphids were worse in this district than ever before, making it necessary to spray quite often to keep them under control. The flea beetles were very much in evidence but were easily controlled by dusting with lime and Paris Green, using one pound of Paris Green to half a pail full of sifted slaked lime.

ASPARAGUS.—The yields from the plantation were quite heavy, the shoots being large and of good quality. An experiment is under way to determine the advantage of leaving half the plantation uncut for a season and cutting it the following season. In this way each half gets a year's rest without cutting.

BEANS.—Nineteen varieties were grown; most of the varieties did exceptionally well and produced a good crop of beans. The recommended varieties with yield of green beans from a 30-foot row are: Round Pod Kidney Wax, 23 pounds; Canadian Wonder, 32 pounds; Masterpiece, 37 pounds; Stringless Green Pod, 31 pounds; Hodson Long Pod, 38 pounds; and Improved Golden Wax, 35 pounds.

BEETS.—Sixteen varieties were grown; all varieties doing well. The recommended varieties with yield from a 30-foot row are: Detroit Dark Red, 146 pounds; Extra Early Egyptian, 129 pounds; New Early Wonder, 113 pounds; and Improved Dark Red, 86 pounds.

BORECOLE OR KALE.—Dobbie Selected Victoria was the variety grown and made splendid plants. The leaves make fine greens after being exposed to frost.

BRUSSELS SPROUTS—Three varieties were grown, but owing to persistent attacks of aphids growth of the sprouts were very slow and they were not quite filled out in the fall.

CABBAGE.—Six varieties were grown and all of them did well. The following yields were obtained from a double 30-foot row: Golden Acre, 180 pounds; Copenhagen Market, 235 pounds; Chester King, 220 pounds; Kildonan, 190 pounds; Extra Amager Danish Ballhead (O-8619), 199 pounds; Danish Ballhead (L-2466), 253 pounds.

CAULIFLOWER.—Two varieties were grown; both produced good solid heads. The yield obtained from two 30-foot rows was: Early Dwarf Erfurt, 126 pounds, and Early Snowball, 88½ pounds.

CARROTS.—Eight varieties were grown. All of the varieites made good growth. Some of them, however, grew too large for table use. The recommended varieties (with yield from a 30-foot row) are: Half Long Scarlet Nantes 58 pounds, Oxheart 45 pounds, Chantenay 59 pounds.

CELERY.—Seven varieties were grown. The plants made strong growth and the quality of the celery was excellent. The recommended varieties in order of earliness with the yield from a 15-foot row are: White Plume, 22 pounds; Paris Golden Yellow, 41 pounds; and Easy Blanching, 50 pounds. The last named variety is highly recommended for quality.

CORN.—Twelve sorts were grown. The recommended varieties in order of earliness with yield from twenty hills are: Pickaninny, 101 cobs; Banting, 79 cobs; Early White Cory, 153 cobs; Golden Bantam, 196 cobs; Sweet Squaw, 110 cobs; Early Malcolm, 136 cobs.

CUCUMBER.—Five varieties were grown and produced an abundance of cucumbers. The number of cucumbers obtained from three hills of each variety was: Early Green Cluster 124, Early Fortune 98, Davis Perfect 96, Improved Long Green 102, and Windermoor Wonder 75.

CITRON.—Three varieties were grown. The yields from three hills were: Red Seeded Preserving 115 pounds, Colorado Mammoth 73 pounds and Colorado Green 68 pounds.

EGG PLANT.—Three varieties were grown. Each variety produced some egg plants although there would have been many more had frost been delayed. The yields obtained from a 30-foot row were: Black Beauty 15 pounds, Early White Round 10 pounds, and New York Improved 8½ pounds.

KOHL RABI.—Two varieties were grown, both varieties grew well. The yields obtained from a 30-foot row were: Early Purple Vienna 47 pounds, Early White Vienna 54 pounds.

LETTUCE.—Eight varieties were grown consisting of Leaf, Head and Cos. The varieties recommended with yields from a 30-foot row are: Early Hanson (Head), 12 pounds; Toronto Gem (Head), 7 pounds; Grand Rapids (Leaf), 12 pounds; Trianon (Cos), 12 pounds.

LEEK.—One variety was grown, namely, Dobbie International Prize. This variety is a particularly good one being a vigorous grower and a good exhibition variety. The yield from a 30-foot row was 38 pounds.

MUSKMELON.—The following five varieties were grown: Improved Watters Solid Net Rocky Ford, Extra Early Grand Rapids, Delicious Gold Lined Rocky Ford, Lake Champlain and Eden Gem. Six hills of each variety were planted, three hills were from plants started under glass and three hills from seed sown in the open. Very few fully ripe muskmelons were obtained but in every case those started under glass came much nearer reaching maturity.

ONIONS.—Ten varieties were grown, all varieties ripened up well before late fall. They only attained medium size. The recommended varieties with yield from a 30-foot row are as follows: Yellow Globe Danvers, 22 pounds; Large Red Wethersfield, 26 pounds; Ailsa Craig, 26 pounds; Giant Rocca, 29 pounds; Espanola, 23 pounds.

ONIONS—IMPROVING STOCK BY SELECTION

Until 1919 difficulty was experienced in raising onions without a considerable proportion of thick necks, also in getting the onions ripened before frost. In the fall of that year onions were selected of Southport Yellow Globe, particular attention being paid to shape and earliness. These onions were carried over the winter in a cool dry place and planted the following spring. Care was taken during the summer to keep the seed stalks properly tied up to keep them from breaking down. In the latter part of August the plants were pulled and tied around a stake to thoroughly dry out. The seed was then closely watched for shelling and threshed out the first week in September. The seed was sown as early as possible the following spring. An improvement was noted in the crop, there being fewer thick necks and the onions ripened slightly earlier.

Since then selection has been carried on each year from the crop grown from our own seed resulting in elimination of thick necks, increased size, more uniformity in shape and, probably the most important of all, earlier ripening.

PARSLEY.—Two varieties were grown, namely, Champion Moss Curled and Fine Triple Curled. Both varieties made vigorous growth.

PEAS.—Fourteen varieties were grown in 30-foot rows. All the peas were picked green. The following are the yields from the recommended varieties: Little Marvel, 23 pounds; Thomas Laxton, 32 pounds; Homesteader, 25 pounds; Stratagem, 29 pounds; Prince Edward, 30 pounds.

POTATOES.—The same fourteen varieties that were under test in the dry land garden were planted in the irrigated garden. The planting was done on May 13 and they were dug September 30. They received two irrigations. For information regarding the irrigation of potatoes the reader is referred to the part of this report dealing with irrigation tests under the division of Field Husbandry.

The following table gives the yield per acre of marketable potatoes and also the average yield per acre for the past four years of the ten varieties that have been tested for that length of time. Since the establishmnt of the Station, many varieties of potatoes have been tested but those sorts that have proved inferior have been dropped from time to time.

POTATOES (IRRIGATED)

YIELD PER ACRE OF MARKETABLE POTATOES

Variety	1923	1924	1925	1926	Average yield for 4 years	Colour of skin	Earliness
	bush.	bush.	bush.	bush.	bush.		
Sutton Abundance	428	391	581	733	533·2	Creamy white	Late.
Irish Cobbler	319	346	650	606	480·2	Creamy white	Early.
Reeves Rose	289	388	560	530	441·7	Light rose	Late.
Royal Russet	270	423	578	451	430·5	Russet brown	Late.
Wee Macgregor	342	400	518	361	405·2	Creamy white	Late.
Eight Weeks	224	392	483	475	393·5	Rose	Early.
Gold Coin	326	405	366	423	380·0	Creamy white	Late.
Netted Gem	232	263	575	400	367·5	Russet brown	Late.
Gold Nugget	280	331	465	368	361·0	Creamy white	Early.
Early Ohio	175	328	461	455	354·7	Light pink	Early.
Cambridge Russet	.....	395	530	411	.....	Russet brown	Late.
*Netted Gem	.....	400	598	321	.....	Russet brown	Late.
Great Scot	.....	.....	426	475	.....	Yellowish	Late.
Rural Russet	.....	.....	580	231	.....	Russet brown	Late.

*Seed from Invermere.

PUMPKINS.—Five varieties were grown, three hills of each being planted. All made vigorous growth and produced a large crop of pumpkins. The following yields were obtained: Sugar Sweet Pie 192 pounds, Small Sugar 267 pounds, Genuine Mammoth 474 pounds. About a quarter to a third of the two first named varieties were mature but only about a tenth of the last named variety matured.

PARSNIP.—Four varieties were grown. The following yields were obtained from a 30-foot row of each variety: Hollow Crown, 78 pounds; Dobbie Selected, 71 pounds; Elcombe Giant, 60 pounds; Guernsey Half Long, 54 pounds.

PEPPER.—Four varieties were grown but owing to the season the production was light. The following yields were obtained from a 30-foot row of each variety: Harris Earliest, 14 pounds; Long Red Cayenne, 8 pounds; Ruby King, 1 pound; Chinese King, none.

RADISHES.—Eleven varieties were grown. Some of the recommended varieties with yields from 30-foot rows were: White Icicle 14½ pounds, Perfection 10 pounds, Long Scarlet 8 pounds, Scarlet Globe 8 pounds.

SWISS CHARD.—Giant Lucullus was the variety grown. The plants made strong growth. The yield from a 30-foot row was 154 pounds.

SPINACH.—Two varieties were grown, namely: Long-Standing Bloomsdale and Victoria, both varieties made strong growth of excellent quality.

SALSIFY.—Mammoth Sandwich Island was the variety grown and 80 pounds were harvested from the 30-foot row.

SAVOY.—Two varieties were grown and both produced very large heads. The following yields were obtained from a double 30-foot row of each, Chester 196 pounds and Best of All 165 pounds.

SQUASH.—Four varieties were grown, all making vigorous growth and produced an abundance of squash. The following yields of which about half were mature were obtained from three hills of each variety: Warty Hubbard, 255 pounds; Green Hubbard, 235 pounds; Golden Hubbard, 207 pounds; Early White Bush Scallop, 125 pounds.

TOMATOES.—Twenty-seven varieties of tomatoes were grown, five plants being set out of each but owing to the unfavourable weather during the latter part of the season the yield of ripe fruit was considerably less than usual. The following yields of ripe tomatoes were obtained from the recommended varieties: Alacrity X Earlibell, 18 pounds; Alacrity X Hipper, 20¾ pounds; Bonny Best, 18½ pounds; Alacrity, 16¼ pounds; Carter Sunrise, 15 pounds.

TURNIP.—Three varieties were grown. The following yields were obtained from a 30-foot row of each variety: Extra Early Purple Top Milan, 28 pounds; Snowball, 32 pounds; Golden Ball, 75 pounds.

VEGETABLE MARROW.—Two varieties were grown, both making strong growth and produced a heavy crop of marrow. The following yields were obtained from three plants: English Trailing, 470 pounds; Long Green, 237 pounds.

WATERMELON.—Four varieties were grown, six hills of each variety, three hills from plants started in greenhouse and three hills from seed sown in the open. A large number of the melons reached a good size but none matured.

HERBS.—Eleven kinds were grown, the seed being sown in the open. All but two germinated and made good growth. The varieties grown were: Saffron, Summer Savory, Winter Savory, Sweet Fennel, Coriander, Sage, Thyme, Sweet Basil, Lavender, Hyssop and Dill.

RHUBARB.—Difficulty has been experienced by a great many people in successfully growing rhubarb throughout Southern Alberta. This difficulty was also met with on the Station and to overcome it the practice has been to raise seedlings and plant a new bed every few years. The plants will remain fairly vigorous for about four years when they will start to deteriorate quickly, producing small stalks of rhubarb and eventually dying out, hence, the necessity of starting a fresh plantation with new plants. The Victoria is a particularly good variety on account of it being a vigorous grower and also possessing good quality. The seed is sown in rows similar to beet or carrot seed. Care should be taken when the seedlings appear to prevent attacks of the Flea beetle for they can easily destroy the tiny plants in a single day. To overcome this, rows should be dusted as often as necessary until the plants are about three or four inches high with lime and Paris Green in the proportion of one pound of Paris

Green thoroughly mixed with half a pail of sifted slaked lime. In the fall the plants may be lifted and planted in a permanent location two feet apart in the row and four feet between the rows on irrigated land but on dry land the best results are obtained if the rows are put farther apart as well as the plants farther apart in the rows.

The plants which have been grown four years can be used for forcing. To do this the plants should be dug up in the fall, after the tops have died down, and exposed to frost. The plants can either be forced in the basement of the house or failing this, in a frost proof root cellar. The time required for forcing depends on the temperature of the cellar. With a temperature of 60° Fahrenheit rhubarb can be pulled in four weeks, and with a temperature around 37° Fahrenheit it will take about twelve weeks before the stalks are large enough to pull. One point of note is that the longer the rhubarb takes to force, the redder the stalks will become. The plants may be set fairly close together with about four inches of space between the plants each way to allow for packing soil. Any kind of soil is satisfactory for this purpose. It should be filled level with the crowns of the plants, then thoroughly watered and covered over with about four inches of straw. The soil should be examined occasionally to see that it is moist as failure will result if the roots are allowed to dry out.

SMALL FRUITS

The new plantation of red, white and black currants came into bearing this year. Only the varieties found best in the old plantation were used. Eight bushes of six varieties of red and black currants were set out and eight bushes of two varieties of white currants. The varieties used were:—

Black Currants.—Bang Up, Topsy, Eagle, Saunders, Ontario and Magnus.

Red Currants.—Red English, Frauendorfer, New Red Dutch, Moore Seedling, Raby Castle and Prince Albert.

White Currants.—White Kaiser and Large White.

Gooseberries.—Seven varieties of gooseberries are under test. Only three of these, however, will come through the winter with little winter killing and produce fruit, namely:—Houghton, Carrie and Alma. The other varieties, namely, Barrett, Charles, Red Jacket and Silvia require to be bent down and covered with soil during the winter similar to raspberry canes, a practice which is scarcely practicable with gooseberries owing to the brittle character of the wood.

Raspberries.—The old plantation has been discarded as far as recording yields are concerned. New stock of three varieties were started this year, namely, Herbert, Newman and Ohta. Another plantation of the Herbert variety bore a heavy crop of fruit. The varieties recommended in order of earliness are:—Cuthbert, Loudon and Herbert. The last named variety makes much taller growth and produces large fruit of excellent quality.

To be successful in growing raspberries in this district it is necessary to cover the canes over with soil.

In the fall all dead and weakly canes are cut out, the canes are then bent down lengthway with the rows and entirely covered with moist soil. It is good practice to keep the trench between the rows from which the soil is taken, quite narrow, perhaps eighteen inches to two feet wide as this does not cut the rootlets too severely as would be the case if the soil, was removed from too near the plants. If manure is available it would be very beneficial to fill the trenches

between the rows, the soil removed from the canes in the spring being placed on top of this. Care should be taken in the spring to examine the canes occasionally and as soon as the buds commence to swell they should be uncovered, otherwise a large number of fruit buds will break off in the process of uncovering.

When setting out a new plantation it is advisable to make the rows eight feet apart and the plants two feet apart in the row. (On dry land still farther apart.) It is possible to plough the soil between the rows with a team using an A ditcher to raise the soil over the canes after they have been bent over and fastened down by hand. The finishing touches will have to be done with the shovel. After the canes are uncovered in the spring a good practice is to drive stout stakes every fifteen feet in the row and run heavy twine or light wire down each side of the bushes making it fast and taut at each stake. This will keep the canes in place and facilitate cultivating and picking.

STRAWBERRIES.—Of the large number of varieties grown here none have given as good results as the Senator Dunlap. It is particularly hardy, a vigorous grower, prolific, and produces a good sized fruit of good quality. The recommended method of growing them under irrigation is the single row method. The plants are set out fifteen inches or more apart in the row with rows 2½ to three feet apart. After the plants commence to make runners it is well to set one runner between the parent plants keeping the others removed. In this way cultivating can be done close to each side of the row and the irrigation water can be brought closer to all the plants than would be the case if wide matted rows are used. Under dry land conditions it is very beneficial to use a straw mulch two or three inches deep between the rows to conserve moisture. The plants are strengthened by the removal of blooms that appear the first year.

TREE FRUITS

APPLES.—Both the standard and cross-bred apples came through the winter in good shape. The cross-breds as usual were well laden with fruit. A large number of trees of the standard sorts bore fruit, some of them being quite heavily laden with large fruit presenting a picture more like an orchard in the fruit growing districts. Great interest was shown by the public for in a great many cases it was the first time the younger people had seen "real" apples growing on the tree.

One variety of cross-bred apples, the Osman, can be recommended as being absolutely hardy as it has shown no preceptible winter injury during the eighteen years it has been under test. A number of Western nurserymen are arranging to propagate it so that it should not be long before this variety can be easily obtained through the ordinary commercial channels. No variety of the standard apples can as yet be classed as hardy, although there are a few which might be called half hardy. The hardiest variety so far tested here is Pattens Greening followed by Hibernal.

PLUMS.—The only plums that have, so far, been successful here are the native plums of Manitoba. Several hundred seedling plants of these have been tested, out of these three trees were selected as being worthy of propagation, the first L 608 being selected for earliness. The fruit averages three-quarter inches in diameter, sweet, and colour yellow splotched with red. The second tree L 613 had larger fruit averaging about one inch in diameter, of sweet flavour, colour similar to the former. The third tree L 588 is the largest plum averaging about one and one-quarter inches in diameter, ripening about the last week in August, sweet, colour bright red with yellow on underside. Propagation is being carried on with these with a view to increasing the stock for distribution to farmers.

FLOWERS

ANNUALS.—The annuals as usual did exceptionally well, their beauty being only cut off by the frosts in September when a number of kinds such as Asters were at their best. Although most of the annuals can be grown by sowing the seed in a well-prepared border, it is advisable to start a number of kinds in a hotbed so as to ensure much earlier blooming. This would include Stocks, Asters, Snapdragons, Phlox, Verbena, Zinnias, Lobelia and everlastings such as Statice, Halichrysum, Acroclinium and Globe Amaranthus. The kinds which can be successfully seeded outside are: Sweet Peas, Candytuft, Mignonette, Shirley, Poppy, Lavatera, Larkspur and Calendula.

PERENNIALS.—The perennial border gave a continuance of bloom from spring with the various varieties of Iris until frost when the Golden Glow forms a golden mass. Some of the kinds which do well are Irises, Aquilegias, Pyrethrum, Shasta Daisy, Campanulas, Lychnis, Paeonies, Delphinum, Oriental Poppy, Iceland Poppy, Pinks, Lupinus, Phlox and Golden Glow.

ROSES.—A large number of the rose bushes were cut off near the ground by rabbits which burrowed inside between the boards protecting the roses. Notwithstanding this, however, they made vigorous growth during the summer and produced considerable bloom. Some of the varieties which do well are: Captain Hayward, Juliet, General Jacqueminot, Mrs. J. Laing, Ulrich Brunner, Mrs. R. G. Sharman Crawford, Conrad, F. Meyer, Soleil D'O, George C. Waud, Madame Ravary and Gruss An Teplitz.

The most successful way of protecting roses during the winter which we have so far found consists in tying the shoots together then bending them down in one direction in line of row, nailing two boards twelve inches wide in the form of an A, placing this over the roses. The boards are covered over with soil, leaving the ends open until severe weather when the ends are closed up, opening again when the weather moderates. This allows a circulation of air around the plants and prevents the danger of "sweating" when the weather becomes warm. They are gradually uncovered in the spring when the danger of severe frosts are over. For general purposes it is possibly better to procure roses grown on their own roots than to get grafted or budded stock, for should they kill back to the ground they will always come up from below the ground and produce true to variety, whereas with budded or grafted stock only brier shoots will come up from below, which of course necessitates destroying the bush as it is of no further value.

GLADIOLUS.—The Gladiolus made a wonderful showing, producing long spikes of bloom. Owing to their easy culture Gladiolus are fast becoming a popular flower. Among those that have done well here are: Catharina, Baron Jos. Hulot, White Giant, King of the Reds, Ruffled Gem, Early Sunrise, War, Halley, Niagara, Red Emperor, Marshal Foch, Dawn, General De Wit, Red Canna, Anzac, Mrs. Frank Pendleton, Faust. (Primulinus type) Pysche, Maidens Blush, Alice Tiplady, Hesperia, Harmione and Souvenir.

BULBS.—The tulips as usual made a splendid showing. The early tulips commenced to bloom on April 20, and the Darwins continued until May 27. Some good varieties are:—

Early Single Tulips: Prosperine (crimson pink), La Reine (white), Duchesse De Parma (terra cotta and yellow), Chrysolora (yellow), Pink Beauty (pink), Keizerskroon (bright red, yellow edge). Early Double Tulips: Couronne D'or (yellow), Imperator Rubrorum (bright scarlet), William III (scarlet). Darwin Tulips: Pride of Haarlem (carmine pink), Clara Butt (apple

blossom), Isis (scarlet), Madame Krelage (bright pink, light edge), Nora Ware (mauve), Suzon (pink rose), Bartigon (carmine red), and Bouton D'or (yellow). Daffodils: The daffodils did exceptionally well this year and made a bright display. Some good varieties are: Golden Spur (yellow), Princeps (primrose and yellow), Van Sion, Double (rich yellow, light yellow perienth), Sir Watkin (large yellow), Poeticus Ornatus (white), and Elvira (creamy white).

SHRUBS.—The flowering shrubs bloomed profusely and made a bright show of colour. The outstanding kinds were: Lilac, of which the vulgaris has many named varieties, Syringa villosa, Caragana arboreseens, Caragana frutescens, Caragana pygmaea, Ribes aureum, Spiraea arguta, Viburnum opulus sterile, Lonicera grandiflora and Rosa spinosissima.

TREES.—The various kinds of forest and ornamental trees continued to make good growth. The outstanding kinds are: (deciduous) elm, ash, weeping birch, native cottonwood and balsam poplar; (coniferous) blue spruce, white spruce, lodgepole pine, scotch pine and swiss stone pine.

LAWNS.—The lawns as usual presented a beautiful appearance with their rich shade of green. All the lawns when sown were seeded with Kentucky blue grass. Cutting was done weekly to keep the lawns trim. One irrigation was given the end of May which was sufficient to keep the lawns green. An irrigation is usually given in the fall but owing to so much rain in the early part of September this was not considered necessary. Dandelions are becoming a serious menace and so far no successful means of control have been discovered.

CEREALS*

The climatic conditions during 1926 for the growth of cereals were rather unusual. The continuous wet weather of the previous fall stored an abundant supply of moisture in the soil for the following crop. The winter, however, was exceptionally mild, with practically no snow and many unusually high winds. As a result of this the soil drifting problem in many localities became a serious one. Throughout the district as a whole most of the drifting took place previous to seeding, but in certain localities seed was blown out and the crops had to be reseeded.

The dry surface soil at seeding time also prevented grain crops from getting an even start. After the plants had appeared above the ground it was quite apparent on a great many fields that only a certain percentage of the seed sown had germinated. A rain occurring soon after growth started, however, brought about the appearance of a second lot of plants, and revealed the fact that a certain percentage of the seed sown did not reach moisture.

The loss of moisture during the winter months meant that grain crops commenced growth with approximately the usual amount stored in the soil. On June 19 and June 20, when the moisture was almost exhausted, a storm occurred in the western and northern parts of the district in which four inches of rain fell. This, with the aid of two light rainfalls early in July, was sufficient to carry the crops to maturity, and in the area benefited by these rains an exceptionally heavy crop was grown.

As in the previous season the weather during the harvesting period was extremely unfavourable. Two spells of wet weather occurred which lasted from August 30 to September 23, with snow falling on the last four days.

* The work with cereals and forage crops is under the supervision of W. D. Hay, B.S.A., who has assisted materially in the preparation of the report under these headings.

Threshing had just begun when this adverse weather set in, and a great deal of sprouting in the stook, as well as a little in the standing grain resulted. Only a small proportion of the wheat marketed from the district graded No. 1, and a scarcity of good seed oats for next season's crop became apparent soon after harvest.

VARIETY TESTS—DRY LAND

All preliminary testing of cereal varieties is done in rod row plots. This method is outlined elsewhere in the report and the standing is given for varieties tested by it. Some of the more promising ones, as determined from such preliminary trials, are tested also in duplicate one-sixtieth acre plots. Seeding of these is done on summer-fallowed land.

WHEAT

Thirteen varieties of spring wheat were tested in one-sixtieth acre plots. These were all seeded April 28, at the rate of seventy-five pounds per acre. The field had been affected considerably by soil drifting and consequently a certain percentage of the seed remained in dry soil until it was germinated by the first rain.

WHEAT—TEST OF VARIETIES (DRY LAND)

Grown in duplicate plots of 1-60th acre each

Variety	Date of ripening	Number of days maturing	Length of straw	Strength of straw on scale of 10 points	Yield per acre	Average yield per acre for past 5 years
			inch		bush.	bush.
Marquis (Chemist)	Aug. 6	100·0	36·0	9·0	38·1	27·6
Red Fife (Ottawa 17)	Aug. 7	100·5	41·5	9·5	27·2	25·9
Ruby (Ottawa 623)	Aug. 3	97·0	32·0	9·0	16·4	20·7
Reward (Ottawa 928)	Aug. 3	97·5	30·5	9·0	23·9	19·4
Supreme (Wheeler)	Aug. 7	100·0	32·5	9·5	35·7	
Renfrew	Aug. 4	98·0	40·0	9·0	34·7	
U. of A. 222	Aug. 5	99·0	33·0	9·0	31·7	
Kota	Aug. 6	98·5	41·0	7·5	31·7	
Ceres	Aug. 5	99·0	36·0	8·0	30·8	
Kitchener	Aug. 5	99·0	41·5	9·0	30·3	
Marquis 10B	Aug. 5	99·0	35·5	9·5	28·8	
Early Triumph	Aug. 5	98·5	31·0	9·0	26·9	
Garnet (Ottawa 652)	Aug. 2	96·5	31·0	9·5	24·4	

The seed of the variety designated Marquis (Chemist) was forwarded by the Dominion Chemist at Ottawa. It is the only strain of Marquis that has been grown for the last five successive years, and is the leading variety for this period as well as for the season. When all points are given due consideration Marquis appears to be most worthy of recommendation for the district. Supreme, a selection of Red Bobs made by Dr. Seager Wheeler, has given good results, but has not been tested for five successive years. Reward, one of the newer varieties, has not appeared to be outstanding in the Lethbridge district from the standpoint of yield, but it has proved exceptional from the quality of grain produced.

OATS

There were seven varieties of oats under test in one-sixtieth acre plots. Seeding of these was done on April 28, and the rate was seventy-five pounds per acre. The germination was rather uneven, but the late spring rains eventually brought about a heavy stand, and the yields on all plots, as shown in the table, were considerably higher than usual.

OATS—TEST OF VARIETIES (DRY LAND)

GROWN IN DUPLICATE PLOTS OF 1/60TH ACRE EACH

Variety	Date of ripening	Number of days maturing	Length of straw	Strength of straw on scale of 10 points	Yield per acre	Average yield per acre for past 5 years
			inch.		bush.	bush.
Victory	July 31	95·5	37·0	9·5	75·0	67·5
Leader	July 31	94·0	40·0	9·0	81·9	61·2
Banner, Ottawa 49	July 31	95·0	40·0	10·0	86·3	60·7
Danish Island	Aug. 3	97·0	38·0	10·0	75·5	58·7
Gold Rain	Aug. 3	96·0	39·0	10·0	77·9	54·5
Longfellow, Ottawa 478	July 31	94·0	36·5	8·0	76·8	51·5
Laurel, Ottawa 477	July 31	94·0	34·0	10·0	56·1	.....

The table shows Victory as the leading variety for yield over the five-year period, but it was excelled in this season's results by Leader and Banner. Since Banner has been the highest yielding variety under irrigation it seems natural that it should have yielded highest this season when the moisture supply was heavier than usual, and the yield of all varieties consequently higher than the average. Laurel is a hulless variety, and while it yielded considerably lower than other varieties it can be recommended where a hulless sort is desired.

BARLEY

Fifteen varieties of barley were tested and twelve of these have been grown for the past five years. The date of seeding in each case was April 28, and the rate seventy-two pounds per acre. The heavy rains in June enabled these varieties to reach maturity without suffering from drought to any appreciable extent, and the quality of grain produced was better than usual.

BARLEY—TEST OF VARIETIES (DRY LAND)

GROWN IN DUPLICATE PLOTS OF 1/60TH ACRE EACH

Variety	Date of ripening	Number of days maturing	Length of straw	Strength of straw on scale of 10 points	Yield per acre	Average yield per acre for past 5 years
			inch		bush.	bush.
Trebi	July 29	92·0	26·5	9·0	70·1	45·3
Bark	Aug. 6	99·0	32·0	9·0	47·9	41·5
Cape	July 28	91·5	29·0	9·0	60·2	40·1
Odessa	July 28	91·0	36·5	7·5	54·9	37·2
Bearer, Ottawa 475	July 31	95·0	39·0	8·0	44·7	35·6
Mariout	Aug. 3	96·5	24·0	8·5	39·4	34·5
Early Chevalier, Ottawa 51	July 27	89·5	38·5	7·5	30·4	32·8
O. A. C. 21	July 28	91·5	38·5	7·5	53·5	32·4
Chinese, Ottawa 60	July 28	91·5	38·0	7·5	45·0	32·3
Gold	July 31	95·5	29·0	8·5	47·9	31·4
Himalayan, Ottawa 59	July 29	92·0	26·0	9·0	27·1	29·9
Invincible	Aug. 2	96·5	35·0	8·0	34·4	28·6
Swedish Chevalier	Aug. 2	96·5	33·5	7·0	61·8	
Duckbill, Ottawa 57	Aug. 2	96·5	37·0	9·0	56·3	
Junior, Ottawa 471	Aug. 3	95·5	25·0	9·0	43·1	

Trebi, a six-rowed variety, appears as the highest yielder both for the season and for the five year period. Bark's, another six-rowed variety, has also proved a good yielder. Of the fifteen varieties tested it is the latest in maturing. Of the varieties shown in the table, Early Chevalier Ottawa 51, Gold, Invincible, Swedish Chevalier. and Duckbill Ottawa 57 are the only two-rowed ones, and as a class they appear as lower yielders than those of the six-rowed type. Himalayan and Junior are hulless varieties. The former yielded considerably lower this year than it usually does.

PEAS

Eight varieties of peas were grown in rod row plots for comparative purposes. These plots consisted of five rows each one rod in length and seven inches apart, and they were replicated three times, making four plots in all. Seeding was done by hand as in the case of other cereals. The date of seeding was May 4, and the rate 150 pounds per acre. The seed germinated well and a good stand was obtained in all cases.

In all previous years seeding was done with an ordinary grain drill in duplicate one-sixtieth acre plots, and the table shows the average results of varieties tested in this way over a ten-year period.

PEAS—TEST OF VARIETIES (DRY LAND)

Variety	Date of ripening	Number of days maturing	Yield per acre	Average yield per acre 1915 to 1924 (inclusive)
			bush.	bush.
English Grey	Aug. 31	119	15·5	17·7
Solo	" 29	117	14·5	17·6
Prussian Blue	" 30	118	17·8	16·9
Chancellor, Ottawa 26	" 31	119	11·3	16·4
Mackay, Ottawa 25	" 29	117	19·0	16·3
Golden Vine	" 29	117	18·3	15·9
Arthur, Ottawa 18	" 30	118	16·5	12·0
Cartier, Ottawa 19	" 31	119	15·5	

The column showing the average yield for the ten-year period of the six leading varieties shows no appreciable difference among these. The three highest yielding ones are less popular than some of the others, however, on account of their colour and shape.

The years 1919, 1920 and 1921 were so dry that the crops from variety tests of peas on dry land in all cases were considered failures, and no harvesting was done. These years are included, however, in computing the ten-year average.

FLAX

Four varieties of flax were grown in one-sixtieth acre plots, seeded in duplicate. These were all seeded May 7, at the rate of thirty pounds per acre. After the June rains the Russian thistles developed so fast that they seriously handicapped the growth of flax on all of these plots. For this reason the yields were much lower than they would otherwise have been.

The season of 1922 was so dry that the flax variety plots did not yield sufficient return to warrant harvesting, and all plots were considered failures. The average yield for the five-year period is therefore greatly reduced.

FLAX—TEST OF VARIETIES (DRY LAND)

GROWN IN DUPLICATE PLOTS OF 1/60TH ACRE EACH

Variety	Date of ripening	Number of days maturing	Average length of straw	Strength of straw on scale of 10 points	Yield per acre	Average yield per acre 1922–1926 (inclusive)
			inch.		bush.	bush.
Novelty, Ottawa 53	Aug. 14	99	23·0	10	8·1	8·1
Premost	" 12	97	25·0	10	8·7	7·2
Common	" 14	99	22·5	10	8·2	7·0
Longstem, Ottawa 52	" 14	99	25·0	10	9·3	6·7

ROD ROW TESTING OF CEREALS

The rod row method has been adopted for all preliminary testing of cereal varieties. Previous to the adoption of this method all comparative tests were conducted with one-sixtieth acre plots. The rod row method, on account of eliminating a considerable amount of hand labour and requiring a much smaller acreage, permits of testing a great many more varieties. With careful supervision of small plots replicated four or more times results can be obtained which are equally satisfactory and quite possibly more reliable than those obtained from larger plots in duplicate. For these reasons the rod row plots are replacing the larger plots to a very large extent. Each rod row plot consists of three rows seven inches apart and eighteen and a half feet in length. The plots are sown side by side with just the row space of seven inches between them, thus providing the ordinary field conditions. At harvest time one foot is cut off each end to eliminate the border effect, leaving plots one rod in length. The plots are grown under ordinary field conditions and the yields are determined from only the centre rows. All varieties are tested by this method on both dry and irrigated land, and a few of the more promising ones are tested further in one-sixtieth acre plots.

The varieties of wheat, oats, and barley which have been under test in these plots for the past three seasons on dry and irrigated land are given in the order of their average for the three years.

DRY LAND

Wheat.—Early Triumph, Supreme, Marquis Sask. 7, Criddle's Selection, Kitchener, Kota, Marquis Ottawa 15, Marquis McD. 114, Marquis 10B, Ruby Ottawa 623, Huron Ottawa 3, Golden, Marquis McKay, Crown Ottawa 353, Garnet Ottawa 652, Brownie Ottawa 491, Acme, Producer Ottawa 197, Prelude Ottawa 135, Master Ottawa 520, Kubanka.

Oats.—Columbian Ottawa 78, Victory, Leader, Irish Victor P, Leader B, Gerlach, Danish Island, Legacy Ottawa 678, O.A.C. 72, Gold Rain, Prolific Ottawa 77, Banner Ottawa 49, Alaska, Leader A, Laurel Ottawa 477.

Barley.—Himalayan Ottawa 59, Hannchen Sask. 229, Early Chevalier Ottawa 51, Chinese Ottawa 60, Feeder Ottawa 561, O.A.C. 21 (Sask. Sel.), Junior Ottawa 471, Swedish Chevalier, Charlottetown No. 80, O.A.C. 21, Bearer Ottawa 475, Albert Ottawa 54, Duckbill Ottawa 57.

IRRIGATED LAND

Wheat.—Marquis Ottawa 15, Marquis 10B, Criddle's Selection, Marquis McKay, Supreme, Marquis Sask. 7, Marquis McD. 114, Early Triumph, Golden, Kitchener, Kota, Kubanka, Reward Ottawa 928, Acme, Huron Ottawa 3, Producer Ottawa 197, Early Red Fife Ottawa 16, Garnet Ottawa 652, Crown Ottawa 353, Brownie Ottawa 491, Ruby Ottawa 623, Duchess Ottawa 933, Master Ottawa 520, Prelude Ottawa 135.

Oats.—Leader, Columbian Ottawa 78, Leader B, Victory, Danish Island, Irish Victor P, Prolific Ottawa 77, Gold Rain, Gerlach, Legacy Ottawa 678, Leader A, O.A.C. 72, Alaska.

Barley.—O.A.C. 21, O.A.C. 21 (Sask. Sel.), Hannchen Sask. 229, Chinese Ottawa 60, Bearer Ottawa 475, Junior Ottawa 471, Charlottetown No. 80, Himalayan Ottawa 59, Swedish Chevalier, Early Chevalier Ottawa 51, Duckbill Ottawa 57, Albert Ottawa 54, Feeder Ottawa 561.

BEANS

The importance of field beans in Southern Alberta is dealt with more fully in the irrigated section of this crop. Under dry land conditions there is much less danger from early fall frosts than under irrigated conditions, as the crop ripens at least a week earlier. The yield under dry land conditions, however, is usually only from thirty to fifty per cent of that obtained under irrigated conditions. The present indications are that beans may eventually prove to be a profitable crop to grow as a summer-fallow substitute.

Seventeen varieties were tested in duplicate one hundredth acre plots, consisting of two rows 72.6 feet long and three feet apart. They were all seeded with an ordinary two-row corn planted on May 13 at the rate of approximately fifty-five pounds per acre.

BEANS—TEST OF VARIETIES (DRY LAND) 1926

Variety	Date of ripening	Number of days maturing	Colour of bean	Size of bean	Yield per acre	Average yield per acre 1925 and 1926
					bush.	bush.
*Luther Burbank	Sept 8	118	White	Small	13·9	13·7
*Michigan Early Wonder	" 8	118	"	"	11·8	11·8†
Australian Brown	" 9	119	Brown	Large	7·4	10·7
*Robust Pea Bean	" 9	119	White	Small	9·7	10·3
*Imperial Pea Bean	9	119	"	"	7·9	9·9
Bayo	" 4	114	White and Purple	Large	7·0	9·2
*Mayer	" 9	119	White	Small	7·3	8·7
Yellow Six Weeks	" 5	115	Yellow	Large	7·6	8·0
Great Northern	" 15	115	White	Medium	6·4	7·9
Quito	" 8	118	White and Brown	Large	7·6	7·6†
*Beauty, Ottawa 712	" 8	118	White and Brown	Medium	5·3	7·5
Norwegian, Ottawa 710	" 10	120	Brown	Large	4·7	7·5
Navy, Ottawa 711	" 10	120	White	"	6·9	7·2
Red Kidney	" 8	118	Red	"	7·3	6·6
Large White, Ottawa 713	" 9	119	White	"	4·1	6·6
*Kotenashi	" 10	120	"	Small	6·0	6·0†
*Lady Washington	" 10	120	"	Medium	7·4	5·6

*The most promising varieties. †Grown only in 1926.

Attention is drawn to the fact that the average yields given in the table are for only two years' results, and data for such a short period should never be looked upon as truly representing what is to be expected under average conditions. The varieties which at present appear to be most worthy of recommendation are marked with a star.

IRRIGATED LAND—VARIETY TESTS

A few of the most important varieties of wheat, oats and barley were tested in one-sixtieth-acre plots as well as in the rod row plots. These were seeded on land that had been in hoed crop the previous season and was in good condition for the growing of cereals. They received only one irrigation; on June 12.

On account of the surface soil being so dry at the time of seeding the germination on most of the plots was uneven, and a full stand did not appear until after the occurrence of one or two rains.

WHEAT

Seven varieties of spring wheat were grown for comparison in one-sixtieth-acre plots. These were seeded April 27, at the rate of ninety pounds per acre.

WHEAT—TEST OF VARIETIES (IRRIGATED LAND)

GROWN IN DUPLICATE PLOTS OF 1/60TH ACRE EACH

Variety	Date of ripening	Number of days maturing	Length of straw	Strength of straw on scale of 10 points	Yield per acre	Average yield per acre for past 5 years
			inches		bush.	bush.
Marquis, Ottawa 15	Aug. 7	102·0	36·0	10·0	42·0	47·2
Red Fife, Ottawa 17	" 16	110·0	49·5	8·5	38·4	38·2
Reward, Ottawa 928	" 5	100·0	33·5	10·0	38·3	36·0
Ruby, Ottawa 623	" 3	97·5	34·5	9·5	32·2	35·8
Early Triumph	" 6	101·0	36·0	10·0	43·2	
Renfrew	" 9	104·0	46·0	8·0	38·9	
Garnet, Ottawa 52	" 4	98·5	33·0	9·0	31·8	

Four of the varieties have been tested for the past five years, and of these Marquis is leading by nine bushels per acre. On account of it being stronger in the straw, medium early in ripening, and a good yielder, Marquis meets the requirements for a wheat on irrigated land better than others tested so far. The wet season was responsible for Red Fife being so much later than other varieties in maturing. Early Triumph, a selection from Red Bobs, is the leading variety in this year's test, and has provided a fair yielder in the four years that it has been tested. Renfrew, one of the newer varieties, originating at the University of Alberta, was tested this year for the first time in one-sixtieth-acre plots, and was found to yield second only to Marquis. Reward, Ruby, and Garnet are three of the earliest varieties grown, and they have been found to yield lower than the later ones. Reward has outyielded the other two, and has produced grain of exceptional quality.

A section of the cereal variety test plots on the irrigation part of the station. Note the lodging of some varieties. Grain with weak straw does not stand up well on fertile irrigated land.

OATS

Four of the leading varieties of oats were tested under irrigation. Seeding of these was done on April 27 at the rate of one hundred and two pounds per acre.

OATS—TEST OF VARIETIES (IRRIGATED LAND)

GROWN IN DUPLICATE PLOTS OF 1/60TH ACRE EACH

Variety	Date of ripening	Number of days maturing	Length of straw	Strength of straw on scale of 10 points	Yield per acre	Average yield per acre for past 5 years
			inches		bush.	bush.
Banner, Ottawa 49	Aug. 5	100·0	42·0	9·5	81·3	85·4
Leader	" 5	99·5	40·0	9·0	76·3	82·5
Longfellow, Ottawa 478	" 4	99·0	43·5	8·0	88·1	81·0
Victory	" 4	99·5	42·0	9·5	71·6	77·8

From the table of yields it will be observed that Banner is the leading variety for the five year period, but it is outyielded for the year by Longfellow. Banner has a slight advantage over other varieties in being somewhat stronger in the straw, and, therefore, less liable to lodge in wet seasons or under excessive irrigation.

BARLEY

Comparative tests were conducted with five of the more important barley varieties. These were seeded on April 27 at ninety-six pounds per acre.

BARLEY—TEST OF VARIETIES (IRRIGATED LAND)

GROWN IN DUPLICATE PLOTS OF 1/60TH ACRE EACH

Variety	Date of ripening	Number of days maturing	Length of straw	Strength of straw on scale of 10 points	Yield per acre	Average yield per acre for past 5 years
			inches		bush.	bush.
Trebi	Aug. 3	98	31·5	7·5	86·5	77·2
Bark's	" 7	102	32·0	10·0	84·8	76·3
O. A. C. 21	" 2	97	37·5	7·5	68·4	63·9
Himalayan, Ottawa 59	" 2	97	37·5	7·5	77·8	63·3
Swedish Chevalier	" 6	101	36·0	7·0	66·0	

Trebi has outyielded other varieties both for the year and for the five-year period, but was followed closely in both cases by Bark's. The latter is considerably later in maturing than other varieties, and in the past two seasons has suffered more damage from the adverse weather, otherwise it, no doubt, would have appeared as the highest yielder. Himalayan is a hulless variety, and has proved a very satisfactory one of this class. Swedish Chevalier is a two-rowed variety; one of the latest in maturing, and one of the highest yielding varieties of this class.

PEAS

Variety tests of peas were conducted in rod row plots. These plots consisted of five rows each one rod in length and seven inches apart. Replicating

was done three times, making four plots of each variety, and yields were determined by averaging each four plots. Seeding of all varieties was done by hand on May 7, and a good stand was obtained in all cases.

On account of such unfavourable weather in the fall of 1925 at the time the peas were ready to harvest, the plots were damaged to such an extent that it was impossible to determine yields from them. The yields from 1915 to 1924 inclusive are, therefore, taken in computing the average yield over a ten year period. During this period all testing was conducted in one-sixtieth-acre plots, seeded with an ordinary grain drill.

PEAS—TEST OF VARIETIES (IRRIGATED LAND)

Variety	Date of ripening	Number of days maturing	Yield per acre	Average yield per acre 1915 to 1924 (inclusive)
			bush.	bush.
Mackay, Ottawa 25	Sept. 11	127	62·3	40·0
Prussian Blue	" 13	129	47·0	39·7
Chancellor, Ottawa 26	" 12	128	47·5	38·3
Golden Vine	" 11	127	32·8	36·2
Arthur, Ottawa 18	" 13	129	49·3	36·0
English Grey	" 11	127	32·0	34·9
Solo	" 10	126	39·5	32·3
Cartier, Ottawa 19	" 12	128	46·0	

The column showing the average yields over a ten year period shows that there is only a difference of approximately eight bushels between the highest yielding and lowest yielding varieties. Mackay, when considered from other standpoints as well as yield, seems to meet the requirements for irrigated land slightly better than others tested so far. Cartier is a new variety and has only been under test two years.

BEANS

Beans, while still in the experimental stage, are a crop which will probably attract more attention in the future than they have been given in the past. The chief reason for this is the fact that the length of the growing season over the greater part of the Lethbridge district does not appear to be prohibitive for growing beans successfully under average seasonal conditions. There should also be a good local demand for field beans provided they are of good quality and of a desirable type. The market demand is for the small white type of bean, and practically all of the supply is now being imported from the United States and the Orient. Wholesalers state that there is brought into Lethbridge annually approximately five car loads of 35,000 pounds each, of field beans, and the price paid for them averages about 5¼ cents per pound. The necessary equipment for growing beans is not available in the district, and until it becomes definitely proven that beans can be looked upon as a safe crop, and the machinery for harvesting them can be easily procured, farmers would be well advised to devote only small acreages to them.

Fifteen varieties of field beans were grown for comparative purposes in quadruplicate rod row plots. Seeding was done on May 13 at the rate of fifty-five pounds per acre, and the rows were three feet apart.

BEANS—TEST OF VARIETIES (IRRIGATED)

Variety	Date of ripening	Number of days maturing	Colour of bean	Size of bean	Yield per acre	Average yield per acre 1925-26
					bush.	bush.
*Luther Burbank	Sept. 12	122	White	Small	45·4	45·75
Bayo	" 10	120	White and Purple	Large	36·4	39·38
*Michigan Early Wonder	" 13	123	White	Small	42·9	39·24
*Imperial Pea Bean	" 13	123	White	Small	38·7	38·73
Australian Brown	" 11	121	Brown	Large	32·3	38·08
Red Kidney	" 11	121	Red	Small	38·7	36·54
*Lady Washington	" 13	123	White	Medium	34·9	34·54
Great Northern	" 17	127	White	Medium	31·6	33·80
*Kotenashi	" 15	125	White	Small	39·7	33·50
Yellow Six Weeks	" 11	121	Yellow	Medium	31·5	32·00
*Robust Pea Bean	" 14	124	White	Small	30·6	30·54
*Beauty, Ottawa 712	" 12	122	White and Brown	Medium	32·4	30·47
*Meyer	" 13	123	White	Small	38·5	29·13
Navy, Ottawa 711	" 14	124	White	Large	37·2	28·79
Large White, Ottawa 713	" 12	122	White	Large	30·6	26·14

*The most promising varieties.

Since these variety tests have been conducted for only two seasons the results cannot be looked upon as truly representative of what should be expected under average conditions.

The varieties which appear most worthy of recommendation are marked in the table with a star.

GROWING WHEAT SAMPLES FROM PRODUCERS OF REGISTERED SEED

One hundred and twenty-five samples of wheat were received from the Seed Branch office in Calgary. These were representative samples of the seed sown by growers of registered seed for field inspection. Just previous to the ripening of these plots the seed inspectors of the province made a very thorough study of them to determine the number of impurities contained in each, and how true the sample as a whole was to type. This study gave the inspectors a good indication of what they should expect to find in each field of registered seed which they had to inspect later, both from the standpoint of other varieties and plants not true in type for the particular variety grown. The inspectors also had an opportunity of examining other variety plots and becoming familiar with the characteristics of each variety. Further inspection of a few field lots gave them practice in singling out both impure varieties and plants that were not true to type.

FORAGE CROPS

The open winter and high winds of the early spring dried out the surface soil rapidly to a considerable depth. This along with the scanty precipitation during the month of May made conditions unfavourable for securing a satisfactory stand of grass and clover crops under dry land conditions. The same conditions prevailed in certain cases on irrigated land, and it was found necessary by some to irrigate the land after seeding in order to get a satisfactory germination. With crops such as corn, however, which are seeded more deeply this difficulty was not experienced to nearly the same degree. All crops which did get well started were greatly benefited by the heavy rains in June, and produced very favourable yields. The continued wet weather during the late summer and fall made conditions extremely difficult for harvesting late crops, and prevented the earlier varieties of corn from ripening. It also prevented the third cutting of alfalfa being harvested in many cases.

CORN AND SUNFLOWERS

Corn is now classed as one of southern Alberta's important farm crops. It is not considered as one destined to mean any appreciable increase in cash returns, nor to cause any radical changes in the general agricultural practices of the district. It is rather looked upon as an important source of winter feed for live stock, and the corn acreage in the district is likely to increase with the tendency of mixed farming to increase. The provincial and local corn shows have also brought farmers to realize the importance of using northern grown seed for both grain and ensilage purposes. An appreciation of the value of this will, no doubt, result in a better choice of the varieties used, earlier seeding, with more maturity at harvest time, and consequently a higher standard of quality in the crop produced.

Sunflowers have gradually decreased in popularity throughout the district where corn can be raised successfully, and the only parts where much importance is attached to them are in the foothills of the western part of the district, and in the northern part.

The season produced a heavy growth of corn, but so much wet weather during the middle part of August and almost throughout September made conditions extremely unfavourable for maturing it. Then a drop in temperature on September 23 to nine degrees above zero resulted in the crops which were still unharvested being badly frozen, and therefore reduced in quality.

CORN—TEST OF VARIETIES—DRY LAND

Twelve varieties of corn were tested on dry land. They were all seeded on April 30, in duplicate plots one-hundredth acre in size. These plots consisted of two rows three feet apart and 72.6 feet in length. All varieties were harvested September 16. The total green weight was recorded, and the percentage dry matter was determined by placing a two pound green sample in a drying oven until it ceased to lose weight. The following table shows the standing of these varieties based on their yield per acre of dry matter.

Considering the variety tests as a whole, there are higher yields per acre of green weight but a lower degree of maturity than is obtained in years when more favourable fall weather prevails. Of the varieties included in the table North Dakota White Flint, and Gehu have given best results in the past from the standpoint of grain for hogging off, while the North Western Dent strains have proved more satisfactory for ensilage purposes.

CORN—TEST OF VARIETIES (DRY LAND)

Variety	Source	Height of plants	Maturity at harvest	Yield per acre green weight	Yield per acre dry matter	Percentage of dry matter
		ft. in.		tons	tons	p.c.
Assiniboine Yellow	.....	4 2½	Glazing.....	10·2	2·3	22·95
North Dakota White Flint	.....	4 4½	"	9·1	1·9	20·90
North Western Dent	Dakota Improved Seed Co.	4 10½	Dough.....	9·6	1·8	18·56
Gehu	Lethbridge.....	4 ½	Glazed.....	7·1	1·7	24·56
North Western Dent	Kelowna, B.C.....	5 3½	Dent.....	6·5	1·7	25·39
Compton's Early	J. O. Duke.....	5 9	Early Milk.....	13·6	1·6	11·96
North Western Dent	Nebraska grown....	5 —	Milk.....	9·3	1·5	16·02
North Western Dent	Brandon.....	4 6	Almost mature.	6·1	1·5	24·02
Falconer	.....	4 5½	Dent.....	6·4	1·2	19·53
Pride Yellow Dent	.....	4 9½	Milk.....	7·3	1·1	15·23
Minnesota No. 13	Grand Forks, N.D.	4 11	Dough.....	6·3	1·1	16·75
Longfellow	.....	5 1	Early milk.....	7·8	1·0	12·70

CORN—TEST OF VARIETIES—IRRIGATED LAND

Nineteen varieties of corn were tested on irrigated land for ensilage purposes. These were each grown in quadruplicate $\frac{1}{200}$ acre plots, and yields and other records were obtained by averaging results of the four plots. Seeding was done with an ordinary corn planter on May 14. The rows were three feet apart, and the rate of seeding was approximately fifteen pounds per acre. After all varieties had appeared above the ground thinning was done leaving the plants approximately ten inches apart. These varieties were not irrigated as the rains in June supplied sufficient moisture for their needs. The following table shows the most important data concerning these varieties and their standing in order of yield of dry matter.

Burr Leaming is the leading variety both in the amount of green weight and of dry matter per acre. This is due to the heavy amount of growth produced rather than to the per cent of dry matter, as seen from the fact that it reached only the stage of forming ears at harvest time. As a greater degree of maturity increases the quality of the ensilage produced, the strains of North Western Dent seem to meet the requirements best for this purpose, and the choice of a strain that is northern grown is most advisable. These strains were more mature than most others, and three of them stand near the top of the list in yield of dry matter.

CORN—TEST OF VARIETIES—IRRIGATED LAND

Variety	Source	Height of plants		Maturity at harvest	Yield per acre green weight	Yield per acre dry matter	Percentage of dry matter
		ft.	in.		tons	tons	p.c.
Burr Leaming	Geo. S. Carter	8	10	Ears formed	36·91	5·42	14·68
North Western Dent	North Dakota	6	3	Dent	21·90	4·75	21·68
North Western Dent	Nebraska	7	8	Ears formed	29·21	4·73	16·21
Longfellow	J. O. Duke	6	10	" "	34·0	4·58	13·48
North Western Dent	Brandon	6	—	Early dent	18·64	4·37	23·43
Pride Yellow Dent		6	7	Milk	23·83	4·26	17·87
Assiniboine Yellow		5	4	Dough	21·00	3·98	18·95
Minnesota No. 13	Grande Forks, N.D.	6	6	Milk	18·69	3·94	21·09
North Western Dent	Dakota Improved Seed Co.	6	10	"	26·03	3·91	15·04
Bailey	J. O. Duke	7	8	Early milk	23·39	3·94	16·41
North Dakota White Flint.		5	7	Dough	23·73	3·82	16·08
Gehu	Lethbridge	5	5	Late dough	20·16	3·66	18·17
Leaming	J. O. Duke	8	6	Silking	28·17	3·27	11·62
North Western Dent	Kelowna, B.C.	6	7	Dent	20·55	3·19	15·53
Wisconsin No. 7	J. O. Duke	8	—	Early milk	22·23	3·12	14·09
Golden Glow	J. O. Duke	9	2	Ears formed	23·99	2·89	12·0
North Western Dent	Lethbridge	5	11	Dent	17·00	2·64	15·52
Compton's Early	J. O. Duke	7	10	Ears formed	28·53	2·62	9·1
Falconer		5	11	Dent	21·76	2·42	11·1

POULTRY

But one breed, the Barred Plymouth Rock, is used in the poultry work at this Station. Being hardy and prolific, they have proved to be well suited to Alberta.

The winter of 1925-26 was mild and so was favourable for egg production, with the result that some very good egg records were made. Extensive experimental feeding tests, some of which proved unsatisfactory, reduced the average production per bird for the Station flock below some previous years. The highest individual laid 303 eggs and the next highest 293. Twenty-seven pullets produced 250 eggs, or more while one hundred and four pullets laid 200 eggs or over in the year.

The feeds and methods of feeding, except for those birds in the special feeding tests, were much the same as in former years except that less corn was used, because of the mild winter. The winter scratch ration was two parts of wheat to one each of cracked corn and crushed oats. A very small portion of this feed was thrown in the litter in the morning to start the birds exercising. The balance of the scratch feed was given about one hour previous to the birds going to roost. The dry mash which was available to the birds at all times, was composed of equal parts of bran, shorts, wheat, middlings, cornmeal, oat chop and meat meal, with a little fine salt and charcoal added. A moist, crumbly mash consisting of the same ingredients as the dry mash with the meat meal, salt and charcoal omitted, was fed at noon, on each alternate day or on each day if thought desirable. Green feed consisted of cabbage, alfalfa leaves, mangels, turnips, beets and sugar beets. This was augmented in the spring and summer by the growth in the runways which were seeded to a mixture of wheat, barley and oats. The summer scratch feed was changed gradually to five parts wheat to one each of cracked corn and crushed oats.

BARLEY VS. CORN FOR LAYING PULLETS

An experiment was started in 1924 to test the relative values of barley and corn as ingredients in the scratch-grain and mash fed to laying pullets, in an endeavour to find a cheap, home-grown feed that could be used to replace the more expensive, imported corn that is now fed so extensively regardless of price.

In the spring of 1924, when the chicks were put on the range at nine weeks of age they were divided into two groups. One of these groups was fed the usual growing ration which contained a portion of corn and the other a similar ration except that the corn was replaced by barley. When the pullets were put in the laying houses in the fall, one pen of fifty from the group receiving barley was placed in one-half of a laying house and another fifty from the lot receiving corn was placed in the other half of the same building. Each group was fed a basic ration consisting of equal parts bran, shorts, low grade flour, ground oats and meat meal with a little salt and charcoal, in dry mash hoppers and two parts wheat and one part oats as scratch feed. One part of ground barley was added to the mash and one part crushed barley to the scratch feed of the barley fed pen and an equal amount of ground corn and cracked corn to the feed of the birds receiving corn. The amount of barley or corn fed to the respective pens was approximately one-fifth of the total feed consumed, exclusive of green feed. A good quality of alfalfa leaves was kept before the birds at all times. Liberal amounts of mangels, turnips and beets were provided and cabbage was fed until January 10. Only water was given to drink.

The results of the test in 1924-25 were greatly in favour of the corn-fed lot both in egg production and vitality of the birds. The average pullet year egg production of the lot receiving corn was 201 eggs, while the barley fed birds averaged but 174 eggs for the same period. The most noticeable difference in the results from two feeds was the high mortality in the barley-fed pen, where 46 per cent of the pullets died as compared to 18 per cent that died in the corn-fed pen.

The experiment was continued in the laying year of 1925-26 but was modified to the extent that the chicks were all reared on feed containing corn and barley was not substituted for corn until the pullets were placed in the laying pens in the fall. The same feeds were used as in the previous year's test for two

pens but two more pens of fifty pullets each were added to the experiment. One of these received the same ration as the barley-fed pen except that milk as well as water was provided to drink. The other pen received the same ration as the corn fed pen except that double the amount of corn was given in both the mash and the scratch feed.

The results in 1925-26 were similar to those of the previous year. About December 15, some of the birds in the barley-fed pens appeared unthrifty and on December 21 one pullet died in the pen receiving barley and milk. A few days later another bird died in the same pen and deaths continued until nine in this pen had succumbed by March 1. The production continued to be good for all healthy birds in the pen. There were no deaths until February in the pen receiving barley and no milk, but many of the birds were unthrifty and production was light especially in January and February.

During January and February many of the pullets in both barley-fed pens developed what appeared to be a form of roup. No indication of this trouble was observed in the corn fed pens although no precaution was taken to prevent them from being exposed to infection from the other pens. On careful examination of the trouble in the barley-fed pens, it appeared to be identical with a disease described by Beach, of California, as caused by Vitamine A deficiency.

By March 1st most of the birds in both barley-fed pens were suffering from the ailment and it was evident that the same high mortality experienced the previous year would be repeated. It was then decided to try feeding cod liver oil, so after March first the barley-fed birds were given one-fourth teaspoonful of crude cod liver oil per bird in the wet mash each day. Within two weeks after starting the feeding of cod liver oil, all the pullets had become thrifty, production soon returned to normal and with the exception of some head swellings that appeared to be permanent, no indication of the former trouble was observable. No further deaths were recorded in the barley-fed pens except two in June from ovary trouble.

Several investigators have found that the disease due to Vitamine A deficiency could be prevented by feeding liberal amounts of well cured alfalfa or alfalfa leaves and as a good quality of alfalfa leaves was before the birds at all times, it was considered advisable to keep watch to note if the birds affected were eating the alfalfa. This watch, which was made before the cod liver oil was given, revealed that there was no correlation between the amount of alfalfa consumed and the occurrence of the trouble and some birds seriously affected consumed alfalfa estimated to be equal to twelve per cent of their total feed consumption. This experiment will be repeated next season and with an additional pen fed barley and cod liver oil throughout the year.

EFFECT OF COD LIVER OIL AND RAW LIVER FED TO BREEDING HENS, ON FERTILITY, HATCHABILITY AND VIABILITY

Duplicate pens of ten hens mated to a cockerel for pedigree breeding were fed one-quarter teaspoonful per bird per day of cod liver oil; two other pens were fed one-half ounce of finely chopped raw pork liver and two pens were fed one-half of these amounts of both cod liver oil and raw liver, as supplemental feeds to the regular rations, for the purpose of testing the effects of these feeds on the fertility and hatchability of the eggs produced and the viability of the resultant chicks. At the close of the regular hatching season the male birds were alternated from pen to pen daily and after a week of this practice eggs from the various pens were set as a check on variation due to the individuality of the male bird.

ONE YEAR'S RESULTS ON FERTILITY, HATCHABILITY AND VIABILITY FEEDING COD LIVER OIL, RAW LIVER AND A COMBINATION OF BOTH

—	Supplementary feed	Fertility of eggs	Fertile eggs hatched	Chicks alive at 3 weeks	Total eggs required for 1 chick at 3 weeks
		p.c.	p.c.	p.c.	
Males unchanged.....	Cod liver oil.....	84	55	90	2·4
	Raw liver.....	87	61	92	2·0
	Cod liver oil and raw liver	86	58	88	2·3
	No supplement.....	94	55	90	2·1
Males changed daily.....	Cod liver oil.....	86	50	86	2·0
	Raw liver.....	94	60	93	1·9
	Cod liver oil and raw liver	92	56	80	2·5
	No supplement.....	96	56	93	2·0

SIRE'S INFLUENCE ON EGG COLOUR OF PROGENY

In this test, conducted for four years, an effort has been made to determine if the hereditary character of the sire had any influence on the colour of the shells of eggs laid by his daughters. The males used descended from several generations of dams that laid attractive brown eggs, and these were mated to hens laying light coloured eggs.

From the results obtained, which were the same each year, it seems that egg colour is an inheritable factor with brown as dominant over white in the Barred Plymouth Rock breed and it has been found easy to keep the eggs produced by a flock quite uniform in shell colour by using sires from dark brown egg strains.

EGG PRESERVATIVES

Water Glass was compared with a solution of lime and common salt as a preservative for eggs. The lime-salt solution was prepared by mixing one gallon of water to one pound of fresh, water-slaked lime and one-half pound of common salt. The mixture was stirred frequently for two days, then allowed to settle and the liquid carefully strained off and used as the preservative.

The eggs in the water glass kept fairly well for five months but at the end of ten months were almost worthless. The eggs in the lime-salt solution were in excellent condition in five months and compared favourably to good storage eggs after being in the preservative for ten months.

SEVENTH ALBERTA EGG-LAYING CONTEST

The production in the seventh Alberta Egg-Laying Contest that ended October 30, 1926, was much better than that obtained the previous year, due to some extent to the mild winter of 1925-26. The average production per bird last year was 164.7 eggs and this year it was 176.5 eggs and 175.8 points.

The position of birds and pens in this year's contest was determined by the number of points scored. In determining points the weights of eggs as well as the number were considered as one point was given for each egg weighing 24 ounces per dozen. One-tenth of a point less was given for each ounce that an egg weighed less than 24 ounces per dozen, and one-tenth of a point was added for each ounce that an egg weighed more than 24 ounces per dozen. Eggs weighing more than 27 ounces to the dozen were considered as 27 ounces, and eggs weighing less than 20 ounces per dozen were not counted.

FINAL STANDING OF SIX LEADING PENS AND BIRDS, 1925-26

LEADING PEN

Breed	Owner	Eggs	Points
1. Barred Rocks	F. Lote, Hillcrest	2,406	2,522·5
2. S.C.W. Leghorns	E. R. Nicholls, Big Valley	2,232	2,302·0
3. S.C.W. Leghorns	Jasper Place Poultry Farm, Edmonton	2,208	2,301·1
4. Barred Rocks	H. Higginbotham, Calgary	2,282	2,241·8
5. Barred Rocks	Experimental Station, Lethbridge	2,210	2,181·5
6. S.C.W. Leghorns	Cloverlea Stock Farm, Edmonton	1,891	2,159·4

LEADING BIRD

1. Barred Rock	F. Lote, Hillcrest	312	387·2
2. Barred Rock	Experimental Station, Lethbridge	262	335·6
3. Barred Rock	F. Lote, Hillcrest	271	322·9
4. S.C.W. Leghorn	Jasper Place Poultry Farm, Edmonton	291	306·2
5. S.C.W. Leghorn	H. Higginbotham, Calgary	293	289·9
6. S.C.W. Leghorn	Jasper Place Poultry Farm, Edmonton	250	287·3
7. Barred Rock	H. Higginbotham, Calgary	305	282·8

NOTE.—The pens and birds given above are arranged in the order of the number of points made and not the number of eggs.

SUMMARY OF BREEDS

Breed	Number of birds	Average per bird	
		Eggs	Points
Barred Rocks	100	189·5	143·5
S.C. White Leghorns	110	179·9	183·8
S.C. White Leghorn	10	150·1	185·8
White Wyandotte	20	158·1	143·5
Rhode Island Red	10	141·5	142·9
Chantacleer	10	108·3	100·4
All breeds	260	176·5	175·8

POULTRY REGISTRATION

All birds in the contest were registered in the Canadian Live Stock Records if they had no standard disqualifications and laid 200 eggs or more averaging twenty-four ounces per dozen. A total of forty-eight birds qualified for registration.

BIRDS REGISTERED IN 1926

Name and address of breeder	Breed	Number of birds registered	Average production	Average egg weight ounces per dozen
E. R. Nichols, Big Valley, Alta	S.C. White Leghorn	5	238	25·0
Jasper Place Poultry Farm, Sub. 7 P.O., Edmonton, Alta	" "	4	246	25·0
Clover Lea Stock Farm, Edmonton, Alta	" "	3	215	25·9
Pioneer Poultry Farm, Medicine Hat, Alta	" "	1	200	24·8
Mrs. C. D. Mylius, 10830-73rd Ave., Edmonton, Alta	" "	4	219	25·3
Laywell Poultry Farm, Macleod, Alta	" "	2	205	24·3
F. J. Taylor, Pirmez Creek, Alta	" "	2	209	24·0
Alpine Poultry Farm, Calgary, Alta	" "	2	218	24·3
Round T. Ranch, High River, Alta	R.C. "	2	235	24·9
T. Hutchinson, Chedderville, Alta	Barred Rock	3	234	24·4
G. Glasser, 722-17th Ave. S., Lethbridge, Alta	"	3	214	24·3
H. G. L. Strange, Fenn, Alta	"	2	238	25·1
G. E. Harp, Shouldice, Alta	"	1	221	26·1
H. H. Higginbotham, 1315-1st St. N.W., Calgary, Alta	"	4	247	24·9
R. T. Van Amburg, High River, Alta	"	1	213	24·0
F. Lote, Hillcrest, Alta	"	5	261	25·6
Experimental Station, Lethbridge, Alta	"	4	235	25·7

BREEDING AND DISTRIBUTION OF POULTRY

Careful pedigree breeding with rigid culling has been carried on at the Station for a number of years for the purpose of developing a high egg producing strain of Barred Rocks as uniform in character as possible. At the present time the flock is quite uniform and therefore well adapted to use in comparative tests.

All of the female stock, that remains after culling, is required for experimental purposes, but each year a number of excellent cockerels are available for distribution to farmers and other poultrymen. The demand for this stock always exceeds the supply and this year one hundred and seven of the hundred and twenty birds sold were disposed of by November 1.

In addition to the cockerels, hatching eggs are sold each year after April 10 to 15, as no eggs are used for hatching at the Station after the middle of April. The demand for these eggs, as with cockerels, exceeds the supply so the policy has been adopted to limit each purchaser to two settings in one season. This method of distributing eggs together with the cockerels sold has resulted in the Lethbridge Experimental Station strain of Barred Rocks becoming very widely distributed over Alberta, as well as the neighbouring provinces, with some shipments to the United States and Ontario. Wherever this stock has gone, it has given high egg production which with the results obtained at the Station, seems to show that the factor for production is firmly established in the flock.

APIARY

The work with bees is carried on by H. T. Luther from whose careful notes the following has been prepared.

FALL MANAGEMENT

Thirty-nine ten frame Langstroth and thirty-two ten frame Jumbo colonies were prepared and fed by November 11, 1925, ready for the winter. The colonies were then packed, some in single and double but mostly in quadruple wintering cases with four inches of planer shavings on the sides, seven inches under the hive and twelve inches on top. All colonies were fed either sugar syrup or honey to bring the weight of Langstroth hives after feeding up to seventy-five pounds and the Jumbo up to eighty-five pounds.

In addition to the seventy-one ten frame full colonies ten queens in double colonies were packed for the winter. These double colonies consisted of two five frame nuclei with queen, placed in a ten frame Langstroth hive with a bee tight division board between the nuclei with entrances at opposite ends of the hive. These were packed in single packing cases similar to those referred to above.

WINTER WEATHER CONDITIONS

September of 1925 ended with rain, ice and snow, and October was wet and cold making it difficult to get colonies properly packed and fed for winter. The bee winter was unusually long, having started in October, but the mild open winter with very little snow, abundance of sunshine, and a temperature which fell but twice to seven below zero, brought Alberta bees through to the dandelion flow of late April and May strong in bees and brood. Colonies hurriedly examined on March 10 were found to contain four to five combs of brood. The unusual activity of a mild open winter caused a greater consumption of stores than in ordinary winters and some spring feeding had to be restorted to.

Winter losses were two single colonies and two double colonies amounting to five per cent of the total put into winter quarters. These appear to have perished from lack of stores. The eight double colonies that survived the winter were used in the spring for making single colonies, requeening colonies or building up weak colonies.

SPRING AND SUMMER CONDITIONS AND HONEY FLOW

Conditions during the early spring of 1926 were ideal. Pussy Willows were in evidence on March 10 and these, followed later with Dandelion, Caragana and fruit bloom, gave a maintenance of pollen and nectar for heavy brood rearing. Notwithstanding the fact that during the latter part of May and the early part of June some "spring dwindling" occurred, the colonies were in an exceptionally strong condition, so far as number of bees were concerned, to begin on the season's work. The main honey flow started on June 22 from White Dutch clover and sweet clover, followed in a few days by alfalfa. On July 1 a hive on scales recorded nineteen pounds increase. A steady flow continued through the month accompanied by much swarming. On July 17 a hive on the scales recorded twenty pounds gain in weight, this being the highest daily gain for the season. The last four days of July did not give good nectar secreting weather and these conditions with changeable weather continued throughout August. Second Cutting of alfalfa was in bloom August 5 with White Dutch clover, sweet clover and gum weed yielding a light flow. August, which is usually one of our best honey gathering months, yielded a small flow, six pounds being the largest daily gain from a colony on scales. Brood rearing had practically ceased by the first of September and very little brood were found in the brood chambers by the fifteenth of the month. It was necessary to unite a number of small colonies.

The season was one of unexpected happenings, in that nectar flow began strong in June. July gave an unusually good flow accompanied by many swarms, while August, the month in which a strong flow is looked for, was a disappointment. However, when compared with the average results of the past ten years, a satisfactory crop was produced. Ten frame Jumbo colonies averaged 107.2 pounds and ten frame Langstroth 119.4 pounds of extracted honey. An increase to the Apiary of twenty-seven colonies over spring count was also made. Ninety-five single colonies and twelve hives each containing two five frame nuclei were packed and fed for the winter of 1926-27.

SWARM CONTROL

All tests carried on in the Apiary have a certain bearing or effect on swarm control but two specific methods were tried for the past two seasons, and the effect of each on the control of swarming and honey production noted. All colonies in the Apiary not used in other projects with which this work would interfere, were carefully watched for swarming tendencies and were treated by one of the following methods:

1. *Swarm Control by Dequeening and Requeening.*—As soon as larvae were observed in queen cells the queens were removed and all queen cells were destroyed. Nine days later all queen cells were again destroyed and a young laying queen given to the colony. Five colonies were so tested.

2. *Swarm Control by Separation of Queen and Brood.*—Five colonies that showed larvae in queen cells had the combs containing brood removed from the brood chamber and replaced with empty drawn combs, leaving the queen on these combs. The bees from one of the combs of brood were shaken down with the queen and a queen excluder placed over this chamber. All combs of brood were then placed in a super and put on top of the hive above the extracting supers with the queen excluder between the extracting supers and the one containing brood. The queen cells in the upper super were not destroyed but the cover was left on tightly so that no virgin queen could fly.

In 1925 no further preparations were made for swarming by any colonies treated by either method, but in 1926, a year when swarming was a serious problem in most apiaries in Southern Alberta, twenty per cent of the colonies treated by each method built queen cells after they had been treated as outlined.

While both methods seemed equally effective in controlling swarming, the hives treated by separation of brood and queen produced 16.8 pounds more honey per colony in 1925, and 43.6 pounds more in 1926 than was produced by the colonies treated by dequeening and requeening.

METHODS FOR DETECTING PREPARATION FOR SWARMING

Nine colonies were used for this test in 1925 and twenty-one in 1926. As soon as the bees in the colonies showed signs of congestion in the spring, a shallow super with drawn comb was added to the regular brood chamber without a queen excluder. At the regular examination of the colonies (every nine or ten days) the shallow super was tipped from the rear and it was noted if any queen cells were present along the lower edges of the combs in the shallow super. If such queen cells containing larvae were present the colony was treated by one of the methods for swarm control. If no queen cells were present above, all combs in the lower chamber were examined and if any were found there, they were not destroyed, but the position they occupied on the comb was carefully noted as such cells may have been supersedure cells. During the last two years, thirty colonies have been treated in this manner with satisfactory results. Sixteen built queen cells, twelve of which were found by tipping the shallow super and four were found on the sides of combs in the lower chamber. The four cells in the lower chamber proved to be supersedure cells. Swarming was effectively controlled in all colonies treated by this method.

WINTERING IN ONE, TWO OR FOUR COLONY CASES

It would appear that colonies of bees can be kept satisfactorily in this district in any of these types of wintering cases provided they are properly insulated, have adequate food stores and are not subjected to moisture. The larger case is preferred as it is cheaper and requires less labour in packing the bees than does the smaller case.

COMPARISON OF DIFFERENT STORES FOR WINTER

Fifteen colonies of as nearly equal strength as possible were chosen for this test when the bees were packed in the fall. One-third of these had all honey removed and were fed enough sugar syrup to bring the colony weight up to seventy-five pounds. One-third of the colonies were left with a small amount of honey and fed up to the required weight with sugar syrup. The other one-third were given enough combs of alfalfa and sweet clover honey to bring them up to wintering weight. The reason for carrying on this experiment is on account of the tendency of alfalfa and sweet clover honey to candy. When the honey is candied in the comb the bees appear to suffer and often die of thirst during the long periods when it is impossible for them to have flights and seek moisture from outside sources.

Results of this test so far indicate that it is not advisable to remove all the honey and provide sugar syrup only for winter stores, as colonies so treated have been weaker in the spring. If the winter is mild so that the bees are permitted to have occasional flights they seem to do well on all honey stores, but where the winter is severe, having some sugar appears to be of decided advantage. The feeding of ten to twenty pounds of sugar may be looked upon as a good insurance for having proper winter stores regardless of the kind of winter that may come.

WINTERING SURPLUS QUEENS BY THE TWO-QUEEN SYSTEM

Colonies having less than five combs covered with bees were carefully noted when the last honey was removed in September. The five lightest combs in each of one-half of these colonies were removed and the bees on them brushed off into the hive. The five remaining combs were pushed to one side and a bee tight division board fitted in the centre of the hive with an entrance for bees provided in each compartment at opposite ends of the hive. The following day the five combs containing bees with queen from the remaining weak colonies were placed in the vacant sides; thus two weak colonies or nuclei were brought together into one hive body. Each nucleus so formed was packed and fed twenty pounds of honey and sugar syrup. In the spring one queen was removed from each hive and used for requeening queenless colonies, or to replace drone laying queens. The division boards were then removed from the hives and the bees from the two sides permitted to unite and form a strong colony.

This method of wintering nuclei has been practiced for three winters and the results have been quite satisfactory, especially as a means for providing beekeepers with a few surplus queens in the spring when they are difficult to secure. The brood from the nuclei also may be used to advantage for building up weak colonies if they are not required for starting new colonies.

COMPARISON OF DIFFERENT SIZES OF HIVES

Ten frame Jumbo hives have been compared with ten frame Lanstroth hives for four years. Less swarming has been experienced in the Jumbo than in the Langstroth hive and this helped to make a larger honey crop for the Jumbo hive. The average value of honey produced over the four years' test was for Jumbo hives $27.59, and for Langstroths $23.49. It would appear that as the Langstroth combs are smaller they do not give the prolific queen room enough to lay nor the bees room in the brood chamber, thus causing congestion and swarming. The Jumbo being two inches deeper seems to relieve this difficulty. Occasionally where an extremely prolific queen is present, even the Jumbo hive does not provide sufficient room.

QUEEN REARING

Wooden queen cells, coated with bees wax and fastened twenty to a frame were used for queen rearing. The cells were first primed with a small amount of Royal jelly and a very young larva transferred from a colony of a selected queen, and the cell frame then placed in a queenless colony. When cells were drawn out, and capped, they were transferred one each to hatching and mating boxes. After emerging, mating and laying, the young queens were introduced to queenless colonies or disposed of otherwise.

Three years of queen rearing in June, July and August of each year gave an average of sixty-three per cent of queens mated and laying from the larvae transferred. This percentage did not include undesirable queens that were destroyed. July and August have proved more satisfactory than June for queen rearing as more of the cells were accepted and better queens were reared in these months. It was also noted that as the honey flow strengthened, queen cells were accepted more readily and larger queens were produced.

Raising queens by transferring eggs instead of larvae to the queen cells was tried but the bees refused to accept such cells.

The queens reared at the Station are giving good results and with the small amount of labour entailed and the success with which they may be reared, it would seem feasible for the Western beekeepers to raise their own queens. The home reared queen is usually better and can be produced at less than the cost of the imported queen.

BUILDING UP WEAK COLONIES IN THE SPRING

Three methods of building up weak colonies in the spring were tried:

1. Shaking a two pound package of bees into a weak colony.

2. Placing weak colonies above a queen excluder on top of strong colonies allowing bees to unite and have one common entrance and six weeks later moving the bottom or strong colonies to a new location.

3. Giving combs of emerging brood to weak colonies.

The average amount of honey produced per colony for each method was:—

—	1924	1925	1926
	lb.	lb.	lb.
Method (1) Adding 2-lb. packages	.....	.....	52·4
Method (2) Uniting two weak colonies	78·5	80·7	113·3
Method (3) Giving combs of brood	84·6	104·2	100·3

Considerable fighting took place when the package bees were shaken into the hives and there was a decided tendency to swarm in the colonies so treated.

RELATION BETWEEN DIVIDED AND UNDIVIDED COLONIES AND HONEY YIELD

Comparisons have been made for three years between colonies artificially divided by approved methods and those not divided. The undivided colonies were troubled much more with swarm preparations causing loafing and loss of time during the honey flow, than were the divided colonies with the result that the undivided colonies produced an average of 22.5 pounds less honey per colony per year than was produced by the divided colonies and their increase.

TIMES AND METHODS FOR MAKING INCREASE

Three tests were made to determine the time of season and the best method to use for making increase so as to control swarming and interfere as little as possible with the honey crop.

1. When the colony became ready for a honey super in the spring, most of the capped brood and nurse bees along with the old queen were taken away and a young laying queen was introduced.

2. The first week in July when the first queen cells containing larvae were found, the queen and one frame of capped brood and adhering bees were taken away and all queen cells were destroyed. Nine days later all queen cells were again destroyed in the parent colony and a young laying queen was introduced.

3. A second brood chamber of drawn comb without a queen excluder was given when the colony was ready for a honey super in the spring. In the second week of the honey flow all capped brood was moved to the bottom chamber with the queen. A young laying queen was introduced to the uncapped brood with adhering bees in the former top super which was now given a cover and bottom board and set alongside of the parent colony. Combs of honey were removed from both brood chambers and the space left vacant was filled in with drawn comb. Ten days later on a day when bees were flying freely the new colony was removed to a new location. In the years 1924 and 1925 there were no swarms developed in any of the groups but in the past season (1926) with an early strong flow of honey swarm cells were built in one colony of each group.

The average results for three years show that the first method had an advantage over the others with a production of honey and increase valued at $22.22, the second method produced honey and increase valued at $19.33 and the third $21.72, while the check colonies not divided averaged $17.29 for the honey and increase produced. The length, strength and duration of honey flow and the nectar secreting season, as well as the strength and condition of hive at time of dividing and the method used, effected the data obtained.

DRAWN OUT COMB VERSUS SHEETS OF FOUNDATION WAX FOR EXTRACTED HONEY PRODUCTION

Three years' comparison of giving drawn out combs and sheets of foundation wax for honey production have clearly shown the value of drawn comb to the commercial beekeeper where a large quantity of foundation must be drawn out. In years where nectar and pollen supply and weather conditions were favourable, colonies drew out wax with less loss to the honey crop than they did in a year of light honey flow and variable weather.

Judged by the smaller production of honey made by the bees on foundation as compared to the production of those working on drawn comb, it cost 73 cents in loss of honey to draw out a Langstroth frame from foundation in 1924, a year when the honey crop was short; 49 cents in 1925 which was a good honey year, and 52 cents per frame in 1926, a year of medium honey production. The average cost for the three years was 58 cents per frame.

ADDITIONAL APIARY PROJECTS

In addition to the projects reported the following are under way and will be reported when sufficient data have been accumulated.

Ap. 22. Package bees as a means of starting colonies and best time for procuring package bees.
Ap. 25. The value of stimulative feeding for brood production.
Ap. 35. Comb honey versus extracted honey production.
Ap. 36. Relation of strength of colony in bees and brood to the honey crop.
Ap. 42. Protected versus unprotected hives during summer.
Ap. 55. Returns from out apiaries.
Ap. 56. Uniting colonies for main honey flow.
Ap. 57. Increasing strength of colony for main flow.

GENERAL NOTES

The Annual Short Course on Irrigation Farming conducted in co-operation with the Provincial Department of Agriculture was held the first week in February and was enthusiastically received by the farmers. From sixty-five to one hundred attended each session. Besides speakers from the Provincial Department of Agriculture and the Experimental Farm staff, speakers were provided by the Department of Natural Resources of the Canadian Pacific Railway, the University of Alberta, the Dominion Seed Branch, The Dominion Entomological Branch, The Canadian Sugar Factories, Limited, and the Crystal Dairy of Lethbridge. The manager of the Prince of Wales' ranch at High River and C. B. Gooderham, of Ottawa, each gave a series of lectures. A duplicate course was given this year at the School of Agriculture, Raymond, where the same speakers appeared.

But few of the small fairs of the district were held this year so no tent exhibit was sent out as in previous years. Two exhibits, one of the cereal, forage crop and vegetable varieties and another of sheep, hogs, dairy cattle and poultry were shown at the Lethbridge Summer Fair. An extensive educational display of horticulture and apiculture was placed at the Lethbridge Horticultural Show and a similar exhibit of horticulture was placed at the Calgary Horticultural Show.

Members of the staff were called on frequently during the year to address farmers' meetings and conventions.

OTTAWA: Printed by F. A. ACLAND, Printer to the King's Most Excellent Majesty, 1928.