DOMINION OF CANADA

DEPARTMENT OF AGRICULTURE

DOMINION EXPERIMENTAL FARMS

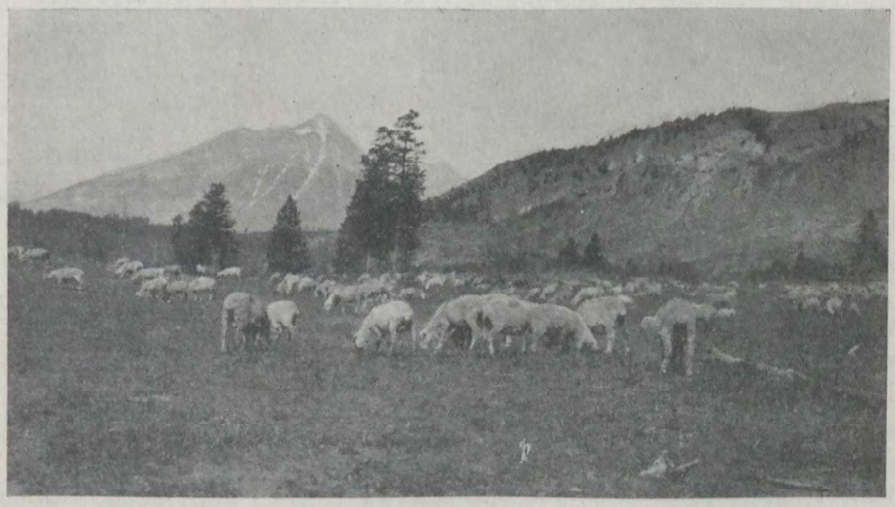
EXPERIMENTAL STATION

LETHBRIDGE, ALTA.

REPORT OF THE SUPERINTENDENT

W. H. FAIRFIELD, M.S.

FOR THE YEAR 1922



Type of Pasture in the Forest Reserve.

Printed by authority of the Hon. W. R. Motherwell, Minister of Agriculture, Ottawa, 1923

OTTAWA
F. A. ACLAND
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1923

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EXPERIMENTAL STATION, LETHBRIDGE, ALTA

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

THE SEASON

The season of 1922 opened with an unusually late spring. April was so stormy and wet that it was impossible to do any work whatsoever on the land throughout the month. There has been only one other year since the establishment of the Station when work on the land has not been in full swing before the first of May, this occurred in the spring of 1920. On account of the late start, much of the wheat and practically all the other field crops in the district were seeded after May 15, in fact several farmers did not finish seeding wheat until well into June. After work started, however, it continued in an almost uninterrupted manner and the total acreage planted was about the same as last year. The late spring had the effect of causing farmers to hurry through their work, with the usual result that much seeding was done on poorly prepared land.

Weather conditions were favourable for bringing the crops along rapidly until the middle of June, when two weeks of dry weather caused some injury. The effect of the absence of rain was felt sooner than would have been the case had the usual supply of moisture been present in the subsoil, but the late summer and fall of 1921 were so dry that there was practically no reserve moisture in the soil for the following spring and the showers during May, while frequent and timely, were too light to wet down to any depth.

The extent of injury to the crops in June varied greatly throughout the district. In some localities, showers came just at the critical time and kept the plants growing without a check, while in less fortunate districts the crops burned badly. The dry spell was broken by some good general rains the last week in June and occasional showers until the middle of July. After that date dry weather again prevailed, causing some damage, especially to late crops.

Crop conditions generally throughout Southern Alberta were better in the season just past than in any year since 1916. On the west adjacent to the mountains, crops were good but farther east they were only fair and in some districts distinctly poor.

There was little soil drifting during the season but cutworms did considerable damage in some localities. Grasshoppers threatened to be a serious menace but the energetic campaign carried on against the pest by the Provincial Government with the co-operation of the farmers reduced their depredations to a minimum.

The precipitation for the crop year August, 1921, to August, 1922, was below the normal, being 12.34 inches. The season was remarkably frost-free, as the last frost of the spring was on May 23, when the thermometer went to 29 degrees F. and the first killing frost of the fall was recorded on October 11, the thermometer registering 21 degrees F. The absence of early fall frosts compensated for the backward spring, permitting the late-sown crops to mature.

METEOROLOGICAL DATA FOR CALENDAR YEAR 1922

Month	Temperature F.			Precipitation	Bright sunshine
	Highest	Lowest	Mean		
	°	°	°	Inches	Hours
January	46·0	27·0	16·95	0·43	83·7
February	43·0	31·0	4·82	0·41	122·3
March	58·0	11·0	27·18	0·81	165·4
April	63·0	8·0	36·55	2·57	152·6
May	84·0	28·0	50·43	0·89	254·9
June	88·0	38·0	61·4	1·87	267·2
July	90·0	40·0	62·3	2·30	302·1
August	92·0	38·0	64·0	0·40	268·9
September	88·0	34·0	57·4	0·81	198·1
October	74·0	21·0	46·25	0·78	157·3
November	67·0	9·0	33·3	0·47	106·0
December	52·5	34·5	13·57	0·60	69·3
Total for year	.....	.....	.....	12·34	2,147·8

Latest spring frost occurred on May 26, 1922 ..... 29·5°
First fall frost occurred on October 2, 1922 ..... 32°
First killing frost occurred on October 11, 1922 ..... 21°
Total precipitation for the 4 growing months of April, May, June and July, 1922, 7·63 inches
Twenty-one years average for the 4 growing months of April, May, June and July ..... 8·00 inches
Twenty-one years average annual precipitation ..... 15·25 inches

A limited number of farmers in the district have been supplied with rain gauges and they have been good enough to report monthly to this Station. The table that follows gives the location and the name of the observers who have sent in complete reports for the twelve months.

PRECIPITATION RECORDS IN THE DISTRICT, 1922

Station and Observer	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total 1922
	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.
Barons Rev. S. Pike.	0·40	0·90	0·55	2·29	0·80	1·46	3·41	0·50	0·60	0·80	0·50	0·90	13·11
Bow Island A. T. Werts.	1·20	1·40	0·47	1·04	1·18	1·29	0·61	1·10	0·48	0·41	0·66	0·65	10·49
Cameron Ranch Geo. A. McDonald.	0·30	0·55	0·60	1·46	1·01	1·91	1·47	0·82	0·52	0·89	0·30	0·60	10·43
Carmangay W. R. Henderson.	0·35	0·40	0·60	2·06	0·78	1·70	2·45	0·74	0·65	0·62	0·50	0·85	11·70
Claresholm School of Agriculture.	0·20	0·32	0·61	3·42	0·50	1·83	3·07	0·99	0·57	0·44	0·29	0·56	12·80
Coaldale Rev. N. F. Priestly.	0·43	0·60	0·60	1·89	1·01	0·73	2·02	0·26	0·89	0·80	0·50	0·65	10·38
Grassy Lake James Palmer.	0·85	0·80	1·15	2·25	1·75	1·41	1·46	1·15	0·59	0·61	0·42	0·55	12·99
Kippenville D. Kippen.	0·30	0·60	0·95	3·10	1·43	0·70	2·31	1·11	0·84	nil	0·21	0·50	12·05
Lethbridge Experimental Farm.	0·43	0·41	0·81	2·57	0·89	1·87	2·30	0·40	0·81	0·78	0·47	0·60	12·34
Nobleford A. J. Penny.	0·30	0·50	0·40	1·88	0·50	1·46	2·87	0·27	0·59	0·71	0·30	0·60	10·38
Orion S. Eggleston.	1·35	1·50	0·85	1·34	1·50	1·16	2·41	0·99	0·80	0·37	0·46	0·80	13·53
Pincher Creek W. W. Henderson	0·70	0·60	1·40	3·69	0·68	0·88	3·01	0·48	0·32	0·55	0·20	1·00	13·69
Raymond School of Agriculture.	0·80	0·50	0·85	2·59	0·44	2·31	1·99	0·10	0·53	0·71	0·55	0·60	11·97

Precipitation Records, 1902–1922

Table showing the precipitation at Lethbridge, giving the total for each season from August 1 to July 31, the reason for presenting it in this manner is that moisture received after July 31 has little effect on growing grain, but from this date on, during the fall, there is reason to believe that at least some of the moisture received in the form of rain and snow is carried over in the soil and subsoil for the use of the crop the following spring. Consequently, the total precipitation is given for what is termed the "crop year" rather than reporting for the total of the "calendar" year as is usually done.

Year	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Year	Total for crop year
	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.		in.
1902	.....	.....	.....	.....	.....	0·67	1·03	0·48	0·15	11·27	5·68	5·95	1902	25·23*
1902–03	0·69	0·84	0·02	0·43	0·84	0·62	0·79	0·89	0·33	2·95	1·12	1·86	1903	11·38
1903–04	3·21	1·60	0·18	0·58	0·70	0·50	0·90	1·03	0·41	2·86	1·80	0·96	1904	14·73
1904–05	1·19	0·52	0·85	0·03	0·35	1·45	0·05	0·74	0·56	1·13	2·68	1·44	1905	10·99
1905–06	1·99	0·80	1·13	1·36	0·25	0·22	0·20	0·54	1·30	8·60	2·31	0·83	1906	19·53
1906–07	4·70	0·16	1·93	0·81	0·88	1·52	0·30	0·34	1·08	1·14	3·64	1·43	1907	17·93
1907–08	2·30	3·24	0·05	0·14	0·32	0·27	0·75	1·10	0·67	2·78	7·64	0·41	1908	19·67
1908–09	0·89	0·73	1·16	0·02	0·35	0·49	0·28	0·37	1·51	4·27	0·62	1·98	1909	12·67
1909–10	0·21	0·49	0·40	0·53	0·54	0·24	0·83	0·17	0·28	0·79	0·53	0·09	1910	5·10
1910–11	1·07	2·01	0·59	0·41	0·94	0·70	0·52	0·32	0·82	1·90	4·71	2·27	1911	16·26
1911–12	3·63	4·16	0·57	0·95	0·77	0·69	0·40	0·44	0·20	0·66	1·73	2·78	1912	16·98
1912–13	1·41	2·61	1·07	0·99	0·23	0·80	0·30	0·42	0·52	1·70	4·70	1·29	1913	16·04
1913–14	1·93	1·65	0·50	0·36	nil	1·55	0·96	1·12	0·54	0·29	2·48	0·93	1914	12·31
1914–15	3·59	1·07	2·17	0·63	1·19	0·50	0·94	0·22	0·04	3·03	4·84	3·44	1915	21·66
1915–16	0·96	1·32	0·96	0·75	0·27	1·09	0·86	0·90	0·46	3·77	3·54	3·33	1916	18·21
1916–17	2·97	4·66	1·99	0·49	0·51	0·73	0·27	0·10	1·57	0·95	1·42	1·37	1917	17·05
1917–18	2·00	1·67	0·72	nil	1·13	0·46	0·76	0·66	0·13	0·58	0·75	0·85	1918	9·71
1918–19	1·23	1·07	0·24	0·43	0·46	0·06	0·95	0·75	0·47	1·75	0·56	1·06	1919	9·03
1919–20	1·05	2·04	1·78	1·26	0·55	0·84	1·21	0·89	4·37	1·66	0·40	2·59	1920	18·64
1920–21	0·20	0·05	0·99	0·06	0·79	0·56	0·47	1·42	1·19	0·96	1·04	3·23	1921	10·96
1921–22	0·46	1·29	0·23	1·73	0·19	0·43	0·41	0·81	2·57	0·89	1·87	2·30	1922	12·34
Average	1·78	1·60	0·88	0·60	0·56	0·69	0·63	0·65	0·91	2·57	2·57	1·92	.....	15·07

*1902 total for 7 months only as records were not kept before January 1, 1902.
Ten inches of snow is computed as one inch of precipitation.

ANIMAL HUSBANDRY

HORSES

At the present time there are 22 head of horses at the Station, consisting of 16 work-horses, 1 driver and 5 young horses, the latter ranging in age from two to four years. With the exception of one team of pure-bred Clyde mares, they are all grades. All wintered outside in a corral excepting the driver and two teams. They came through the winter in good shape and were in excellent condition to start the spring work.

WINTER FEEDING FOR BEEF AND MUTTON

The most profitable general crop a farmer can raise on irrigated land is alfalfa providing he can dispose of it readily at a reasonable price, but, owing to the limited amount of breeding stock kept on the irrigated farms, a large proportion of the hay now raised is being offered for sale. Even in seasons when the market is strong, only baled hay of good colour and quality finds a ready market. Often alfalfa is of good feeding value but sufficiently off in colour to prevent its being sold to good advantage when baled, consequently the problem of disposing of the hay must be met by feeding at least a portion of the crop on the farm. It was to attempt to assist in finding some profitable means of feeding alfalfa on the home farm that feeding tests have been carried on at the Station. As early as 1911 these experiments were started with lambs and in 1912 with steers, the main object in view being to determine the feasibility of marketing alfalfa "on the hoof" rather than baling and shipping it. Each year an attempt has been made in these experiments to solve a market problem which is becoming more acute for the hay growers on the irrigated land. For this reason, alfalfa has been the basic roughage employed in all the feeding tests carried on at the Station. It has been fed alone and in conjunction with other feeds that are commonly available on an irrigated farm. All feeding has been done in the open, the only shelter provided having been open sheds, one at the end of each feeding lot.

CATTLE

STEER FEEDING EXPERIMENT

To obtain information as to the value of feeding silage along with alfalfa as a roughage to steers and also to compare corn and sunflower silage, a feeding test was started December 14, with 39 head of steers. The steers were divided into three groups of thirteen each. Each group, throughout the test, received the same quantity of grain, made up of a mixture of equal parts of ground oats and barley, but the roughage supplied varied as follows:—

Group 1—Alfalfa hay and sunflower silage.

Group 2—Alfalfa hay and corn silage.

Group 3—Alfalfa hay.

As in previous tests, the steers were fed in the open in the corrals, where they had access to water at all times. For shelter, other than the 7-foot board fence surrounding the corral, they were provided with a straw shed open to the south. The following table gives in detail the results of the feeding test:—

SUNFLOWER VS. CORN SILAGE
ENSILAGE VS. NO ENSILAGE

	Group 1 — Sunflower silage Alfalfa grain	Group 2 — Corn silage Alfalfa grain	Group 3 — Straight Alfalfa grain
Number of days in experiment ..... day	118	118	118
Number of steers in experiment	13	13	13
Total initial weight (Dec. 14, 1921) ..... lbs.	13,822	13,812	13,817
Average initial weight ..... "	1,063·23	1,062·46	1,062·84
Final total weight (April 11, 1922) ..... "	16,055	16,360	15,820
Final average weight ..... "	1,235	1,258·46	1,216·92
Total gain for period ..... "	2,233	2,548	2,003
Average gain per head for period ..... "	171·77	196	154
Average gain per head per day ..... "	1·456	1·661	1·305
Quantity of silage fed for period ..... "	23,481	23,481	
Quantity of alfalfa hay for period ..... "	29,180	29,690	34,165
Quantity of grain (equal parts ground barley and oats) fed for period ..... "	11,128	11,128	11,128
Quantity of salt fed for period ..... "	75	75	75

COST OF FEED AND RETURNS

Silage at $4 per ton	$ 46.96	$ 46.96	$
Alfalfa hay at $10 per ton	145.90	148.45	170.88
Grain at $22 per ton	122.41	122.41	122.41
Salt at $40 per ton	1.50	1.50	1.50
Total cost of feed	316.77	319.32	294.79
Cost of feed per head	24.37	24.56	22.68
Cost of feed per head per day	0.206	0.208	0.19
Cost to produce one pound of gain	0.141	0.125	0.147
Initial cost of steers including commission, insurance and freight	700.77	700.26	700.52
Initial cost of steers per pound	0.0507	0.0507	0.0507
Total cost plus cost of feed	1,017.54	1,019.58	995.31
Selling price of steers 5½c. per lb. less 3% shrink	805.86	818.95	792.27
Selling price of steers at 3½c. and 4c. respectively less 3% shrink	32.23	34.30	37.64
Net loss on group	179.45	166.33	165.40
Net loss per head	13.80	12.79	12.72

From a financial standpoint the experiment was a disappointment. The reason for this was that there was not sufficient difference between the buying and selling price. As will be noted, the steers were purchased in December for 5.07 cents per pound and they were sold in March for 5½ cents per pound. A study of the above table will indicate that the cost of producing one pound of gain was 12.5 cents, 14.1 cents and 14.7 cents per pound in the respective lots. Although in this particular test the cost of producing one pound of gain is relatively high, still it is safe to assume that it will cost more to produce a pound gain in winter feeding than beef will sell for per pound in the spring. It is perhaps needless to point out that the profit comes from the higher price that the entire animal or carcass will sell for in the spring on account of its better finish, as compared to its value the previous fall.

In this test, where the steers cost 5.07 cents per pound in the fall, making the gains that they did they should have sold for 6.29 cents per pound in the spring to have broken even, i.e., to have paid for the feed consumed at the prices charged. Any price paid over this amount would have been net profit.

This experiment shows in a very clear manner the importance of having a reasonable spread between the buying and selling price. In averaging up the results of the winter steer feeding experiments at this Station since 1912, after eliminating the years 1916 to 1919 inclusive as being abnormal war years, it is found that the average spread would have to be $1.19 per hundred weight

between the buying price in the fall and the selling price in the spring to break even on the feeding operations, any amount more than this would show a profit. Speaking roughly, therefore, our experience would indicate that a farmer should have about $1.25 per hundred weight spread between the buying and selling price to be on the safe side. Of course the length of the feeding period is an important item. The shorter this is, provided the steers are in condition and can be disposed of at a satisfactory price, the greater the profit.

The daily gain made by the three groups was only fair, but this, no doubt, was the result of the severe weather experienced throughout the feeding period. The two lots receiving silage made slightly higher gains than the lot fed on straight alfalfa, but not enough additional gains to offset the cost of the extra feed consumed. In no case was the amount of alfalfa hay fed per day limited to less than the steers in the respective groups would eat up clean.

The groups getting silage were started on 3 pounds of silage per head per day. Ten days elapsed before this amount was increased to 5 pounds, as it was a week before they appeared to relish it and seemed to want more. Observations would lead one to believe that the quantity of corn silage could have been increased more rapidly than the sunflower silage as the steers cleaned up the corn silage better. The maximum consumption of silage when the steers were on full grain ration was 25 pounds per head per day. Ten pounds of chop was the amount of grain fed during the latter part of the finishing period.

The table following gives the average daily ration for the entire period:—

——	Group 1	Group 2	Group 3
	Lbs.	Lbs.	Lbs.
Silage (sunflowers)	15·31	(corn) 15·31	
Alfalfa	19·0	19·36	22·27
Chop	7·25	7·25	7·25

The weight of silage fed per day was the same for groups 1 and 2, but was determined by the consumption of the group eating the least amount. It took 5 pounds of silage to take the place of 1 pound of alfalfa hay.

From one year's test it would be unwise to draw any conclusions as to the value of ensilage in winter feeding for the production of beef, but a second feeding test along similar lines was started in December, 1922, and is now under way.

SHEEP

LAMB FEEDING EXPERIMENT

An experiment similar to that with steers, planned along identical lines, was started with lambs on January 5, 1922. One hundred and twenty range lambs were selected and divided as equally as possible as to weight and general quality into three lots of forty each. For grain, the lambs received whole oats. The roughage supplied to the different lots was the same as for the steers.

Group 1—Alfalfa hay and sunflower silage.

Group 2—Alfalfa hay and corn silage.

Group 3—Alfalfa hay.

As in previous tests, the lambs were fed in open corrals where they had access to water at all times. For shelter they had a shed open to the east. The lambs received hay in combination racks at 7.30 a.m. and 3.30 p.m. each day and the grain was fed on silage in the same trough. They were started on one half-pound of oats and at the close of the feeding period were getting 1 pound

per head per day. The amount of oats fed was the same in all three groups. The sunflower silage fed group 2 was regulated by the amount of corn silage eaten by group 1, as the sunflower silage proved less palatable than the latter. The lambs were started on half pound of silage and at the close of the period were getting 1 pound per head per day. Each group was given all the hay they would eat up clean.

Water was constantly supplied in troughs and, in extreme weather, tank heaters were used to keep the ice off the surface. Salt was furnished in boxes made for this purpose.

The following table gives the detail of the results of the feeding test:—

SUNFLOWER VS. CORN SILAGE
ENSILAGE VS. NO ENSILAGE

——	Group 1 Sunflower silage Alfalfa grain	Group 2 Corn silage Alfalfa grain	Group 3 Straight Alfalfa grain
Number of days in experiment	96	96	96
Number of lambs in experiment	40	40	40
Total initial weight, Jan. 5, 1922 lbs.	2,680	2,688	2,688
Average initial weight "	67	67·2	67
Final total weight, April 11, 1922 "	3,565	3,520	3,435
Final average weight "	89·125	88	85·875
Total gain for period "	885	832	755
Average gain per head for period "	22·125	20·8	18.875
Average gain per head per day "	·23	·2166	·1966
Quantity of silage fed for period "	3,020	3,020	
Quantity of alfalfa hay fed for period "	7,810	7,845	8,575
Quantity of grain (whole oats) fed for period "	2,900	2,900	2,900
Quantity of salt fed for period "	85	85	85

COST OF FEED AND RETURNS

Silage at $4 per ton	$ 6.04	$ 6.04	
Alfalfa hay at $10 per ton	39.05	39.23	$ 42.88
Grain at $18.25 per ton	26.46	26.46	26.46
Salt at $40 per ton	1.70	1.70	1.70
Total cost of feed	73.25	73.43	71.04
Cost of feed per head	1.83	1.84	1.78
Cost of feed per head per day	0.19	0.19	0.185
Cost to produce one pound of gain	0.083	0.88	0.094
Initial cost of lambs	194.30	194.88	194.30
Initial cost of lambs per pound	0.0725	0.0725	0.0725
Total cost plus cost of feed	267.55	268.31	265.34
Selling price at $11.10 per cwt., less 3% shrink	383.84	378.95	369.85
Net profit on group	116.29	110.64	104.51
Net profit per head	2.91	2.77	2.61

The table following gives the average daily ration for the entire period.

——	Group 1	Group 2	Group 3
	Lbs.	Lbs.	Lbs.
Silage (sunflowers)	0·79	(corn) 0·79	
Alfalfa	2·03	2·04	2·23
Whole oats	0·76	0·76	0·76

The daily gains made by the three groups were fair. It should be stated that the lambs showed only a moderate degree of finish at the close of the test, notwithstanding these gains. This may be accounted for by the fact that the grain fed was oats. With the amount of alfalfa hay fed, barley would have

tended to balance the ration better. In any event, a mixture of barley and oats would have doubtless given better results than the straight oats.

Lambs getting sunflower silage showed an average daily gain of .23 pound, while those getting corn silage showed an average daily gain of .22 pound. In replacement value, 3.5 pounds of both kinds of silage replaced 1 pound of alfalfa hay.

SUGGESTIONS REGARDING THE FATTENING OF LAMBS

When a feeder has a supply of feed it may be profitable to produce gains at a slow rate and keep the lambs a longer time. Lambs cannot be fattened properly on alfalfa alone, hence it is advisable to use alfalfa during the first part of the fattening period and then add grain to finish the lambs before marketing.

There is naturally a great deal of individual variation among the lambs that make up any bunch that goes into the feeding lot. They are not all likely to be in the same condition and some will fatten very much more quickly than will others. Hence, in case a large number of lambs are being fed, it is quite often possible and highly advisable, provided market conditions are right, to cut out and sell a carload lot very early in the feeding operations. This is usually more profitable than to wait till the thinner ones are finished.

The trough in which the grain is fed should be kept clean and there should be ample space so that each animal can get its share of the grain. Both troughs and racks should be constructed so that sheep cannot get their feet into them.

Great care should be exercised at all times in getting lambs on to a full grain ration or some of them will go off their feed. Generally speaking, it is better to start with 2 ounces of grain per day and take from four to six weeks to get the lambs to full feed. In no case should the operation be hurried, as this means waste of grain and may result in a loss of some of the lambs.

Sheep require salt and it is a good plan to supply it in a trough used only for that purpose. When salt is kept before them all the time they seldom eat more than one-quarter ounce per head per day.

RESUME OF LAMB FEEDING TESTS

An interesting development that has taken place in the last couple of years in the sheep industry in this province has been the rapid expansion of lamb feeding. In the vicinity of Calgary in particular, thousands of sheep, principally lambs, have been fed with profit, screenings being the main feed used. On this account it would seem fitting to give a brief summary of the lamb feeding experiments carried on at Lethbridge. There is still another reason for doing so for, with the impetus that the growing of alfalfa is having in southern Alberta due to the development of irrigation, all means of disposing of this valuable crop by feeding on the farm rather than by disposing of it otherwise, is of particular and timely interest to farmers on irrigated lands who find themselves in possession of reasonably large quantities of alfalfa.

The conditions under which range lambs are handled are such that the lambs are not, as a rule, fit for slaughter at weaning time. The owner sells them at once because he has not the surplus feed available with which to finish them. The alfalfa grower has an opportunity to step in at this point with his feeding operations and thus build up an industry profitable both to himself and the district, for the rancher can rear the lambs more cheaply than the farmer can on his limited land holdings, but cannot feed them through the winter, as he usually requires more feed for his breeding stock than is available, while the farmer can finish the lambs on his abundance of alfalfa hay supplemented, of course, with the necessary grain.

Another fact recognized by progressive farmers is that some form of live stock should be kept to convert into cash the by-products of the grain lands, as each fall a goodly amount of feed goes to waste on the stubble fields. As scavengers for gleaning stubble fields, cleaning up around straw piles and converting screenings and refuse grain into cash, the sheep is an animal *par excellence*. Then again, damaged feed had far better be fed than hauled to the market where, if saleable at all, it must be disposed of at a sacrifice.

In the intermountain states to the south the alfalfa growers have found, since the practice of lamb feeding has become general during the last twenty or thirty years, that it is a most satisfactory and profitable venture. Our experiments along similar lines carried on at this Station since 1911 have demonstrated that excellent results may be obtained here.

Various combinations of feeds have been used, such as ensilage and green feed, to combine with the alfalfa supplemented with grain. The following summary gives this in detail:—

SUMMARY FEEDING TABLE

Year	Roughage	Grain
1911–12...	Group 1. Lambs—Alfalfa and.....	2 parts oats, 2 parts wheat, 1 part bran.
	Group 2. Lambs—Alfalfa and.....	Screenings.
	Group 3. Lambs—Alfalfa, roots and.....	2 parts oats, 2 parts wheat, 1 part bran.
	Group 4. Lambs—Alfalfa and roots.....	
	Group 5. Lambs—Alfalfa alone.....	
1912–13...	Group 1. Lambs—Alfalfa, roots and.....	2 parts oats, 2 parts wheat, 1 part bran.
	Group 2. Yearlings—Alfalfa, roots and.....	2 parts oats, 2 parts wheat, 1 part bran.
	Group 3. Yearlings—Alfalfa and.....	2 parts oats, 2 parts wheat, 1 part bran.
	Group 4. Yearlings—Alfalfa and.....	Screenings.
	Group 5. Yearlings—Alfalfa alone.....	
	Group 6. Yearlings—Alfalfa and roots.....	
1913–14...	Group 1. Yearlings—Alfalfa, roots and.....	2 parts oats, 2 parts wheat, 1 part bran.
	Group 2. Lambs—Alfalfa, roots and.....	2 parts oats, 2 parts wheat, 1 part bran.
	Group 3. Lambs—Alfalfa and roots.....	
	Group 4. Lambs—Alfalfa and.....	2 parts oats, 2 parts wheat, 1 part bran.
	Group 5. Lambs—Alfalfa and.....	Screenings.
	Group 6. Lambs—Alfalfa alone.....	
1914–15...	Group 1. Lambs—Alfalfa and.....	Equal parts barley and oats.
	Group 2. Lambs—Alfalfa, oat sheaves and.....	Equal parts barley and oats.
1915–16...	Group 1. Lambs—Alfalfa, short feed and.....	Equal parts barley and oats.
	Group 2. Lambs—Alfalfa, long feed and.....	Equal parts barley and oats.
1916–17...	Duplication of 1915 and 1916.	
1917–18...	Group 1. Subdivided—Lambs—Home grown vs. range.....	
	Group 2. Subdivided—Lambs—Mixed grain vs. screenings.....	
1918–19...	Group 1. Lambs—Alfalfa, short feed.....	Screenings.
	Group 2. Lambs—Alfalfa, long feed.....	Screenings.

Some conclusions to be drawn from the eight consecutive years' tests from 1911-12 to 1918-19 are:—

1. It is profitable to stubble-graze and fatten range lambs in the fall and winter months.

2. It is more profitable to dispose of alfalfa by feeding it to fattening lambs than to bale and ship it off the farm.

3. Owing to the high cost of production, roots are not likely to be raised for fattening range lambs. When fed as an extra in the form of an addition to alfalfa, slightly higher gains were secured than when alfalfa was fed as a sole roughage. Roots are, therefore, valuable as a supplement.

4. When a ration of two-thirds alfalfa and one-third oat sheaves was fed, the lambs ate more roughage and made greater gains than on straight alfalfa.

5. Screenings (No. 1 stock food) are a valuable substitute for grain. When alfalfa was the sole roughage fed it was found that it took 105·9 pounds of screenings to equal 100 pounds of grain (equal parts barley and oats) that is, recleaned screenings are 94·4 per cent efficient as grain.

6. Screenings, owing to their low price, produce cheaper gains than grain.

7. In order to finish lambs satisfactorily, it is necessary to feed grain in addition to alfalfa.

8. The only protection necessary for fattening lambs is shelter from winds and a dry place to bed.

In presenting the summary of the feeding trials the following table is included to give a comparison of the results of the different years.

SUMMARY OF LAMB FEEDING TRIALS 1911–1919

Winter of	Buying price per cwt.	Selling price per cwt.	Spread per cwt.	Profit per head	Cost of Shearing per head	Price received for wool per pound	Prices charged for feeds					Cost of feed per head per day	Cost to produce one pound of gain	Weekly gain per head
							Alfalfa per ton	Roots per ton	Oat sheaves per ton	Grain per ton	Screenings per ton			
	$	$	$	$	cents	cents	$	$	$	$	$	cents	cents	lbs.
1911–12.....	3·80	6·25	2·45	1·24	.....	.....	10·00	2·50	.....	20·00	5·00	1·85	7·05	1·83
1912–13.....	5·10	6·50	1·40	0·52	.....	.....	12·00	3·00	.....	20·00	5·00	1·87	9·28	1·49
1913–14.....	4·65	6·88	2·23	1·33	9	16½	12·00	3·00	.....	20·00	9·00	1·90	9·30	1·49
1914–15.....	6·11	7·96	1·85	1·20	.....	.....	12·00	.....	10·00	20·00	.....	1·65	7·40	1·57
1915–16.....	7·55	9·40	1·85	2·19	11	33	12·00	.....	.....	20·00	.....	2·3	8·75	1·89
1917–18.....	16·54	16·65	0·11	4·05	20	60	12·50	.....	.....	22·50	20·00	3·65	11·9	2·13
1918–19.....	14·73	15·13	0·40	1·24	25	57	20·75	.....	.....	.....	20·25	4·46	16·4	2·00

PASTURING SHEEP IN FOREST RESERVE

October, 1922, completed the third year of the experiment in pasturing sheep on the forest reserve. The object of the experiment was to determine, if possible, the feasibility of alfalfa growers on the irrigated land carrying fairly good-sized flocks of sheep on their farms and for summer pasture using the nearby forest reserve in the Rocky Mountains. The accompanying cuts depict the type of pasture the forest reserve afforded.

Description of the Experiment.—In the fall of 1919, nine hundred grade Merino ewes were provided for the foundation stock. In order to accommodate them during the lambing period, a shed 140 feet by 64 feet was built.

The ewes are lambed rather early, from the middle of March to the middle or latter part of April. They have been moved each year by rail to Coleman early in June, after shearing and dipping, and returned the last of September or early in October.

Results from October, 1921, to October, 1922.—On October 4, 1921, the sheep were returned from the forest reserve, landing in Lethbridge the morning of the 5th and the lambs separated from the breeding stock. They were run on stubble but, owing to the severe weather during the breeding season, were fed a limited amount of hay. The entire flock was dipped on October 14.

After the breeding season, they were put on stubble pasture several miles east of the Station for six weeks but, after this period, the weather was such that the flock had to be fed at the Station during the remainder of the winter. The two previous winters the sheep were carried on stubble fields until a short time before lambing.

The ewes were bred to start lambing the middle of March, to permit of getting the bulk of the lambing over before work on the land started in the spring. During the winter when the sheep were not pasturing on stubble fields, alfalfa hay and silage formed the rations, while in the lambing period they were fed screenings in addition.

Owing to the fact that there were so many aged ewes in the flock the winter losses were heavier than might normally be expected. The deaths from October, 1921, to June, 1922, when the ewes were moved to the mountains, were 52. When it is taken into consideration that in the October, 1921, inventory 53 ewes were classed as culls and valued only at $1.00 per head, the loss actually sustained during the winter is light.

Seven hundred and ninety-seven of the ewes had lambs, bringing the number of yeld ewes up to 104. It is hard to say why this number should be so high, but it was probably due to the severe weather which prevailed during the breeding season. There were 850 lambs marked. The losses of lambs from the time of marking to the date of shipping to the summer pasture was 81. These deaths resulted from various causes, but the most common one was wool balls.

On May 17 there were 1,234 head of sheep sheared, this number being made up of 904 mature or aged ewes and 330 yearling ewes. The average weight of fleece from these 1,234 head was 7.2 pounds. The entire flock was dipped on May 27. A creosote dip was used. On June 9 the sheep were shipped to the Forest Reserve where they remained till October 4. The number shipped was 1,231 head of mature sheep and 769 "followers" or lambs, making a total of 2,000 head.

Two men were put in charge of the sheep while they were in the mountains. On August 24, 222 of the best wether lambs were shipped to the Calgary market. They averaged 66.6 pounds off cars in Calgary. The remainder of the sheep were shipped back to the farm October 4.

During the summer in the mountains 58 ewes and 10 lambs were lost. The total loss for the year from October to October of mature sheep came therefore to 110 head or, expressed in another way, 11.5 per cent.

The Expenses for the year were as follows—	
Winter pasture on stubble fields	$ 150 00
Alfalfa, 158 tons at $10 per ton	1,580 00
Silage, 59·15 tons at $3.50 per ton	207 03
Screenings, 17·5 tons at $16.65 per ton	291 37
Oats, 3·1 tons at $23.50 per ton	72 85
Salt, 1·5 tons at $35 per ton	52 50
Summer pasture on forest reserve	96 76
Total freight to and from forest reserve	651 10
Shearing	158 75
Labour, total for 12 months	1,462 52
	$4,722 88
Inventory, October, 1921, and current year's expense—	
Number of ewes to be bred, 900, valued at $6	$5,400 00
Number of cull ewes to be bred, 53, at $1	53 00
Number of ewe lambs on hand, 330, at $5.25	1,732 50
Number of wether lambs on hand, 70, at $4.75	332 50
Number of bucks on hand, 19, at $20	380 00
Expenses October, 1921, to October 1922	4,722 88
	$12,620 88
Sales—	
70 wether lambs, net receipts	$ 660 45
10 ewes and 222 lambs, net receipts	1,443 40
Pelts	17 48
Net wool returns	2,127 29
Inventory, October, 1922—	
Number of ewes to be bred, 826, valued at $6.50	$ 5,369 00
Number of cull ewes to be sold, 337, at $3.25	1,095 25
Number of ewe lambs on hand, 315, at $6	1,890 00
Number of wether lambs on hand, 222, at $5	1,110 00
Number of bucks on hand, 15, at $25	375 00
	$14,087 87
Profit	1,466 99

FIELD HUSBANDRY

TWO FARMS

There are two distinct types of farming carried on in southern Alberta, irrigation farming and farming without irrigation or "dry farming." The problems connected with these two are often as distinct as those found in widely separated parts of the country. When the Experimental Station was established at Lethbridge this situation was realized and a farm chosen where both types of agriculture could be carried on under one management. There are, therefore, really two farms operated here—one half the Station as a dry farm and the other half as an irrigated farm. In reporting the field investigations the results on the dry land and on the irrigated land are kept separate. In each division the dry land is reported first, followed by the report of the irrigated land.

CROP ROTATIONS (DRY LAND)

Eight different rotations are under test on the dry farm but so far none of them is entirely satisfactory. The principal obstacles met with are the prevention of soil drifting and the difficulty in securing stands of biennial or perennial hay crops if the season is dry, which is so often the case.

Of the eight rotations, six have been conducted for twelve years and two, "J" and "Z", for two years. Records have been kept each year of all items of

expense and returns. Prior to 1920 a fixed set of values was used, but, during the past three seasons, values have been based on current prices for determining returns and expenses.

COST VALUES FOR THE SEASON OF 1922

Rent dry land	per acre	$ 2 00
Rent irrigated land	per acre	10 00
Manure	per ton	1 00
Seed wheat	per bushel	1 50
Seed oats	per bushel	0 68
Seed barley	per bushel	0 96
Seed peas	per bushel	3 00
Seed rye	per bushel	1 40
Seed corn	per pound	0 10
Alfalfa seed	per pound	0 40
Seed potatoes	per ton	20 00
Twine	per pound	0 15
Machinery	per acre	1 00
Manual labour	per hour	0 30
Horse labour, per horse	per hour	0 08
Threshing wheat, barley and peas	per bushel	0 13
Threshing oats	per bushel	0 09

RETURN VALUES FOR THE SEASON OF 1922

Wheat	per bushel	$0 80
Oats	per bushel	0 34
Barley	per bushel	0 48
Peas	per bushel	2 00
Potatoes	per ton	12 00
Alfalfa hay, and peas and oats hay	per ton	10 00
Corn ensilage	per ton	3 50
Wheat straw	per ton	1 00
Oat straw	per ton	3 00
Barley straw	per ton	2 00
Pea straw	per ton	1 00
Pasture one horse or cow	per month	1 50
Pasture one sheep	per month	0 30

Cultivation of Rotations (Dry Land).—The summer-fallow fields of the rotations were disced in the early spring of 1921 and ploughed to a depth of six or seven inches in May or early June. After ploughing, the fields were harrowed down and kept clean throughout the summer by cultivating with a duckfoot cultivator. From three to five cultivations were required to keep the fields clean. In the spring of 1922, these summer-fallow fields were all cultivated the first week in May before seeding, and, where late sown crops, such as corn, were used, two cultivations were given before planting. The fields which produced hoed crops the previous year received the same spring treatment as was given the summer-fallow, while those in other crops the previous year were spring-ploughed six inches deep the first week in May and harrowed down immediately.

Seeding.—The varieties of the various crops used and the rates and dates of seeding were:—

Winter wheat, Kharkov, 75 pounds per acre September 2.
Winter rye, Common, 40 pounds per acre August 9.
Spring wheat, Marquis, 75 pounds per acre May 3.
Oats, Banner, 85 pounds per acre May 12.
Peas and oats, 105 pounds Arthur peas, 15-20 pounds Banner oats May 12.
Alfalfa, Grimm in rows, 4 pounds per acre May 30.
Corn, North Western Dent, 20 pounds per acre May 30.
Western rye, 10 pounds with 3 pounds of alfalfa May 30.
Sweet clover, White, 10 pounds May 30.

ROTATION "A," WHEAT CONTINUOUSLY

But few farmers of the district are still following the practice of growing wheat continuously without an intervening summer-fallow, as such poor results have been obtained from this system of farming during the dry years. It is also very difficult to keep weeds in check where wheat is grown every year.

ROTATION "B," TWO YEARS' DURATION

First year—Wheat.
Second year—Summer-fallow.

The practice of summer-fallowing one half the land each year as is done in rotation "B" has two outstanding advantages: First, the moisture and available plant food accumulations for two years can be utilized for one year's crop, which often makes possible the growing of a profitable crop, whereas if dependence were placed upon one year's moisture alone the crop would be light, and second, the farm work is spread more evenly throughout the season.

Among the disadvantages encountered are: The necessity of permitting one half the farm to remain idle each year, the cost of summer tillage to keep weeds in check on the summer-fallow, the rapid destruction of the soil fibre where a bare fallow is maintained, and the danger of soil drifting caused by the loss of fibre and pulverization of the soil by cultivation.

ROTATION "C," THREE YEARS' DURATION

First year—Summer-fallow.
Second year—Wheat.
Third year—Wheat or coarse grain.

This rotation is followed quite extensively by farmers of the district. It possesses the advantages over rotation "B" that two thirds of the farm is in crop each year instead of one half, the destruction of fibre is not so rapid with a summer-fallow every third year only, instead of every second, and the danger of drifting is eliminated on the part of the field that was in crop the previous year.

ROTATION "M" SIX YEARS' DURATION

First year—Summer-fallow.
Second year—Wheat.
Third year—Coarse grains. Manured in fall.
Fourth year—Summer-fallow.
Fifth year—Peas and oats for hay.
Sixth year—Barley or oats.

Rotation "M" has a summer-fallow every three years with wheat following once in six years and oats and peas for hay every sixth year. The other crops of the rotation are coarse grains. This rotation would meet the demands of the dry farmer for feed but has the same cultural disadvantage as has rotation "C." Another drawback is the high price of seed peas where peas are used as hay crop.

ROTATION "S", NINE YEARS' DURATION

First year—Summer-fallow.
Second year—Hoed crop.
Third year—Wheat.
Fourth year—Summer-fallow.
Fifth year—Wheat.
Sixth year—Coarse grain.
Seventh year—Summer-fallow.
Eighth year—Peas and oats for hay.
Ninth year—Rye pasture.

This rotation is similar to rotation "M" but has two wheat crops in nine years instead of one in six years. It also has a hoed crop, which helps to keep weeds in check and furnishes silage and a field of rye for pasture. The problem of soil drifting is similar in the three rotations "C", "M", and "S".

ROTATION "T", TEN YEARS' DURATION

First year—Summer-fallow.
Second year—Wheat.
Third year—Oats or barley.
Fourth year—Seeded to alfalfa in rows.
Fifth year—Alfalfa hay or seed.
Sixth year—Alfalfa hay or seed.
Seventh year—Alfalfa hay, seed or pasture.
Eighth year—Summer-fallow.
Ninth year—Hoed crop.
Tenth year—Wheat, manured on stubble.

In this rotation, alfalfa is included in an attempt to replace the fibre of the soil and furnish a feed crop or, in years when alfalfa seed sets well, a cash crop for the farmer.

The alfalfa is seeded in rows 35 inches apart and is handled as an inter-tilled crop. It was thought that by planting the alfalfa in rows, thus having fewer plants per acre and permitting of cultivation to destroy weeds, the alfalfa would make a better growth in the dry years and that this method would also be more favourable for seed production. The results on the alfalfa plots have so far been very disappointing, however, as it has not been possible to secure satisfactory stands during the dry years, the production of seed and hay has been low and the work required to keep the weeds in check has made the cost excessive.

ROTATION "J," SIX YEARS' DURATION

First year—Summer-fallow, manured before ploughing.
Second year—Wheat.
Third year—Wheat.
Fourth year—Oats seeded down to western rye grass and alfalfa.
Fifth year—Hay.
Sixth year—Hay.

If this rotation could be successfully operated it would go far toward solving the problem of soil drifting on the dry farm, as it provides a grass crop for replacing soil fibre. It has been found extremely difficult, however, to start either grass crops or alfalfa under dry farming conditions during the past six dry years. This rotation was started two years ago, but so far we have been unable to get a stand of hay.

ROTATION "Z" FIVE YEARS' DURATION

First year—Summer-fallow, manured before ploughing.
Second year—Wheat.
Third year—Oats.
Fourth year—Seeded to sweet clover (without a nurse crop).
Fifth year—Hay or pasture.

This rotation is similar to rotation "J," except that sweet clover is used as the hay crop. The same difficulty has been experienced in securing a stand of sweet clover as of grasses.

DRY LAND ROTATIONS

Rotation A (wheat continuously)

Rotation year	Crops 1921	Crops 1922	Area	Items of expense in raising crop. Per acre: Rent and manure	Seed, twine and use of machinery	Horse labour (including teamster): Hours manual labour	Cost of manual labour	Hours: Single horse	2-horse team	3-horse team	4-horse team	5-horse team	Value of horse labour	Cost of threshing or siloing	Particulars of crop. Per acre: Total cost of 1 acre	Cost of 1 bushel	Cost of 1 ton	Weight: Grain	Straw	Hay	Hoed crop	Value of crop per acre	Profit or loss per acre
			ac.	$ c.	$ c.	No.	$ c.	No.	No.	No.	No.	No.	$ c.	$ c.	$ c.	$ c.	$ c.	lbs.	lbs.	lbs.	lbs.	$ c.	$ c.
11	Wheat	Wheat	1·57	2 00	3 20	0·95	0 29	.....	.....	1·11	1·38	.....	1 46	2 36	9 31	0 51	.....	1,089	1,554	.....	.....	15 30	5 99

Rotation B (two years' duration)

2	Summer-fallow	Wheat	1·57	2 00	3 25	1·27	0·38	.....	.....	1·06	1·11	.....	1 26	3 18	10 07	0 41	.....	1,468	2,599	.....	.....	20 88	10 81
1	Wheat	Summer-fallow	1·57	2 00	1 00	.....	.....	.....	.....	.....	4·15	.....	2 57	.....	5 57	.....	.....	.....	.....	.....	.....	.....	— 5 57
	Aggregate		3·14	4 00	4 25	1·27	0·38	.....	.....	1·06	5·26	.....	3 83	3 18	15 64	.....	.....	.....	.....	.....	.....	20 88	.....
	Average per acre		.....	2 00	2 12	0·64	0·19	.....	.....	0·53	2·63	.....	1 92	1 59	7 82	.....	.....	.....	.....	.....	.....	10 44	2 62

Rotation C (three years' duration)

3	Wheat	Oats	1·57	2 00	3 03	1·27	0·38	.....	.....	1·43	3·93	.....	3 21	2 65	11 27	0 38	.....	1,003	1,838	.....	.....	12 79	1 52
1	Oats	Summer-fallow	1·57	2 00	1 00	.....	.....	.....	.....	.....	4·20	.....	2 60	.....	5 60	.....	.....	.....	.....	.....	.....	.....	— 5 60
2	Summer-fallow	Wheat	1·57	2 00	3 26	1·27	0·38	.....	.....	0·96	1·38	.....	1 37	3 02	10 03	0 43	.....	1,395	1,930	.....	.....	19 56	9 53
	Aggregate		4·71	6 00	7 29	2·54	0·76	.....	.....	2·39	9·51	.....	7 18	5 67	26 90	.....	.....	.....	.....	.....	.....	32 35	.....
	Average per acre		.....	2 00	2 43	0·85	0·25	.....	.....	0·80	3·17	.....	2 39	1 89	8 97	.....	.....	.....	.....	.....	.....	10 78	1 82

Rotation J (six years' duration)

2	Summer-fallow	Wheat	1·00	4 00	3 18	1·00	0 30	.....	.....	1·00	1·16	.....	1 26	3 19	11 93	0 49	.....	1,470	2,350	.....	.....	20 78	8 85
3	Wheat	Wheat	1·00	4 00	3 18	1·00	0 30	.....	.....	9·49	0·66	.....	5 53	2 69	15 70	0 76	.....	1,240	1,900	.....	.....	17 48	1 78
4	Wheat	Oats seeded to alfalfa and W. rye G.	1·00	4 00	4 72	1·00	0 30	.....	.....	9·66	0·66	.....	5 62	1 51	16 15	0 96	.....	570	1,300	.....	.....	7 65	— 8 50
5	Oats seeded to alfalfa and W. rye G.	Hay	1·00	4 00	4 72	1·00	0 30	.....	.....	7·83	0·66	.....	4 64	1 11	14 77	1 19	.....	420	770	.....	.....	5 36	— 9 41
6	Hay	Hay or pasture	1·00	4 00	4 72	1·00	0 30	.....	.....	8·08	0·66	.....	4 71	1 19	14 98	1 03	.....	450	870	.....	.....	5 81	— 9 17
1	Hay or pasture	Summer-fallow	1·00	4 00	1 00	.....	.....	.....	.....	7·08	2·92	.....	5 63	.....	10 63	.....	.....	.....	.....	.....	.....	.....	—10 63
	Aggregate		6·00	24 00	21 52	5·00	1·50	.....	.....	43·14	6·72	.....	27 45	9 69	84 16	.....	.....	.....	.....	.....	.....	57 08	.....
	Average per acre		.....	4 00	3 59	0·83	0 25	.....	.....	7·19	1·12	.....	4 58	1 62	14 03	.....	.....	.....	.....	.....	.....	9 51	— 4 52

ROTATION *M* (six years' duration)

6	Peas and oats	Oats	1·25	4 00	3 06	0·80	0 24			1·20	1·33		1 47	1 87	10 64	0 51		7 08	1,508			9 34	— 1 30
1	Oats	Summer-fallow	1·25	4 00	1 00						5·47		3 30		8 30								— 8 30
2	Summer-fallow	Winter wheat	1·25	4 00	2 62	0·80	0 24		1·20		1·00		1 27	1 26	9 39	0 96		580	1,000			8 23	— 1 16
3	Winter wheat	Oats	1·25	4 00	3 06	2·40	0 72		1·00	8·60	0·80		5 60	2 67	16 05	0 54		1,008	1,840			12 84	— 3 21
4	Oats	Summer-fallow	1·25	4 00	1 00	1·06	0 32		1·00	6·60	4·13		6 58		11 90								—11 90
5	Summer-fallow	Peas and oats	1·25	4 00	7 40	1·33	0 40		1·80	0·74	1·38		2 09		13 89					2,840		14 20	0 31
	Aggregate		7·50	24 00	18 14	6·39	1 92		5·00	17·14	14·12		20 31	5 80	70 17							44 61	
	Average per acre			4 00	3 02	1·07	0·32		0·83	2·85	2·36		3 39	0 97	11 69							7 69	— 4 26

ROTATION S (nine years' duration)

1	Winter rye	Summer-fallow	1·25	3 33	1 00	0·80	0 24		1·06	6·60	3·28		6 07		10 64								—10 64
2	Summer-fallow	Corn	1·25	3 33	3 60	17·60	5 28		9 33	3·46	1·26		6 94	2 20	21 35		5 83				7,336	12 84	— 8 51
3	Corn	Wheat	1·25	3 33	3 18	1·20	0 40			1·20	1·39		1 51	2 46	10 88	0 57		1,136	1,272			15 79	4 91
4	Wheat	Summer-fallow	1·25	3 33	1 00					6·60	3·46		5 71		10 04								—10 04
5	Summer-fallow	Winter wheat	1·25	3 33	3 18	0·80	0 24			1·33	0·94		1 30	1 26	9 31	0 98		5 80	732			8 10	— 1 21
6	Winter wheat	Oats	1·25	3 33	3 06	0·80	0 24			1·73	5·86		4 56	2 19	13 38	0 55		828	1,628			10 72	— 2 66
7	Oats	Summer-fallow	1·25	3 33	1 00						9·86		6 11		10 44								—10 44
8	Summer-fallow	Peas and oats	1·25	3 33	7 40	1·33	0 40		1·80		1·39		1 69		12 82		7 91			3,240		16 20	3 38
9	Peas and oats	Winter rye	1·25	3·33	2 00					6·66	1·64		4 62		9 95							7 20	— 2 75
	Aggregate		11·25	29 97	25 42	22·53	6 80		12·19	27 58	29·08		38 51	8 11	108 81							70 85	
	Average per acre			3 33	2 82	2·50	0 76		1·35	3·06	3·23		4 28	0 90	12 09							7 87	— 4 22

ROTATION T (ten years' duration)

5	Alfalfa seeding	Alfalfa seed	1·57	3 20	2 20						5·31		3 29		8 69								— 8 69
6	Alfalfa seed	Alfalfa seed	1·57	3 20	2 20						1·48		0 92		6 32								— 6 32
7	Alfalfa seed	Alfalfa seed	1·57	3 20	2 20						0·83		0 51		5 91								— 5 91
8	Alfalfa seed	Summer-fallow	1·57	3 20	1 00					5·85	2·34		4 60		8 80								— 8 80
9	Summer-fallow	Hoed crop	1·57	3 20	3 67	10·19	3 06	6 58	3·82	1·22		5 86	4 02	19 80							13,404	23 46	3 66
10	Hoed crop	Spring wheat	1·57	3 20	3 26	1·21	0 36			1·17	1·38		1 49	3 12	11 43	0 47		1,440	1,662			20 03	8 60
1	Spring wheat	Summer-fallow, w. wheat.	1·57	3 20	1 00					6·26	3·18		5 35		9 55								— 9 55
2	Summer-fallow, winter wheat.	Winter wheat	1·57	3 20	4 38	1·21	0 36			1·21	1·38		1 51	2 98	12 43	0 54		1,376	1,917			19 30	6 87
3	Winter wheat	Oats	1·57	3 20	3 03	1·21	0 36			1·43	4·03		3 27	3 41	13 27	0 35		1,287	2,083			15 99	2 72
4	Oats	Alfalfa seeding	1·57	3 20	2 20						5·31		3 29		8 69								— 8 69
	Aggregate		15·70	32 00	25 14	13·82	4 14		6 58	19·73	26·46		30 08	13 53	104 89							78·7	
	Average per acre			3 20	2 51	1·38	0 41		0·66	1·97	2·65		3 01	1 35	10 49								— 2 60

DRY LAND ROTATIONS

Rotation Z (five years' duration)

Rotation year	Crops 1921	Crops 1922	Area	Items of expenses in raising crop. Per acre: Rent and manure	Seed, twine and use of machinery	Hours manual labour	Cost of manual labour	Horse labour (including teamster) Hours: Single horse	2-horse team	3-horse team	4-horse team	5-horse team	Value of horse labour	Cost of threshing or ensiling	Total cost of 1 acre	Cost of 1 bushel	Cost of 1 ton	Particulars of crop. Per acre: Weight: Grain	Straw	Hay	Hosd crop	Value of crop per acre	Profit or loss per acre
			ac.	$ c.	$ c.	No.	$ c.	No.	No.	No.	No.	No.	$ c.	$ c.	$ c.	$ c.	$ c.	lbs.	lbs.	lbs.	lbs.	$ c.	$ c.
2	Summer-fallow	Wheat	1·00	4 40	3 25	1·00	0 30	.....	.....	1·00	1·16	.....	1 26	2 74	11 95	0 54	.....	1,340	1,440	.....	.....	.....	6 64
3	Wheat	Oats	1·00	4 40	3 00	1·00	0 30	.....	.....	1·66	7·08	.....	5 29	2 30	15 29	0 23	.....	870	1,210	.....	.....	.....	− 4 77
4	Oats	Seeded to s. clover	1·00	4 40	2 40	.....	.....	.....	.....	7·41	1·66	.....	5 03	.....	11 83	.....	.....	.....	.....	.....	.....	.....	−11 83
5	Seeded to s. clover	Hay or pasture	1·00	4 40	2 40	.....	.....	.....	.....	0·75	8·08	.....	5 42	.....	12 22	.....	.....	.....	.....	.....	.....	.....	−12 22
1	Hay or pasture	Summer-fallow	1·00	4 40	1 00	.....	.....	.....	.....	0·75	9·08	.....	6 04	.....	11 44	.....	.....	.....	.....	.....	.....	.....	−11 44
	Aggregate		5·00	22 00	12 05	2·00	0 60	.....	.....	11·57	27·06	.....	23 04	5 04	62 73	.....	.....	.....	.....	.....	.....	.....	.....
	Average per acre		.....	4 40	2 41	0 40	0 12	.....	.....	2 31	5·41	.....	4 61	1 01	12 55	.....	.....	.....	.....	.....	.....	.....	− 6 72

CULTURAL EXPERIMENTS

LIGHT CROP VERSUS SUMMER-FALLOW.

For eight years an experiment has been conducted to determine the feasibility of substituting a thinly-seeded hoed crop for summer-fallow on the dry land. In this experiment, six fields of one acre each were used. Each year one field was summer-fallowed, one planted to corn and one to potatoes. The following season these fields were seeded to wheat, thus giving a comparsion of wheat following summer-fallow, corn and potatoes. Both the potatoes and corn were planted in check rows three feet apart each way to facilitate cultivation and reduce moisture losses to a minimum. This year the experiment was changed in that sunflowers were substituted for potatoes. The yields of wheat for eight years were:—

LIGHT HOED CROP VERSUS SUMMER-FALLOW

——	1915	1916	1917	1918	1919	1920	1921	1922	Average for 8 years
	bush.	bush.	bush.	bush.	bush.	bush.	bush.	bush.	bush.
Wheat following fallow	59·2	44·0	21·3	18·	2·1	20·7	6·0	15·2	23·3
Wheat following potatoes	53·0	37·4	20·8	7·4	Nil	18·5	10·5	.....	.....
Wheat following corn	51·7	43·7	22·2	10·0	Nil	17·8	5·0	11·0	20·2
Wheat following sunflowers	.....	.....	.....	.....	.....	.....	.....	12·0	.....

A seven years' average shows that the yield of wheat after summer-fallow was about 3 bushels per acre more than the yields on potato land. The eight years' average shows about the same difference in yield between the summer-fallow and corn land. The one year's results with wheat following sunflowers do not furnish satisfactory data for comparison in the above table.

The average yield for potatoes for seven years was 4,473 pounds and for shelled corn, 631 pounds per acre per year. Gold Coin was the variety of potatoes used and the corn was a low growing, early Squaw variety which has ripened almost every year.

The objection the average farmer would raise to the growing of potatoes is the uncertainty of the market and the labour required to lift the crop in the fall. Neither of these objections can be made with corn for the idea in this experiment is to " hog off " the corn in the fall and winter. Not only can the field be used for hogs but cattle, horses and sheep show a great liking for a fodder of this kind.

DATES OF SEEDING

Dates of seeding tests with wheat, oats, barley and flax have been carried on under dry farming conditions since 1912. Seedings have usually been made every ten days, beginning as near April 1 as the season would permit. In 1920 and 1922 it was impossible to get on the land until after May 1. A study of the results from year to year would indicate that the best yields are obtained from seeding wheat and oats in April while barley appears to produce most when seeded about May 1 and flax from May 1 to May 15.

Another item of interest brought out in this investigation is the effect of different dates of seeding on the length of time required to mature the crop. It has been observed that, practically every year, grain seeded previous to the 20th of April ripens at the same time as when sown on this date. In consequence, the length of time to mature grain will be longer if planted early in April than if planted on or after the 20th. Marquis wheat sown from April 1 to April 10

required about 124 days to ripen while it matured in 101 to 106 days when sown between April 20 and 30 and in 97 days when sown after May 11. Barley matured in 122 days when sown between April 1 and 10 but when sown between May 11 and May 20 it required only 92 days to reach maturity.

DATES OF SEEDING MARQUIS WHEAT (Dry Land)

Date seeded	Date up	When ripe	Yield per acre, 1922
			bush.
May 10	May 20	Aug. 11	22·5
May 20	May 27	Aug. 17	22·0
May 30	June 7	Aug. 21	17·0
June 10	June 16	Sept. 2	14·0
June 21	June 28	Sept. 30	5·5
July 3	July 10		Nil

DATES OF SEEDING MARQUIS WHEAT—8 YEARS' AVERAGES. (Dry Land)

Date seeded	Average number of days maturing	Average yield per acre
		bush.
April 1–11	124	31·1
April 11–21	117	31·7
April 21–30	110	29·4
May 1–11	106	28·5
May 11–21	101	28·8

DATES OF SEEDING BANNER OATS (Dry Land)

Date seeded	Date up	When ripe	Yield per acre, 1922
			bush.
May 10	May 19	Aug. 7	22·5
May 20	May 29	Aug. 14	24·0
May 30	June 8	Aug. 21	19·0
June 10	June 16	Sept. 2	27·0
June 21	June 28	Sept. 28	16·0
July 3	July 11	Oct. 7	12·0

DATES OF SEEDING BANNER OATS—8 YEARS' AVERAGES. (Dry Land)

Date seeded	Average number of days maturing	Average yield per acre
		bush.
April 1–10	128	75·1
April 11–21	117	70·9
April 22–30	104	71·8
May 1–10		
May 11–21	97	71·8

DATES OF SEEDING MANCHURIAN BARLEY. (Dry Land)

Date seeded	Date up	When ripe	Yield per acre 1922
			bush.
May 10	May 19	Aug. 7	10·0
May 20	May 29	Aug. 11	8·5
May 30	June 7	Aug. 14	10·0
June 10	June 15	Aug. 26	9·0
June 21	June 28	Sept. 25	8·0
July 3	July 11	Oct. 3	5·0

DATES OF SEEDING BARLEY—8 YEARS' AVERAGES. (Dry Land)

Date seeded	Average number of days maturing	Average yield per acre
		bush.
April 1–10	122	33·2
April 11–20	111	33·7
April 21–30	98	37·0
May 1–10	.....	.....
May 11–20	92	35·2

FLAX. (Dry Land)

Date seeded	Date up	When ripe	Yield per acre 1922
			bush.
May 10	May 19	Aug. 10	5·0
May 20	May 30	Aug. 14	7·5
May 30	June 7	Aug. 21	4·0
June 10	June 15	Aug. 28	6·0
June 21	June 30	.....	Nil
July 3	July 11	.....	Nil

WINTER RYE. (Dry Land)

Date seeded	Yield per acre 1922
	bush.
Sept. 2	10·5
Sept. 14	8·0
Sept. 19	11·0
Sept. 29	7·0

CULTURAL EXPERIMENT WITH WHEAT

A cultural experiment with wheat was started in 1921 in the hope that the results of the work might prove of value in aiding to solve some of our dry land problems. Uniform land was chosen for the work, part of which was virgin prairie and the remainder had only been cropped one year in wheat since breaking. The land was divided into three ranges with twenty-foot roads between the ranges. Plots one-tenth of an acre in size were used and separated by four and a one-half foot paths. In all, 225 plots were employed and a three-year rotation followed, first year summer-fallow, second year wheat and third year wheat.

All of the plots of the third year, namely, wheat following wheat, were damaged by cutworms in 1922. This vitiated the yields to such a varying extent that the entire range had to be thrown out. Many plots were not even worth harvesting with the binder and were cut with the mower. In no case was the grain sown on summer-fallow land destroyed by cutworms. The greatest amount of damage was done on spring stubble. This tends to show that fall ploughing destroyed a great number of the cutworm eggs.

DEPTH OF PLOUGHING FOR SUMMER-FALLOW

Treatment given when ploughing for summer-fallow	Yield of wheat per acre
	bush.
Plough 3 inches	26·0
Plough 4 inches	26·3
Plough 5 inches	27·2
Plough 6 inches	28·2
Plough 7 inches	27·7
Plough 8 inches	27·0
Plough 9 inches	25·7

This experiment dealing with the depth of ploughing seems to indicate that there is little to be gained by ploughing for summer-fallow deeper than six inches. It should be borne in mind that this is the second ploughing this land has received since it was broken from prairie and, consequently, the deeper ploughing for summer-fallow may have a different effect on older land. Throughout the fallow season each plot received similar treatment, the only difference in the cultural operations being the difference in depth of ploughing. In each case sufficient surface cultivation was given to keep the weeds and all other vegetation in check. It was quite noticeable, however, that, on the very shallow ploughing, weeds were harder to control and in the growing crop weeds were more in evidence.

DATE OF PLOUGHING FOR SUMMER-FALLOW

Depth and date ploughed for summer-fallow	Yield of wheat per acre
	bush.
Ploughed 6 inches middle May	28·2
Ploughed 6 inches middle June	28·3
Ploughed 6 inches middle July	23·5

It is evident from the foregoing figures that there is a decided falling-off in yield when the land is ploughed for summer-fallow in July. Land ploughed for summer fallow after the middle of June was harder to keep clean and

showed evidence of weeds the following year. Owing to the pressure of spring work it is extremely difficult for the average farmer to start ploughing for summer-fallow before June. On the other hand there is little loss in yield by not getting started in May. The findings of this experiment fit in well with the seasonable work on the farm, that is, with seeding over the latter part of May, it is quite timely to rush the operation of ploughing for summer-fallow.

FALL CULTIVATION BEFORE PLOUGHING FOR SUMMER-FALLOW

Treatment given	Yield of wheat per acre
	bush.
Stubble disced after harvest, ploughed 6 inches following June	28·6
Stubble ploughed 6 inches immediately after harvest	28·4
Stubble ploughed 6 inches late in fall	28·8

SPRING CULTIVATION BEFORE PLOUGHING FOR SUMMER-FALLOW

Treatment given	Yield of wheat per acre
	bush.
Disc stubble early spring plough 6 inches in June	29·7

A comparison of the above figures indicates no advantage, in fact a disadvantage, in destroying the stubble after harvest or even ploughing for summer-fallow in the fall. The stubble, if left, retains the snow which otherwise would be blown away by the prevailing high winds. Fall cultivation before ploughing for summer-fallow does not give an increased yield and such a practice only increases the cost of production. The discing of the stubble in the early spring is a farm practice that can be recommended to reduce the weed and volunteer grain growth; it conserves moisture which would be used up by the vegetation. Such land, so disced, not only ploughs more easily in the early part of June but is more easily kept free of weeds throughout the remainder of the season.

PACKING WHEN PLOUGHING FOR SUMMER-FALLOW

Treatment given	Yield of wheat per acre
	bush.
Ploughed 6 inches in June packed with disc	32·3
Ploughed 6 inches in June packed with surface-packer	29·8
Ploughed 6 inches in June packed with subsurface packer	29·6
Ploughed 6 inches in June packed with combination packer	29·0

In previous findings, the use of the packer at the time of ploughing for summer-fallow, in a seven-year trial, resulted in an average of only twenty-four pounds increase of wheat to the acre over not packing—not enough to warrant the expense of packing. In this experiment, comparing the two last-preceding tables, the average of the three plots packed with surface, subsurface and combination packers is less than the unpacked plot. There has been considerable controversy regarding the use of the packer. The governing factor that determines its use is undoubtedly the condition of the land at the time

of ploughing. Should a farmer think the land requires packing at the time of ploughing for summer-fallow, he can accomplish the desired end by the use of a disc, as evidenced from the findings given in the above table, and so avoid the expense of purchasing a packer. In using the disc as a packer, all that is necessary is to set the discs straight and weight the machine with two or more sacks of soil.

APPLICATION OF MANURE

When applied	Yield of wheat per acre
	bush.
Summer-fallow, no manure	31·3
Applied before ploughing for summer-fallow	31·0
Applied on summer-fallow in September	31·8
Applied on summer-fallow in winter	34·0

The application of manure on new land in dry years is a questionable procedure. This may account for the conflicting results as given in the above table.

APPLICATION OF MANURE

1st year	2nd year		3rd year	
When applied	Crop	Yield per acre	Crop	Yield per acre
		bush.		bush.
Summer-fallow, no manure	Potatoes	98·8	Wheat	21·3
Applied before ploughing for summer-fallow	Potatoes	89·8	Wheat	17·2
		tons		
Summer-fallow, no manure	Corn	2·5	Wheat	24·2
Applied before ploughing for summer-fallow	Corn	4·5	Wheat	27·0
Summer-fallow, no manure	Sunflowers	4·3	Wheat	16·8
Applied before ploughing for summer-fallow	Sunflowers	5·4	Wheat	14·5

When manure was ploughed under at the time of ploughing for summer-fallow, it did not increase the yield of potatoes or the yield of wheat following potatoes. In the case of corn the yield was increased by 2 tons and the sunflowers by 1 ton 200 pounds and, in addition, the yield of wheat following corn was increased by 2 bushels 48 pounds per acre. Another deduction that can be drawn from this table is the effect of potatoes, corn and sunflowers on the succeeding crop of wheat. Taking the average of the two plots, wheat following potatoes yielded 19 bushels 15 pounds per acre and wheat following sunflowers yielded 15 bushels 40 pounds per acre, while wheat following corn yielded 25 bushels 36 pounds per acre.

SUMMER-FALLOW SUBSTITUTES

Plot	Crop, 1920	Yield per acre	Crop, 1921	Yield per acre	Crop 1922	Yield per acre	Remarks
1	Summer-fallow		Potatoes	100·1 bush.	Wheat	10·8 bush.	
2	Summer-fallow		Corn	1·3 tons	Wheat	22·7 bush.	
3	Summer-fallow		Sunflowers	4·5 tons	Wheat	14·7 bush.	
4	Potatoes	50·0 bush.	Wheat	19·2 bush.	Wheat	13·3 bush.	5% cutworm damage
5	Corn	2·1 tons	Wheat	17·8 bush.	Wheat	13·5 bush.	10% cutworm damage
6	Sunflowers	4·3 tons	Wheat	17·2 bush.	Wheat	Nil bush.	15% cutworm damage

The crop of wheat following wheat was damaged to the extent noted in the above table just after the grain had properly stooled. The second crop of wheat following sunflowers was not worth harvesting, showing that sunflowers are particularly hard on the soil.

During the season 1922, potatoes, corn, sunflowers, beans, and intertilled grain were compared as summer-fallow substitutes. In the case of intertilled grain it was found that such was not practicable because, in a section so polluted with Russian thistles as this is, all crops seeded in rows have to be hoed to keep the weeds in check. This cannot be accomplished with horse cultivator alone and it naturally follows that it is impracticable to hoe standing grain crops. Grain was seeded in single, double and triple rows and, in each case, hoeing was necessary to keep the weeds in check.

ROTATIONS (IRRIGATED LAND)

Three rotations have been established on the irrigated farm and each have proved statisfactory . The problem of finding a satisfactory rotation for the irrigated land is much more simple than it is on the dry land, as almost any crop adapted to a temperate climate can be grown.

Alfalfa is used as the base of each of the irrigation rotations as this crop furnishes an abundance of excellent feed for live stock, returns organic matter and nitrogen to the soil, which results in increased yields of the crops following, and is valuable as a weed exterminator.

Seeding.—Spring wheat was sown May 17th at the rate of 90 pounds per acre, oats May 17th at the rate of 103 pounds per acre, barley May 17th at the rate of 84 pounds per acre, potatoes May 22nd at the rate of 1,350 pounds per acre alfalfa May 18th at the rate of 15 pounds per acre and corn May 20th at the rate of 20 pounds per acre. The varieties used were: Wheat—Red Fife, Marquis; Oats—Banner; Barley—Swedish Chevalier and Bark's Excelsior; Potatoes—Gold Coin and Alfalfa—Grimm.

Cultivation.—The grain fields were ploughed the previous fall and cultivated and levelled with a float leveller in the spring before seeding. The potato land on which grain was sown was not ploughed but received the same spring treatment. Where alfalfa sod was broken it was ploughed to a depth of 3 inches (crowned) in the fall and ploughed to a depth of 6 to 7 inches again in the spring.

ROTATION "U", TEN YEARS' DURATION

First year.—Alfalfa.
Second year.—Alfalfa.
Third year.—Alfalfa.
Fourth year.—Alfalfa.
Fifth year.—Alfalfa.
Sixth year.—Alfalfa, manured previous fall.
Seventh year.—Hoed crop.
Eighth year.—Wheat.
Ninth year.—Oats.
Tenth year.—Barley. Seeded down to alfalfa.

All the fields of this rotation except the potato land were irrigated in the fall of 1921 and each received two irrigations during the summer of 1922.

Wheat after Potatoes Rotation "W" (Irrigated) Yield 49-5 bushels.

Oats after Wheat Rotation "W" (Irrigated) Yield 88 bushels.

Two cuttings of alfalfa were obtained from each of the alfalfa fields. The grain was rank in growth, both wheat and oats having lodged to some extent.

Rotation "U" is a very good one for the irrigation farmer of southern Alberta as it furnishes the required amount of hay and feed grain (oats and barley) for the feeding of live stock. A hoed crop, which may be a cash crop as potatoes, or an ensilage crop, is provided, and wheat for a cash crop is so placed in the rotation that good yields of clean grain are almost assured. This rotation would fit in especially well for a farmer who desired to grow a limited amount of certified seed of wheat or potatoes, as the land given to these crops is clean and free from disease.

ROTATION "V," ALFALFA CONTINUOUSLY

This field was seeded to alfalfa in 1909 for the purpose of observing the probable life of an alfalfa field under favourable conditions and the production of hay from year to year.

Winter-killing of alfalfa was more serious in the Lethbridge district the past season than at any time since alfalfa growing became general. There was no apparent killing of the alfalfa at the Station except for a slight thinning on a small area of Rotation "V."

ROTATION "X," FIFTEEN YEARS' DURATION

First year.—Alfalfa.
Second year.—Alfalfa.
Third year.—Alfalfa.
Fourth year.—Alfalfa.
Fifth year.—Alfalfa.
Sixth year.—Alfalfa.
Seventh year.—Alfalfa.
Eighth year.—Alfalfa.
Ninth year.—Alfalfa.
Tenth year.—Alfalfa.
Eleventh year.—Barley.
Twelfth year.—Corn.
Thirteenth year.—Wheat.
Fourteenth year.—Oats.
Fifteenth year.—Peas.

Rotation "X" is especially adapted for a stock farm as two-thirds of the land is producing hay and the remainder is producing grain and hoed crop which may be used for feed and ensilage.

The rotation is really a rotation within a rotation. Instead of breaking up one field of alfalfa each year and seeding one each year the breaking is done once in five years when five fields are broken up and used for cereal and hoed crops and the fields that had been used for these crops are seeded down to alfalfa. The cereal and hoed crops are used as a five years' rotation.

ROTATIONS ON IRRIGATED LAND

Rotation year	Crops 1921	Crops 1922	Area	Items of expenses in raising crop. Per acre: Rent and manure	Seed, twine and use of machinery	Hours manual labour	Cost of manual labour	Horse labour (including teamster) Hours: Single horse	2-horse team	3-horse team	4-horse team	5-horse team	Value of horse labour	Cost of threshing or ensiling	Total cost of 1 acre	Cost of 1 bushel	Cost of 1 ton	Particulars of crop. Per acre: Weight: Grain	Straw	Hay	Hoed crop	Value of crop per acre	Profit or loss per acre
			ac.	$ c.	$ c.	No.	$ c.	No.	No.	No.	No.	No.	$ c.	$ c.	$ c.	$ c.	$ c.	lbs.	lbs.	lbs.	lbs.	$ c.	$ c.
ROTATION U (ten years' duration)																							
2	Alfalfa	Alfalfa	1·00	11 20	2 83	6·17	1 85	.....	3·96	.....	.....	.....	1 82	.....	17 70	.....	6 90	.....	.....	5,130	.....	25 65	7 95
1	Barley and alfalfa seeding.	Alfalfa	1·00	11 20	2 83	8·00	2 40	.....	4·54	.....	.....	.....	2 09	.....	18 52	.....	9 64	.....	.....	3,840	.....	19 20	0 68
10	Oats	Barley and alfalfa seeding.	1·00	11 20	3 28	8·00	2 40	.....	1·25	.....	2·00	4·00	4 62	8 55	30 05	0 46	.....	3,160	3,400	.....	.....	35 00	4 95
9	Wheat	Oats	1·00	11 20	3 64	8·50	2 55	.....	.....	2·00	2·00	4·00	5 12	7 99	30 50	0 34	.....	3,020	4,420	.....	.....	36 83	6 33
8	Potatoes	Wheat	1·00	11 20	4 00	6·50	1 95	.....	.....	3·00	2·50	.....	3 17	6 44	26 76	0 54	.....	2,970	5,900	.....	.....	42 55	15 79
7	Alfalfa	Potatoes	1·00	11 20	16 75	125·83	37 75	1·75	22·25	7·75	19·67	.....	27 30	.....	93 00	0 14	4 53	.....	.....	.....	41,010	246 06	153 06
6	Alfalfa	Alfalfa	1·00	11 20	2 83	7·83	2 35	.....	3·71	.....	.....	.....	1 71	.....	18 09	.....	4 71	.....	.....	7,670	.....	38 35	20 26
5	Alfalfa	Alfalfa	1·00	11 20	2 83	7·83	2 35	.....	3·96	.....	.....	.....	1 82	.....	18 20	.....	4 81	.....	.....	7,570	.....	37 85	19 65
4	Alfalfa	Alfalfa	1·00	11 20	2 83	7·99	2 40	.....	3·96	.....	.....	.....	1 82	.....	18 25	.....	4 38	.....	.....	8,330	.....	41 65	23 40
3	Alfalfa	Alfalfa	1·00	11 20	2 83	8·07	2 42	.....	4·04	.....	.....	.....	1 86	.....	18 31	.....	4 71	.....	.....	7,680	.....	38 40	20 09
	Aggregate		10·00	112 00	44 65	194·72	58 42	1·75	47·67	12·75	26·17	8·00	51 33	22 98	289 38	.....	.....	.....	.....	.....	.....	561 54	.....
	Average per acre		.....	11 20	4 46	19·47	5 84	0·17	4·77	1·27	2·62	0·80	5 13	2 90	28 94	.....	.....	.....	.....	.....	.....	56 15	27 22
ROTATION V (Alfalfa continuously)																							
11	Alfalfa	Alfalfa	1·06	10 00	1 00	7 23	2 17	.....	3·54	.....	.....	.....	1 63	.....	14 80	.....	4 44	.....	.....	6,660	.....	33 30	18 50

Rotation X (fifteen years' duration

1	Alfalfa	Alfalfa	1·00	10 80	1 00	4·10	1 23		3·38				1 55		14 58		6 89			4,229		21 14	6 56
2	Alfalfa	Alfalfa	1·00	10 80	1 00	4·10	1 23		3·38				1 55		14 58		6 89			4,229		21 14	6 56
3	Alfalfa	Alfalfa	1·00	10 80	1 00	4·10	1 23		3·38				1 55		14 58		6 89			4,229		21 14	6 56
4	Alfalfa	Alfalfa	1·00	10 80	1 00	4·10	1 23		3·38				1 55		14 58		6 89			4,229		21 14	6 56
5	Alfalfa	Alfalfa	1·00	10 80	1 00	4·10	1 23		3·38				1 55		14 58		6 89			4,229		21 14	6 56
14	Wheat	Oats	1·00	10 80	3 79	4·00	1 20			9·00	3·00		6 72	7 46	29 97	0 36		2,820	3,550			33 52	3 55
15	Oats	Peas	1·00	10 80	10 00	4·00	1 20		2·00	7·00	3·00		6 56	3 49	32 05	1 20		1,610	3,185			55 29	23 24
11	Peas	Barley	1·00	10 80	3 28	3·83	1 15		1·83	7 00	3 00		6 48	8 29	30 00	0 49		3,060	2,400			33 00	3 00
12	Barley	Corn	1·00	10 80	3 67	9·50	2 85		10·33	10·00	1·33		10 97	4 63	32 92		4 00				16,425	28 74	— 4 18
13	Corn	Wheat	1·00	10 80	3 92	4·00	1 20			2·00	4·17		3 67	5 78	25 37	0 57		2,670	4,070			37 64	12 27
6	Alfalfa	Alfalfa	1·00	10 80	1 00	6·67	2 00		3·47				1 60		15 39		5 72			5,374		26 87	11 48
7	Alfalfa	Alfalfa	1·00	10 80	1 00	6·67	2 00		3·47				1 60		15 39		5 72			5,374		26 87	11 48
8	Alfalfa	Alfalfa	1·00	10 80	1 00	6·67	2 00		3·47				1 60		15 39		5 72			5,374		26 87	11 48
9	Alfalfa	Alfalfa	1·00	10 80	1 00	6·67	2 00		3·47				1 60		15 39		5 72			5,374		26 87	11 48
10	Alfalfa	Alfalfa	1·00	10 80	1 00	6·67	2 00		3·47				1 60		15 39		5 72			5,374		26 87	11 48
	Aggregate		15·00	162 00	34 66	79·18	23 75		58·41	35 00	14·50		50 15	29 65	300 16							428 17	
	Average per acre			10 80	2 31	5·28	1 58		3·89	2·33	0·97		3 34	1 98	20 01							28 54	8 54

IRRIGATION EXPERIMENTS

In the early stages of irrigation in a locality, the engineering features of canal and field ditch construction occupy chief attention. As development proceeds, these problems are more nearly solved and the engineering practice stabilized. Canal operators, as well as farmers, then turn their attention more to the problems of production, or the strictly agricultural features of the industry.

Many of the farming problems on the irrigated farm are similar to those of the dry farm; satisfactory kinds and varieties of crops must be selected, proper cultural methods established and the marketing of products, by feeding or otherwise, receive attention. While all of these factors may be different on the irrigated farm than on the dry farm, and usually are, yet they are attacked in a similar way. This may account for the tendency of both farmers and investigators to study these problems first.

Some featues of irrigation farming, however, are different to any other type of farming, notable among these being the proper use of irrigation water, and while it is recognized that this is an important factor, much less attention has been paid to it than to the other items mentioned.

Realizing the meagreness of information available on many phases affecting the use of water under Western Canadian conditions, investigations have been undertaken at this Station to endeavour to meet this need. It should be stated here that the Reclamation Service of the Department of the Interior, in connection with their duty of water studies, have done some excellent investigational work with regard to the proper amount of water to apply per irrigation and the total yearly water requirements of various crops. Because of the information thus made available, only slight emphasis has been placed on the amount of water used in the investigation here outlined. The principal angle from which we are attacking the subject is the stage of plant development when water can most advantageously be used, as the stage of plant development appears to furnish a better gauge for determining the time of irrigation than do arbitrary dates. It may also be of greater importance than the amount of water used.

A. PURPOSE OF INVESTIGATION

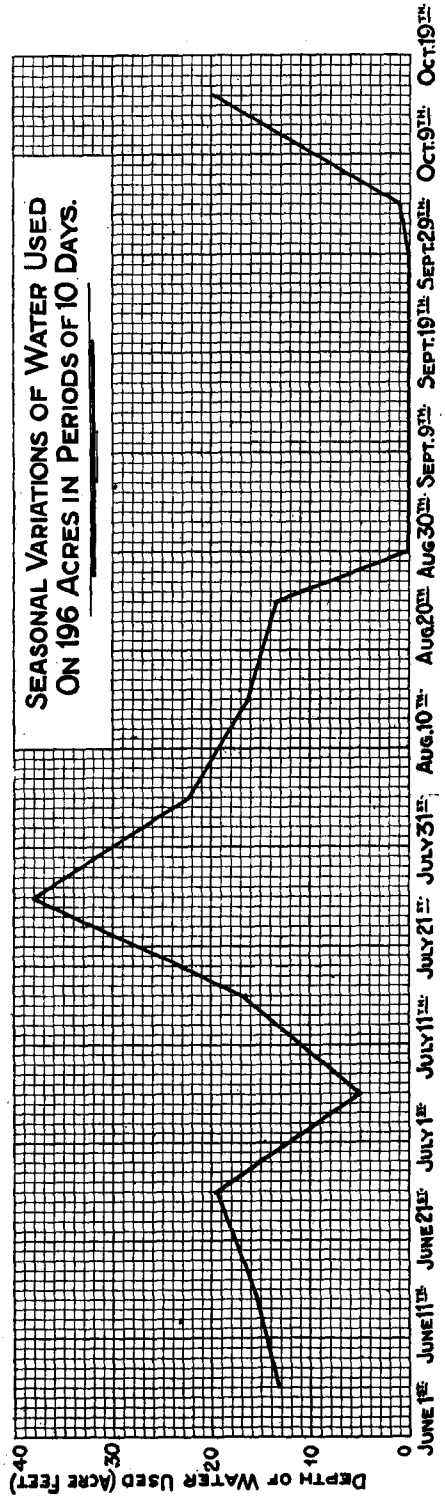
The purpose of the investigation is to obtain information regarding:—

(1) The stage of development of crops when the first and subsequent irrigations of the season should be applied.
(2) The moisture content of the soil when crops require irrigation.
(3) The number of irrigations necessary for different crops.
(4) The value of fall irrigation.
(5) The optimum depth of water per application for the soil on this station.
(6) The desirability of cultivating hay and grain crops after irrigating.
(7) The correlating of data obtained, in an endeavour to find a way for relieving the peak load of water required in June and July.

B. PLAN OF INVESTIGATION

(1) *Crops.*—The crops so far included in our plans are wheat, alfalfa, timothy, brome, mixed pasture grasses, sunflowers and potatoes. As additional land can be made available at the Station for this work, other crops may be added. Two series of grain plots will be operated, one of grain following grain and the other of grain following hoed crop. The hoed crops will follow grain.

(2) Duplicate one-twentieth acre plots are used, the plots being square except on one field where the topography does not permit of square plots. These


SEASONAL VARIATIONS OF WATER USED
ON 196 ACRES IN PERIODS OF 10 DAYS.
DEPTH OF WATER USED (ACRE FEET)
40
30
20
10
0
JUNE 1ST
JUNE 11TH
JUNE 21ST
JULY 1ST
JULY 11TH
JULY 21ST
JULY 31ST
AUG. 10TH
AUG. 20TH
AUG. 30TH
SEPT. 9TH
SEPT. 19TH
SEPT. 29TH
OCT. 9TH
OCT. 19TH

plots are rectangular, however. The individual plots are made level, so that a uniform depth of water can be applied on all parts of the plot. Each plot is surrounded by a ditch and is thus made into a basin, giving a modification of the basin or bedding system of irrigation. In doing the levelling it has not been found necessary to scrape any part of a plot to a depth of more than six inches. Most of the scraping has not exceeded four inches.

(3) *Soil.*—The soil is a uniform, medium sandy, clay loam, with a subsoil of similar texture.

(4) *Application of water.*—(*a*) The stage of plant growth has been used as the basis for determining the time of irrigation. In addition, some of the plots are irrigated in the fall, one pair when the condition of the crop and soil indicates a need of water and one pair of plots receive no irrigation.

(*b*) The depth of water per application for uncultivated crops is six inches, while for intertilled crops three inches has been decided upon. Where any modification of this practice is made, it is for the purpose of studying the effect of heavier or lighter irrigation. This modification consists of four and eight inches for wheat and alfalfa and two and four inches for hoed crops.

(5) *Soil Moisture Studies.*—Soil moisture determinations are made of each foot of soil to a depth of six feet on each plot in the spring and in the fall. In the future it is planned to make determination also before and after each irrigation, the necessary precautions being taken to prevent injuring crops that will be harvested.

WORK CARRIED ON IN 1922

This season one set of plots each of wheat, potatoes, and sunflowers were under test. The wheat was seeded on land that was in corn and sunflowers the previous year, these crops having followed alfalfa. The potatoes followed peas which followed oats.

Alfalfa and pasture grass plots were also established but no data were obtainable on these perennial crops the first year. A field was also prepared for sunflowers for next year.

Wheat.—The wheat was seeded May 19, ninety pounds per acre of Marquis seed having been used. The plots were irrigated at one or more of the following stages.

1. Five leaves appearing.
2. Shot blade.
3. Boot.
4. Flowering.
5. Milk.
6. Soft dough.
7. When crop appeared to need water (abbreviated in table to 'Crop N.W.')

Potatoes.—Irish Cobbler potatoes were used for the test. They were planted May 26-27 in rows three feet apart, seed being used at the rate of 1,300 pounds per acre. The stages of plant growth selected for the first irrigation of potatoes were:—

1. When tops are half grown.
2. Starting bloom.
3. Full bloom.
4. Ten days after full bloom (abbreviated in table to '10 d. after F.B.')

Subsequent irrigations were applied at intervals of ten days or twenty days.

IRRIGATION, SOIL MOISTURE AND CROP YIELD DATA FROM PLOTS IRRIGATED AT DIFFERENT STAGES OF PLANT GROWTH

WHEAT

Number of Irrigations	Time of Irrigation												Depth of water applied		Moisture in 6 ft. of soil in spring	Total water: precipitation, irrigation and in soil	Moisture in 6 ft. of soil in fall	Total water used by crop, evaporated and percolated	Date of harvest	Crop Yield, Acre
	1st Irrigation		2nd Irrigation		3rd Irrigation		4th Irrigation		5th Irrigation		6th Irrigation									
	Stage of plant growth	Date	Stage of plant growth	Date	Stage of plant growth	Date	Stage of plant growth	Date	Stage of plant growth	Date	Stage of plant growth	Date	Per irrigation	Total for season						Grain
															ft.	ft.	ft.	ft.		bush.
0	No irrigation	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1·30	1·86	0·91	0·95	VIII -27	44·9
1	Flowering...	VII	-22	.....	.....	.....	.....	.....	.....	.....	.....	.....	0·50	0·50	1·26	2·32	1·24	1·08	IX -2	47·2
1	Shot Blade..	VII	- 4	.....	.....	.....	.....	.....	.....	.....	.....	.....	0·50	0·50	1·45	2·51	1·19	1·32	IX- 2	58·8
1	Crop N.W...	VI	-27	.....	.....	.....	.....	.....	.....	.....	.....	.....	0·50	0·50	1·40	2·33	1·11	1·22	IX- 5	69·2
1	Five leaf.....	VI	-20	.....	.....	.....	.....	.....	.....	.....	.....	.....	0·50	0·50	1·43	2·49	1·09	1·40	IX- 5	55·0
1	Five leaf....	VI	-20	.....	.....	.....	.....	.....	.....	.....	.....	.....	0·50	0·50	1·40	2·46	1·29	1·18	IX- 9	59·2
2	Shot blade..	VII	- 4	Flowering..	VII	-22	.....	.....	.....	.....	.....	.....	0·50	1·00	1·49	3·05	1·36	1·69	IX- 9	59·8
2	Five leaf....	VI	-20	Flowering..	VII	-26	.....	.....	.....	.....	.....	.....	0·33	0·66	1·34	2·56	1·04	1·52	IX- 9	63·3
2	Five leaf....	VI	-19	Flowering..	VII	-26	.....	.....	.....	.....	.....	.....	·50&·33	0·88	1·52	2·96	1·28	1·68	IX- 9	65·6
2	Five leaf....	VI	-20	Flowering..	VII	-26	.....	.....	.....	.....	.....	.....	0·50	1·00	1·33	2·89	1·12	1·77	IX- 5	62·9
2	Five leaf....	VI	-20	Flowering..	VII	-26	.....	.....	.....	.....	.....	.....	·66&·50	1·16	1·29	3·01	1·08	1·93	IX- 9	63·1
2	Five leaf....	VI	-20	Flowering..	VII	-26	.....	.....	.....	.....	.....	.....	0·66	1·32	1·36	3·24	0·95	2·30	IX- 9	64·2
3	Five leaf....	VI	-20	Boot.....	VII	-11	Milk.....	VIII	-14	.....	.....	.....	0·50	1·50	1·41	3·47	1·24	2·23	IX-19	56·2
4	Five leaf....	VI	-20	Shot blade.	VII	- 4	Flowering..	VII	-26	Soft dough .	VIII	-22	.....	.....	.....	.....	.....	.....	.....	.....
													·50&·33	1·88	1·38	3·82	1·26	2·56	IX-19	51·6

POTATOES

0	No irrigation	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0·98	1·49	0·84	0·66	IX-18	5,755
1	Full bloom..	VII	-25	.....	.....	.....	.....	.....	.....	.....	.....	.....	0·25	0·25	1·04	1·80	0·84	0·96	IX-18	12,762
1	10 d. after f. b	VIII	- 4	.....	.....	.....	.....	.....	.....	.....	.....	.....	0·25	0·25	0·97	1·73	0·87	0·86	IX-18	12,754
2	Full bloom..	VII	-25	10 d. after 1st	VIII	- 4	.....	.....	.....	.....	.....	.....	0·25	0·50	1·01	2·02	0·88	1·14	IX-18	15,678
3	Full bloom..	VII	-25	10d. after 1st	VIII	- 4	10d. after 2nd	VIII	-14	.....	.....	.....	0·25	0·75	0·97	2·23	0·89	1·34	IX-18	16,302
1	Early bloom	VII	-15	.....	.....	.....	.....	.....	.....	.....	.....	.....	0·25	0·25	0·99	1·75	0·99	0·77	IX-18	11,412
2	Early bloom	VII	-15	10d. after 1st	VII	-25	.....	.....	.....	.....	.....	.....	0·25	0·50	0·98	1·99	0·93	1·07	IX-18	15085,
3	Early bloom	VII	-15	10d. after 1st	VII	-25	10d. after 2nd	VIII	- 4	.....	.....	.....	0·25	0·75	0·90	2·16	0·90	1·27	IX-18	14,473
3	Early bloom	VII	-15	20d. after 1st	VIII	- 4	20d. after 2nd	VIII	-24	.....	.....	.....	0·25	0·75	0·86	2·12	0·87	1·26	IX-18	15,520
5	Early bloom	VII	-15	10d. after 1st	VII	-25	10d. after 2nd	VIII	- 4	10d. after 3rd	VIII	-14	10d. after 4th	VIII	-24	.....	0·17	0·85	0·95	2·31	0·93	1·39	IX-18	16,158
5	Early bloom	VII	-15	10d. after 1st	VII	-25	10d. after 2nd	VIII	- 4	10d. after 3rd	VIII	-14	10d. after 4th	VIII	-24	.....	0·34	1·70	0·97	3·18	0·96	2·22	IX-18	17,589
5	Early bloom	VII	-15	Full bloom .	VII	-25	10d. after 2nd	VIII	- 4	10d. after 3rd	VIII	-14	10d. after 4th	VIII	-24	.....	0·25	1·25	0·93	2·69	0·95	1·74	IX-18	18,448
6	Early bloom	VII	-15	Full bloom.	VII	-25	10d. after 2nd	VIII	- 4	10d. after 3rd	VIII	-14	10d. after 4th	VIII	-24	10d. after 5th	IX	-3	0·25	1·50	0·99	3·00	1·04	1·96	IX-18	20,586
1	Fall 1921....	X	-18	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0·40	0·40	1·27	2·18	1·06	1·12	IX-18	14,474
2	Fall 1921....	X	-18	Full bloom.	VII	-25	.....	.....	.....	.....	.....	.....	.....	.....	·40&·25	0·65	1·31	2·47	1·09	1·38	IX-18	18,596
2	Fall 1921....	X	-18	Early bloom	VII	-15	.....	.....	.....	.....	.....	.....	.....	.....	·40&·25	0·65	1·29	2·45	1·06	1·39	IX-18	19,667

The preceding tables give the data obtained from the experiment with potatoes and wheat. As this is the first year's results, it is unsafe to make deductions. The tables are presented as a matter of record.

The potato experiment was not carried out entirely as outlined, the plots receiving their first irrigation when the plants were half grown and those receiving four irrigations having been omitted. The irrigations could not be given when the plants were half grown as the pump which supplied the water for the field was out of order, awaiting repairs from the factory, just at this period. A small auxiliary pump was ordered to meet such an emergency as this but it did not arrive until too late for this irrigation. The plots which should have received four irrigations were spoiled for the year's experiment when a ditch carrying water to an adjoining field broke and flooded these plots.

The low yields of wheat on the heavily irrigated plots were due to the grain lodging badly after the third, and especially after the fourth, irrigation.

WEEKLY EVAPORATION FROM A FREE WATER SURFACE

Weekly readings were made of the evaporation from a free water surface of an evaporation tank to assist in the interpretation of the crop and soil moisture data. The tank used for this purpose was four feet in diameter and two feet deep, and was buried in the ground to within two inches of the top of the tank. The tank was filled to within one inch of the top and enough water added after each weekly measurement to replace the water lost by evaporation.

The following table shows the evaporation for each week of the season:—

Date of week ending	Evaporation	Date of week ending	Evaporation	Date of week ending	Evaporation
	inches		inches		inches
May 8	1·11	July 10	1·15	Sept. 11	0·68
May 15	1·09	July 17	0·87	Sept. 18	0·66
May 22	1·10	July 24	1·12	Sept. 25	1·00
May 29	1·36	July 31	1·16	Oct. 2	1·20
June 5	1·63	Aug. 7	0·85	Oct. 9	0·44
June 12	0·60	Aug. 14	0·66	Oct. 16	0·42
June 19	1·24	Aug. 21	1·12	Oct. 23	0·53
June 26	1·26	Aug. 28	1·49	Oct. 30	0·40
July 3	0·42	Sept. 4	1·50	Nov. 6	0·25

Total evaporation for 189 days, May 1 to November 6 inclusive, 25·31 inches.

WATER USED ON THE FARM IN PERIODS OF TEN DAYS, SHOWN IN ACRE FEET

Period	June 1 to June 10	June 11 to June 20	June 21 to June 30	July 1 to July 10	July 11 to July 20	July 21 to July 30	July 31 to Aug. 9	Aug. 10 to Aug. 19	Aug. 20 to Aug. 29	Aug. 30 to Sept. 8	Sept. 9 to Sept. 18	Sept. 19 to Sept. 28	Sept. 29 to Oct. 8	Oct. 9 to Oct. 19
Acre feet.....	13·26	15·84	19·61	4·79	16·13	37·97	22·46	16·05	13·26	Nil	Nil	Nil	0·70	19·50

Total water used during the season 179·57 acre feet, or 0·92 acre feet per acre.

TOTAL WATER USED ON THE FARM FOR THE SEASON OF 1922

All water used on the farm was measured, for the purpose of determining the water required and at what part of the season the greatest amount of water would be used on a highly diversified farm.

There was no water used during the month of May, which is quite unusual. The reasons for this were that the season was exceptionally late and that all the alfalfa fields were irrigated the previous fall and consequently did not need water in the spring.

The preceding table and graph give the amount of water used from June 1st to October 19 in periods of ten days. The total area irrigated was 196 acres and the total water used during the season was 179·6 acre feet or 0·92 acre feet per acre.

In the table the water is expressed as acre feet.

The total water used was less in 1922 than usual for a year as dry as this, because of the extensive irrigation the previous fall and the relatively small amount of fall irrigation done this year.

HORTICULTURE

Two phases of the horticultural work are carried on at the Station, that dealing with dry land gardening, which serves the purpose of demonstrating the possibilities of a "dry land" farmer's garden and that dealing with irrigation, which includes more elaborate tests and cultural experiments.

THE SEASON

The season from a horticultural viewpoint was, on the whole, quite favourable. Trees and shrubs came through the winter with practically no injury. Although the spring was backward on account of the stormy, wet April which delayed spring planting, all growth was rapid when the weather moderated. Fruit trees and bushes bloomed freely and set fruit well. Ornamental bushes as well as perennial herbaceous plants produced a particularly pleasing show of bloom. The rather scanty rainfall during the summer prevented the dry land garden from doing its best, but, of course, this had no deterring effect on the irrigated land. The last frost in the spring was on May 23, the first frost in the fall was on October 7 and the first killing frost on October 11.

DRY LAND

VEGETABLE GARDEN

The dry land garden was in splendid shape in the spring, there being plenty of moisture to germinate the seed. Owing to the rather dry season, the soil gradually dried out and growth was somewhat checked, greatly reducing the yields. The first vegetable seed was sown May 8.

One 100-foot row of each vegetable was planted, the rows being three feet apart. This distance apart of row allows ample room for cultivating with a horse cultivator, thereby reducing hand labour to a minimum. The need of a good windbreak for a dry land garden cannot be overestimated. In addition to holding the snow in the winter months it protects the crop from the wind and checks soil drifting. For this purpose, single rows of cottonwoods are used on the Station for the dry land garden. The rows, which run north and south, are placed 200 feet apart and the trees four feet apart in the rows. Where a thicker windbreak is required, caraganas and laurel, or sharp-leafed willows may be planted on the west of the cottonwoods. Caraganas used alone make

an excellent windbreak but they are much slower growing. An advantage they have over the cottonwoods is that they do not rob the soil of moisture for nearly so great a distance on each side, making it possible to plant crops closer to the windbreak.

Beets.—Eclipse was the variety sown. The beets reached a nice size for table use and were of excellent quality. The 100-foot row yielded 131 pounds.

Beans.—One variety was sown, namely Early White Kidney. The plants were rather stunted but yielded an abundance of pods, although undersized; 19 pounds of green beans were picked off the 100-foot row.

Carrots.—Half Long Scarlet Nantes was the variety sown. Although the carrots were not very large they were sweet and of excellent quality. The yield from the 100-foot row was 47 pounds.

Corn.—Howe's Yellow Flint was planted as an early corn and was ready for use on July 27; 173 cobs were pulled from the 100-foot row.

Golden Bantam was planted for a sweet corn and was ready for use August 21; 157 cobs were pulled from the 100-foot row.

Cucumber.—One variety was planted May 30, namely Davis Perfect. The cucumbers were rather small in size and lacked tenderness owing to the dry weather but there was an abundant yield; 147 were pulled from 100-foot row.

Cabbage.—Early Jersey Wakefield was the variety used. Excellent heads formed, although small; 63 pounds were cut from the 100-foot row.

Cauliflower.—Early Snowball was the variety planted. Some nice heads were obtained but the majority were small and past the cutting stage in a day or two; 49 pounds were cut from the 100-foot row.

Lettuce.—Grand Rapids was the variety sown. Owing to the dry weather the plants went to seed very quickly.

Onions from seed.—Large Red Wethersfield was the variety sown. The onions were not very large but were firm and well ripened; 30 pounds were harvested from the 100-foot row.

Onions from sets.—Three rows of Yellow Globe sets were planted, and produced a crop of good-sized onions. The onion maggot did considerable damage; 116 pounds were harvested from 300 feet.

Parsnips.—The variety sown was Vaughan's Intermediate. The parsnips when harvested were on the small side, the yield being 39 pounds from the 100-foot row.

Peas.—Thomas Laxton was the variety sown. Like the beans, the plants were stunted but produced an abundance of green peas although the pods were small; 26 pounds of green peas in the pod were pulled from the 100-foot row.

Potatoes.—Five rows of sprouted potatoes were planted on May 8 and were ready for use on July 3. Irish Cobbler was the variety used and the yield from the 500 feet was 336 pounds. It was very noticeable that these sprouted potatoes yielded more heavily than did the unsprouted ones planted ten days later. For sprouting, medium-sized potatoes were placed in flats near light in the cellar the latter part of March and, by the time they were planted on May 8, vigorous, green sprouts had developed one-fourth of an inch in length.

Test of Varieties.—Eleven varieties were tested. These were planted on summerfallowed land on May 18 and dug October 13. They were cultivated six times during the growing season.

POTATOES. (DRY LAND)—TEST OF VARIETIES

Variety	Yield of marketable potatoes	Yield of unmarketable potatoes	Total yield	Per cent small	Average yield of marketable potatoes for 10 years*
	bush.	bush.	bush.		bush.
Gold Coin	446·7	45·0	491·7	9·2	223·9
Irish Cobbler	308·3	21·7	330·0	6·6	212·7
Factor	381·8	61·8	443·6	13·9	212·1
Morgan Seedling	341·7	28·3	370·0	7·6	209·7
Empire State	388·3	55·0	443·3	12·4	205·5
Reeves Rose	321·7	43·3	365·0	11·9	188·5
Wee MacGregor	221·7	33·3	255·0	13·1	181·6
Dalmeny Beauty	400·0	51·7	451·7	11·4	180·3
Table Talk	396·7	40·0	436·7	9·2	178·9
Sutton Abundance	313·3	45·0	358·3	12·6	not grown for
Netted Gem	286·7	63·3	350·0	18·1	10 years

* The total crop failure of 1919 accounts for the low average for ten years.

Pumpkin.—One row 26 feet long of Small Sugar was planted May 30, the rows being placed six feet apart. From the 26 feet of row 96 pounds of pumpkins were harvested of which about 80 per cent were mature.

Radish.—Scarlet Turnip White Tipped was the variety sown. Owing to the warm weather they went to seed quickly and were rather woody.

Spinach.—Victoria was the variety sown. The plants made good growth and were of fair quality; 19 pounds were cut from the 100-foot row.

Vegetable Marrow.—English Trailing was the variety planted May 30. An abundance of marrows formed. Although rather small, 127 pounds were harvested from 76 feet of rows 6 feet apart.

Turnip.—The variety sown was Golden Ball. The turnips were of medium size and of good quality. The yield was 62 pounds from the 100-foot row.

Tomato.—Alacrity was the variety planted. Owing to the exceptionally long season, an abundance of good-sized tomatoes was obtained; 111 pounds of ripe tomatoes were picked from the 100-foot row.

SMALL FRUITS (DRY LAND)

The small fruits on the dry land are protected by a windbreak. The fruit bushes should be set in rows at least eight feet apart to allow for horse cultivation without endangering the fruit. A good distance apart to have the bushes is six feet. During the growing season it is of importance to keep the land absolutely free from the growth of grass and weeds which robs the soil of moisture needed by the bushes.

All of the dry land small fruits gave good yields this year. The fruit, owing to the dry weather in July, was only medium in size. The following are the yields from the twelve bushes of each variety:—

Black Currants.—Eagle, 40 quarts; Merveille de la Gironde, 35 quarts; Saunders, 28 quarts.

Red Currants.—New Red Dutch, 133 quarts; Red Grape, 82 quarts; Cumberland, 76 quarts.

White Currants.—Large White, 77 quarts; White Grape, 61 quarts; White Pearl, 57 quarts.

Gooseberry.—Houghton, 16 quarts.

IRRIGATED LAND

VEGETABLES

The irrigated garden is usually fall ploughed, as it permits of earlier seeding in the spring. Owing to the fact that the windbreaks held the snow, the soil remained in a wet condition until May 1. The first seeding was done on that date. All seeds germinated evenly and good growth resulted.

The flea beetles were again very numerous, attacking radish, turnip and rhubarb plants as they appeared through the ground, but the various dusts experimented with kept them fairly well in check. Although not yet general in the district, onion maggot is spreading and it would seem advisable to grow onions from seed sown as early as possible in the spring. This is preferred to planting onion sets, unless the onion sets are homegrown, for there is a great danger of bringing in the onion maggot when purchasing sets offered for sale by the stores.

In view of the fact that the season was long, most of the tomatoes ripened on the vines even when six trusses were left to the vine. A few melons ripened but were poor in quality.

Asparagus.—As usual the plantation yielded heavily. the shoots being strong and of excellent quality. The variety grown is Conover's Colossal.

Beans.—Twenty-seven varieties were grown. The weight of green beans produced on a thirty-foot row from the recommended varieties was: Canadian Wonder, 58 pounds; Refugee, 42 pounds; Masterpiece, 23 pounds; Stringless Green Pod, 21 pounds; Davis White Wax, 19 pounds. The last three years, anthracnose has made its appearance among many of the varieties, some being more susceptible to the disease than others.

A date of seeding experiment, to determine the variation in yield of beans sown at various times, has been carried on for five years. The first sowing was done the last week in May, with three additional sowings at weekly intervals. One 100-foot row was sown at each date of seeding. From half of this row, 50 feet, the beans were picked green and on the remainder the crop was allowed to ripen.

GARDEN BEANS—DATES OF SEEDING

——	Average yield for five years green beans	Average yield for five years threshed beans
	lbs.	lbs.
First sowing	44	3½
Second sowing	37	3
Third sowing	35	1½
Fourth sowing	29	Nil

Results are in favour of sowing the last week in May, as beans sown after this date do not grow so well in the hot weather. Experience here has shown that beans sown before the latter part of May are liable to be nipped by late spring frosts.

Beets.—Ten varieties were grown. The varieties recommended, with their respective yields from a thirty-foot row, are: Black Red Ball, 91 pounds; Early Wonder, 147 pounds; Detroit Dark Red, 158 pounds; Crosby Egyptian, 183 pounds.

A thinning experiment has been carried on with beets for the past five years. One 100-foot row was divided into three parts and the plants were thinned to two, three and four inches apart, respectively. The five years' average from plants thinned to two inches was 177 pounds; thinned to three inches, 179½ pounds; thinned to four inches, 186½ pounds, this quantity being produced in each case from a row 33⅓ feet long.

Borecole or Kale.—This vegetable is rarely seen in the west, although it grows to perfection here. After the leaves have been exposed to frost they become tender and make a delicious vegetable. Dwarf Green is a good variety.

Brussels Sprouts.—So far brussels sprouts have not been satisfactory, no sprout developing to an edible size before severe frosts.

Carrots.—Nine varieties were grown. All did exceptionally well and were of excellent quality. The following are the recommended varieties, with yield from a 30-foot row: Oxheart, 35 pounds; Danvers Half Long, 77 pounds; Half Long Scarlet Nantes, 86 pounds; Chantenay, 93 pounds.

A thinning experiment has been carried on with carrots for the past five years. One 100-foot row was divided into three parts and thinned to one and a half, two and three inches respectively. The five-year average yield from 33⅓ feet of row from plants thinned to one and a half inches was 79 pounds; thinned to two inches, 75½ pounds and thinned to three inches, 69 pounds.

Corn.—Twenty-four varieties were grown and all produced roasting ears before frost. The varieties recommended in order of earliness, with number of roasting ears from ten hills are: Pickaninny, 71 cobs; Indian Sweet, 48 cobs; Early June, 45 cobs; Early Malcolm, 77 cobs; Extra Early Cory, 49 cobs and Golden Bantam, 65 cobs.

Cabbage.—Eighteen varieties were grown and all did well. Root maggot was noticed on a few plants only, although it is making inroads in certain parts of the district. The recommended varieties in order of earliness, with yield from a 30-foot row are: Early Jersey Wakefield, 67 pounds; Copenhagen Market, 79 pounds; Glory of Enkhuizen, 97 pounds; Fottler Improved Brunswick, 116 pounds and Extra Amager Danish Ballhead, 108 pounds. The last-named is a good winter cabbage for storing. For a pickling red cabbage, Delicatesse or Red Drumhead is recommended.

Cauliflower.—Two varieties were grown and both grew well, forming nice heads. Of the two varieties, Early Snowball is recommended. The yield from 20 plants was: Early Snowball, 44 pounds; Early Dwarf Erfurt, 36 pounds.

Celery.—Nine varieties were grown. The varieties recommended in order of earliness, with yields from a 15-foot row are: White Plume, 37 pounds; Golden Self Blanching, 27 pounds; Golden Yellow, 38 pounds; Evans Triumph, 54 pounds and Winter Queen, 46 pounds.

An experiment has been carried on with the following methods of blanching. Sixty-six plants were used in each case. The average yield for five years was: Pliable material, 66 pounds; boards, 74 pounds; earthing up with soil, 83 pounds; trench, 69 pounds.

Results show that the heaviest yield was obtained from plants earthed up with soil. The celery, however, was not ready for use as early as the plants blanched with boards. From the time the plants were high enough to be

blanched with boards it took, on the average, twenty-five days before the celery was ready for use.

Cucumber.—Six varieties were planted May 29. Six hills were planted of each variety, three hills from plants started under glass and three hills from seed planted in the open. As an abundance of cucumbers can be had from the seed planted in the open, starting them under glass is unnecessary. However, those started under glass were ready to pick from seven to ten days before the seed planted in the open. Recommended varieties in order of earliness, with yields from three hills planted in the open are: Early Russian, 113 cucumbers; Improved Long Green, 111 cucumbers; Davis Perfect, 62 cucumbers; Prolific, 138 cucumbers and Vaughan, 81 cucumbers.

Citron.—Three varieties were grown with three hills of each variety, planted in the open on May 29. The yields were as follows: Colorado, 89 pounds; Colorado Mammoth, 81 pounds and Red Seeded, 75 pounds.

Egg-Plant.—Two varieties were grown. Both varieties were started under glass and planted in the open after danger of frost was past. Owing to the damage done to the plants by the potato beetle, they were considerably checked and only small fruits formed. Potato beetles are particularly partial to egg-plant. The varieties used were: New York Improved Purple and Black Beauty.

Leeks.—Two varieties were grown and both did well. This is another vegetable that is rarely seen in the West although it is used extensively in other parts as a vegetable and for soup.

Lettuce.—Nine varieties were grown, consisting of Leaf, Cabbage and Cos lettuce. A number of them ran quickly to seed in the hot weather. The varieties recommended, with yield from 15 feet of row, are as follows: (Leaf) Grand Rapids; (Cos) Cos Trianon; (Cabbage) Salamander, Iceberg and Crisp as Ice.

Musk Melon.—Four varieties were grown, three hills from plants started under glass and three hills from seed planted in the open. Owing to the long season a number ripened, particularly from the plants started under glass. The recommended varieties are: Extra Early Grand Rapids and Extra Early Hackensack. Musk melons are not considered successful here, as in ordinary years only a few ripen. Even those that do ripen lack quality and flavour.

Onions.—Thirteen varieties of onions were grown. As the soil was infested with onion maggot, the yields were considerably reduced. The varieties recommended, with yield from a 30-foot row, are as follows: Ailsa Craig, 23 pounds; Southport Yellow Globe, 23 pounds; Giant Prizetaker, 22 pounds; Danvers Yellow Globe, 21 pounds; Large Red Wethersfield, 19 pounds; Extra Early Red Flat, 14 pounds and, for pickling, Small Silverskin, 7 pounds.

A thinning experiment has been carried on with onions for five years. Three varieties were grown, using one 100-foot row for each. The rows were divided into three parts and thinned to one, two and three inches respectively.

ONIONS—THINNING EXPERIMENT

	Distance Thinned		
	1 inch	2 inches	3 inches
	lbs.	lbs.	lbs.
Large Red Wethersfield	29	31	28
Yellow Globe	32	33	29
Extra Early Red Flat	22	23	21

Thinning to two inches apart has given the highest yields.

Okra.—One variety was grown, White Velvet. An abundance of pods were formed, reaching the size desirable for making soup, the purpose for which the pods are used.

Peas.—Fifteen varieties were grown. The varieties recommended in order of earliness, with the yields of green peas from a 30-foot row, are as follows: Eight Weeks, 19¾ pounds; Gradus, 26 pounds; Thomas Laxton, 21¼ pounds; Little Marvel, 19 pounds; Pioneer, 25 pounds; Stratagem, 10 pounds.

A date of seeding experiment has been carried on for five years. The first sowing was made each year as early as possible in the spring with three additional sowings at weekly intervals. One 100-foot row was sown in each case. From one half, 50 feet, of this row the peas were picked green and on the remainder the crop was allowed to ripen.

GARDEN PEAS—DATES OF SEEDING

——	Green peas, average yield for 5 years	Threshed peas, average yield for 5 years
	lbs.	lbs.
First sowing	36½	5½
Second sowing	35	5
Third sowing	31	3
Fourth sowing	16½	2

The results are in favour of early sowing, as peas appear to grow better in the cooler weather of spring. The later sowings show a falling-off in yield.

Peppers.—Four varieties were grown. Owing to the long season, a large number of pods ripened. The following varieties are recommended: Harris Early, Neapolitan and Long Red Cayenne.

Parsley.—Three varieties were grown, Triple Curled, Double Curled and Champion Moss Curled. All the varieties made strong growth and were of excellent quality.

Parsnip.—Three varieties were grown. The yields obtained from a row 30 feet long were as follows: Hollow Crown, 90 pounds; Intermediate, 37 pounds; XXX Guernsey Half Long, 13 pounds.

A thinning experiment has been carried on with parsnips for five years. One 100-foot row was divided into three parts and thinned to two, three and four inches respectively. The five-year average yield from 33⅓ feet of row from plants thinned to two inches was 50 pounds, thinned to three inches, 56½ pounds and thinned to four inches, 59 pounds.

Pumpkin.—Three varieties were grown, three hills of each variety being planted. The seed was sown on the 29th of May in the open. An abundance of pumpkins formed, about seventy per cent of them ripening.

Potatoes.—Twelve varieties were under test. They were planted May 18, irrigated July 25, August 9 and 19 and were all dug on the 13th of October. The yields of potatoes depend, to a large extent, on the method of irrigating. The first irrigation should not, as a rule, be given until the plants come in bloom, unless the soil is very dry. A thorough soaking at the first application is not desirable. A good plan to follow is to allow the water to run down every other row. The second irrigation should follow before the soil shows signs of becoming dry; that is, before the soil loses its binding quality. The water should be run

down each row at this irrigation and should be permitted to run until the soil is thoroughly soaked. A third irrigation is usually required. This is determined by examining the soil and, if found necessary to give a third irrigation, it should be done as thoroughly as was the second. When properly applied, three irrigations are usually sufficient. Potatoes require a medium, but uniform, moisture content in the soil throughout the growing season. They should never be allowed to dry out and suffer from lack of moisture, particularly after the young tubers begin to form. The experienced irrigator can tell when potatoes need irrigation by taking up a handful of soil, for, when it crumbles readily, water is required; when it binds in a mass when pressure of the hand is exerted it does not usually require it.

POTATOES (IRRIGATED)—TEST OF VARIETIES

Variety	Yield of marketable potatoes	Yield of unmarketable potatoes	Total yield	Per cent small	Average yield of marketable potatoes for 10 years
	bush.	bush.	bush.		bush.
Dalmeny Beauty	661·7	20·0	681·7	2·9	500·2
Irish Cobbler	418·3	48·3	466·6	10·4	497·8
Table Talk	773·3	65·0	838·3	7·8	497·0
Empire State	746·7	60·0	806·7	7·4	490·3
Factor	638·3	33·3	671·6	5·0	486·7
Gold Coin	723·3	46·7	770·0	6·1	485·3
Reeves Rose	481·7	81·7	563·4	14·5	477·2
Morgan Seedling	586·7	50·0	636·7	7·9	475·4
Wee MacGregor	646·7	50·0	696·7	7·2	472·0
Netted Gem	476·7	41·7	518·4	8·0	not
Sutton Abundance	425·0	40·0	465·0	8·6	grown for
Eight Weeks	183·3	30·0	213·3	14·1	10 years

In addition to the variety tests of potatoes, tests were made from seed supplied by local growers, the ultimate object being to standardize the varieties best suited to the district. At the present time, a large number of varieties are grown and it is hoped, by reducing the number in this section, that the growers may be aided in developing a better market.

The following table gives the results of the seed supplied by local growers.

POTATOES (IRRIGATED)—TEST OF VARIETIES

Variety	Source of seed	Yield marketable	Yield unmarketable	Total yield	Per cent small
		bush.	bush.	bush.	
Wee MacGregor	C. Dogterom, Lethbridge.	605	43·3	648·3	6·7
Royal Russet	F. H. Hutton, Lethbridge.	533·3	70·0	603·3	11·6
Gold Nugget	T. E. Brown, Vauxhall.	376·7	46·7	432·3	11·0
Early Ohio	A. Leedham, Pincher Creek.	321·7	33·3	355·0	9·4

Radish.—Ten varieties were grown and most of them went to seed very rapidly owing to the hot weather. The varieties that grew best were: Scarlet Turnip, White Tipped, French Breakfast, Scarlet Oval and White Icicle.

Spinach.—Two varieties were grown, Victoria and New Zealand, and both made strong growth. Victoria should be cut as soon as large enough as it quickly runs to seed. The New Zealand, being much later, can be used until killing frost.

Swiss Chard.—One variety was grown, Giant Lucullus. Very strong growth was made and the quality was excellent.

Salsify or Vegetable Oyster.—Three varieties were grown. The yields from 30 feet were as follows: Sandwich Island, 28 pounds; Mammoth Sandwich Island, 14 pounds; Long White, 10 pounds.

Squash.—Four varieties were grown. Three hills of each variety were planted in the open on May 29. An unusually large amount of squash formed but only about sixty per cent reached maturity. The varieties were as follows: Green Hubbard, Golden Hubbard, Large Warted and Long Keeping.

Sunberry.—The plants were started under glass and planted out as soon as there was no danger from frost. The plants grew very large and were loaded with fruit.

Tomatoes.—Fourteen varieties of tomatoes were grown from plants started under glass. They were planted out on June 9, five plants of each variety being used. The following is the weight of ripe tomatoes picked from the five plants of the recommended varieties: Danish Export, 25 pounds, 9 ounces: Alacrity, 25 pounds, 12 ounces; Burbank Early, 35 pounds, and Prosperity, 38 pounds.

To determine the best method to employ in staking up tomatoes, three tests have been carried on for five years. In each case the tomatoes were pruned to one stem and no more than six trusses of fruit allowed to form. The methods employed were: first, tying the vines to stakes; second, tying the vines to three wires, the first one being fifteen inches from the ground and the other two eighteen inches apart; third, leaving the vines on the ground.

Due to the heavy winds so prevalent in this district, the stakes have an advantage over the wires in that they hold the plants steadier. The plants left on the ground yield as high as the plants tied to stakes or wires but the fruit is not so clean and in wet weather the tomatoes in contact with the soil usually start to rot.

Vegetable Marrow.—Two varieties were grown, English Vegetable Marrow and Long White Bush. Three hills of each variety were planted in the open on May 29. An abundance of marrows formed some of which grew to be very large, one being 50 pounds.

Watermelon.—Five varieties were grown, three hills from plants started under glass and three hills from seed planted in the open.

Vegetables Recommended for Southern Alberta

Chart showing varieties of Staple Vegetables recommended for Southern Alberta, as determined by tests for the past ten years at Lethbridge, together with da es and rates of planting and approximate time vegetable is ready for use

Name of Vegetable	Quantity of seed required	When to plant or sow	Average time required for seed to germinate	When to plant in the open	When ready for use	Varieties recommended
Beet	1 oz. to 50 ft. of row	Early spring	Between 2 and 3 weeks.		Towards end of June	Early Wonder, Black Red Ball Detroit Dark Red and Eclipse.
Beans	1 lb. to 75 ft. of row.	Middle to end of May.	10 days		2nd week in July	Early Valentine and Davis White Wax, Stringless Green Pod and Masterpiece.
Cabbage (Early)	1 oz. produces 1,500 to 2,000 plants.	Start in bed, 1st week in April.	About 5 days	When large enough.	Middle of July	Early Jersey, Wakefield, and Copenhagen Market.
Cabbage (Late)	1 oz. produces 1,500 to 2,000 plants.	Start in cold farme, end of April.	About 5 days	Middle of June	In the fall	Danish Ballhead and Flat Dutch.
Cauliflower	1 oz. produces 1,500 to 2,000 plants.	Start in hot bed, end of April.	About 5 days	When large enough.	From middle of July.	Early Snowball and Early Dwarf Erfurt.
Cucumber	1 oz. for 50 hills	End of May	About 7 days		Latter part of July.	Early Russian, Davis Perfect, Improved Long Green and Prolific.
Corn	1 lb. for 100 hills	Middle of May	About 2 weeks		Beginning of August	Pickanniny, Sweet Squaw, Early July, Early Mayflower, Kloochman and Golden Bantam.
Carrot	1 oz. to 100 ft. of row	Early Spring	About 3 weeks		End of June	Oxheart, Half Long Scarlet, Nantes and Chantenay.
Celery	1 oz. produces 2,000 to 3,000 plants.	Start in hot bed, middle till end of March.	12 to 14 days	From beginning of June.	From middle of August.	Golden Self-blanching, White Plume, Evans' Triumph and Winter Queen.
Lettuce	1 oz. to 100 ft. of row	Early spring and at intervals.	About 10 days		Middle of June	Leaf:—Grand Rapids. Cos:—Romaine. Head:—Salamander, Hanson, and Iceberg.
Onion (Seed)	1 oz. to 100 ft. row	Early Spring	About 3 weeks		End of July	Early Red Flat, Large Red Wetherfield, Australian Brown, Southport Yellow Globe and Danvers Yellow Globe.
Onion (Sets)	1 lb. to 40 ft. of row	Early Spring		Early spring	Beginning of June	Yellow Globe and Red Globe.
Peas	1 lb. to 75 ft. of row	Early spring	2 to 3 weeks		Last week in June	Little Marvel, Gradus, Thomas Laxton, Sutton's Excelsior, Lincoln and Stratagem.
Parsnip	1 oz. to 150 ft. of row	Early spring	3 to 4 weeks		Middle of August	Hollow Crown and Intermedias.
Parsley	1 oz. to 50 ft. of row.	Early spring	About 4 weeks		End of June	Triple Curled and Champion Moss Curled
Potatoes	1,200 to 1,500 lbs. per acre.	1st to about middle of May.	About 3 weeks		Early—Middle of July. Late—End of August.	Early—Irish Cobbler. Late—Gold Coin.
Pumpkin	1 oz. to 25 hills	End of May	About 7 days		From middle of August.	Small Sugar, Connecticut Field and King of the Mammoths.
Radish	1 oz. to 75 ft. of row	Early spring and at intervals.	About 10 days		From end of May	Scarlet Turnip, White Tipped, Icicle, French Breakfast and Scarlet Ball.

CHART showing varieties of Staple Vegetables recommended for Southern Alberta, as determined by tests for the past ten years at Lethbridge, together with dates and rates of planting and approximate time vegetable is ready for use—*Concluded*

Name of Vegetable	Quantity of seed required	When to plant or sow	Average time required for seed to germinate	When to plant in the open	When ready for use	Varieties recommended
Spinach	1 oz. to 50 ft. of row.	Early spring and at intervals.	About 14 days.		Middle of June	Victoria and New Zealand.
Squash (Summer)—Vegetable Marrow	1 oz. to 30 hills	End of May	About 7 days.		Beginning of August	English Vegetable Marrow and Bush Marrow.
Squash (Winter)	1 oz. to 30 hills	End of May	About 7 days.		Middle of September.	Golden Hubbard and Green Hubbard.
Tomato	1 oz. produces 1,000 to 1,500 plants.	Start in hot bed, 1st week in April.	About 7 days.	About 6th of June.	Towards middle of August.	Danish Export, Burbanks Early, Alacrity and Langdon's Earliana.
Turnip (Early)	1 oz. to 100 ft. of row	Early spring	About 10 days.		About end of June.	Early Purple Top Milan, Early Snowball and Golden Ball.

Herbs.—A collection of different kinds of herb seed was sown in the open, to find out whether they would grow satisfactorily and whether the perennials would live through the winter. About one-half of the collection germinated and made good growth. They are again to be tried out. Among those that grew well were: Sage, thyme, balm, rue, sweet fennel, horehound, anisum, sweet marjorum, coriander and dill.

Rhubarb.—Seed was sown on May 3 but, owing to the large number of flea beetles present and their fondness for the young plants as these appear through the ground, reseeding was necessary. The second sowing came along rapidly and the roots were dug up in the fall and planted in a permanent location.

Tobacco.—Three varieties were grown, the plants being started under glass and planted out on June 10. Owing to the long season, the leaves were in good shape to harvest before frost. The best variety appeared to be White Broad-leaved Burley which ripened before Cuban and Comstock Spanish. This was grown in a very sheltered place in the garden. The same results could not be obtained under field conditions.

SMALL FRUITS

The yields were much heavier this year than last, as the weather was favourable when the fruit was setting.

Black Currants.—The yields from three bushes each of the highest yielding varieties were: Winona, 40 pints; Eagle, 30 pints; Bang Up, 37 pints; Magnus, 33 pints and Topsy, 31 pints.

White Currants.—The yields from three bushes of the highest yielding varieties were: White Grape, 37 pints; White Kaiser, 35 pints; White Cherry, 34 pints; and Large White, 33 pints.

Red Currants.—The yields from three bushes of the highest yielding varieties were: Red English, 40 pints; New Red Dutch, 45 pints; Moore Seedling, 44 pints; La Conde, 42 pints; Raby Castle, 40 pints and Red Grape 37 pints.

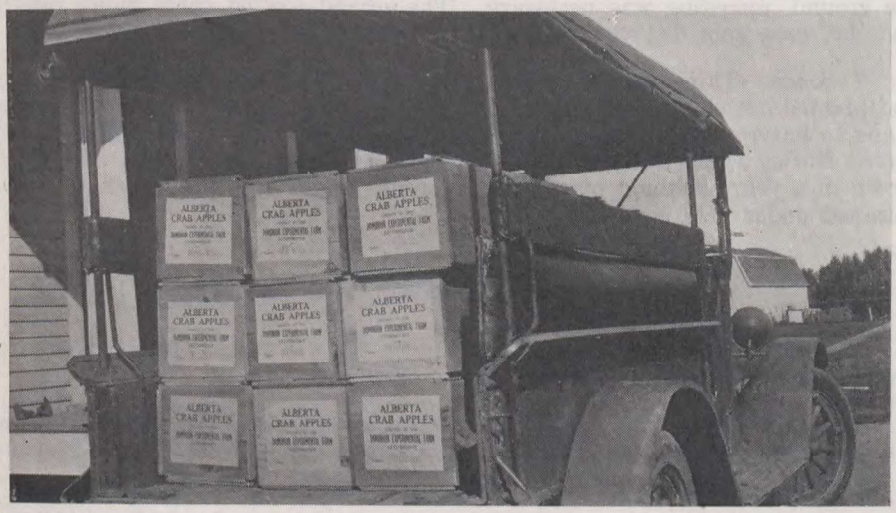
Gooseberries.—Seven varieties are under test. This season the bushes came into bearing. The Hardy, Houghton and Carrie varieties, which bear small to medium-sized berries, gave a good crop, but the varieties bearing larger gooseberries produced only a few. The varieties under test are: Carrie, Houghton, Alma, Barrett, Charles, Red Jacket and Silvia.

Raspberries.—This year the raspberries did exceptionally well, the canes being heavily laden with fruit. The yields from two 30-foot rows were as follows: Golden Queen, 24 pints; Sunbeam, 20 pints; Marlboro, 30 pints; Loudon, 33½ pints; Sara, 34 pints; Ruby, 34½ pints; Herbert, 35 pints and Cuthbert, 37½ pints.

Strawberries.—The yield of strawberries was rather light. The five varieties that gave the highest yields were: Valeria, Senator Dunlap, Bismarck, Cassandra and Ott's Giant.

TREE FRUITS

Apples.—Both the standard apples and the crossbreds came through the winter in good shape. Several of the standards bloomed but only one bore fruit, there being two apples produced on the Fairfield. The crossbreds were exceptionally heavily laden. Two trees of Jewel yielded 370 pounds and 340 pounds respectively. Other recommended crossbreds are: Robin, Tony, Prince, Norman, Osman and Silvia.



Dr. Saunders' Cross-bred Crab Apples ready for Market.

Plums.—The Manitoba selected seeding plums, consisting of thirty-two trees, all fruited this year but no further outstanding trees were found. A number of the trees in the plantation were heavily laden and as high as 76 pounds were picked from one tree.

FLOWERS

Annuals.—The annuals, as usual, made a splendid showing, continuing to bloom until late in the season. Over 150 kinds and varieties were grown. It may be mentioned that the home grown sweet pea seed was in bloom ten days before the imported, both sown on the same date. The annuals recommended are: Stocks, asters, antirrhinums, petunias, phlox, verbena, nicotiana, zinnia, candytuft, mignonette, calendula, nasturtiums, alyssum, lobelia and helichrysum (everlastings).

Perennials.—The perennial border gave a continuance of bloom from spring when the irises made a beautiful showing, until the golden glow was nipped by the frost in the fall. Some of the recommended kinds are: Iris, phlox, aquilegia, lychnis, aster, pyrethrum, polemonium, oriental poppy, Iceland poppy, helianthus, delphinium, pinks, Shasta daisy and lupinus.

Roses.—The roses were in poor shape when uncovered in the spring and quite a few died out completely. However, the following varieties bloomed well: Lady Ashtown, Mrs. J. Laing, Senateur Vaisse, Margaret Dickson and Madame Ravary.

Gladiolus.—A much larger number were planted this year. They made a beautiful showing, producing long spikes of bloom. Owing to its easy culture this flower is rapidly gaining favour.

BULBS

Tulips.—The tulips made a particularly good showing again this year, with blooms of exceptionally fine quality. The early tulips began to bloom May 16, followed by the Darwin tulips, which finished blooming June 17.

Daffodils.—The daffodils bloomed exceptionally well and made a bright showing. The early varieties commenced to bloom May 24 and the late varieties finished blooming June 15.

SHRUBS

The flowering shrubs bloomed profusely, presenting a bright show of colour against the green background. The outstanding kinds were: Lilacs, including common or *vulgaris* varieties; honeysuckle (*loniceratatarica grandiflora*), *viburnum opulus sterile, caragana arborescens, caragana frutescens, caragana pygmaea, ribes aureum, spiraea arguta,* and *rosa spinosissima.*

TREES

The various kinds of forest and ornamental trees continue to make good growth. The outstanding kinds are: (deciduous) elm, ash, weeping birch, balsam, poplar and native cottonwood; (coniferous) blue spruce, white spruce, lodgepole pine, Scotch pine, Swiss stone pine and Douglas fir.

LAWNS

The lawns again presented a beautiful appearance with their rich shade of green. Cutting was done weekly to keep the grass in trim. One irrigating in the late fall of 1921 and one in July was all that was required to keep the lawns in ideal condition for the entire season.

CEREALS

DRY LAND

The variety tests of cereals on the dry farm were conducted on well prepared summer-fallow ploughed early the previous June.

WHEAT

Eleven varieties of spring wheat were under test. The grain was seeded May 10 at the rate of 75 pounds of seed per acre and all germinated well. The season was favourable until the tenth of June, when a period of two weeks of hot, dry weather injured all varieties to some extent. Some good rains in the latter part of June and the first two weeks of July brought the grain forward rapidly and made possible the harvesting of a fair crop. After the fifteenth of July, however, drought conditions again prevailed and prevented the proper filling of the kernels.

Only four of the varieties seeded have been grown for a number of years, therefore, in the following table, average yields for nine years are given only for those four:—

SPRING WHEAT (DRY LAND)—TEST OF VARIETIES

Name of Variety	Date of ripening	Number of days maturing	Average length of straw and head	Yield per acre, 1922	Average yield per acre for 9 years
			inches	bush.	bush.
Kubanka, Ottawa 37	Aug. 21	103	37	24·0	28·6
Huron, Ottawa 3	" 21	103	32	21·5	26·4
Marquis, Ottawa 15	" 17	99	37	26·0	24·3
Red Fife, Ottawa 17	" 21	103	34	25·0	24·4
Dicklow	" 19	101	35	31·5	
Red Bobs	" 12	94	34	27·0	
Kitchener	" 21	103	32	25·0	
Early Triumph	" 12	94	30	20·0	
Ruby, Ottawa 623	" 10	92	34	19·0	
Reward, Ottawa 928	" 10	92	34	19·0	
Supreme	" 14	96	27	16·5	

Dicklow, a soft wheat grown extensively in the western United States, gave the highest yield this year, being four and one-half bushels per acre above Red Bobs, which came second. Marquis, as third, was one bushel below Red Bobs. Over a period of nine years, Kubanka has given the highest average yield with Huron second and Marquis third. The difference between the average yields of Marquis and the other two varieties is not sufficient, however, to offset the superior milling qualities of Marquis. Red Bobs, which gave a better yield than Marquis this year, has been grown at the Station for five years. The average for that period was 9·7 bushels while Marquis for the same years produced 12·2 bushels per acre. A field of eight acres of Red Fife on prairie breaking produced 18 bushels per acre. From the date so far available, it would appear that Marquis is as good a variety for the dry farmer of the district as any yet tested.

WINTER WHEAT

Two varieties of winter wheat, Kanred and Kharkov, were seeded on summer-fallow September 2 and September 14 respectively, but both varieties failed to survive the winter.

OATS

Seven varieties of oats were seeded May 10, 85 pounds of seed being used per acre.

The drought of middle June did not affect the oats to the extent that it did the wheat and the yields were fair for all the varieties. Only three of the varieties have been grown for a sufficient period to make average yields for a number of years available.

OATS (DRY LAND)—TEST OF VARIETIES

Name of Variety	Date of ripening	Number of days maturing	Average length of straw and head	Yield per acre, 1922	Average yield per acre for 8 years
			inches	bush.	bush.
Gold Rain	Aug. 7	89	28	53·8	53·6
Danish Island	" 14	96	35	60·0	53·2
Banner, Ottawa 49	" 14	96	36	63·5	51·3
Leader	" 12	94	35	79·4	
Victory	" 14	96	37	67·1	
Longfellow, Ottawa 478	" 15	97	40	52·9	
Liberty (Hulless), Ottawa 480	" 14	96	36	25·6	

The yields this year place Leader at the top with a good margin over the other varieties. Victory comes next, with Banner as a close third. In the eight-year average Gold Rain is first, Danish Island is second and Banner third. Although Banner has given a slightly lower average yield than has Gold Rain and Danish Island, the inferior colour of the kernel of Gold Rain and the weakness of straw of Danish Island make Banner a more popular variety. Leader and Victory are showing up well but as only two years' results for these varieties are yet available no definite conclusions are drawn. A field of 6·63 acres of Baner oats on summer-fallowed land gave a yield of 43·7 bushels per acre.

BARLEY

Tests were made of thirteen varieties of barley. All varieties were seeded May 10 at the rate of 72 pounds of seed per acre. The dry weather in June decreased the yields materially, the production being less than one-half as much on the dry land as for the same varieties on the irrigated farm.

Seven varieties have been grown for a sufficient length of time to give the average yields for a number of years.

BARLEY (DRY LAND)—TEST OF VARIETIES

Name of Variety	Date of ripening	Number of days maturing	Average length of straw and head	Yield per acre, 1922	Average yield per acre for 7 years
			inches	bush.	bush.
Bark's Excelsior	Aug. 17	99	28	46·3	31·7
Swedish Chevalier	" 21	103	29	47·5	27·3
Invincible	" 26	108	30	22·5	25·9
Gold	" 12	94	30	30·0	27·2
O. A. C. 21	" 12	94	32	27·5	25·0
Odessa	" 14	96	34	35·0	24·3
Early Chevalier, Ottawa 51	" 7	89	39	25·0	23·3
Bearer, Ottawa 475	" 15	97	31	38·8	
Trebi	" 7	89	26	36·3	
Chinese, Ottawa 60	" 12	94	36	25·0	
Cape	" 7	89	28	23·8	
Mariout	" 11	93	29	16·3	
Himalayan, Ottawa 59	" 9	91	23	15·6	

Swedish Chevalier, a two-row variety, gave the highest yield for the year, with Bark's Excelsior, a six-row feed barley, a close second. Over a period of seven years, Bark's Excelsior has made the best average returns and as, in addition to its high yielding qualities, it is uniform in type and has fair strength of straw, this variety would appear to be very satisfactory for the district.

FLAX

Four varieties of flax were seeded May 10 on summer-fallow. The crop, however, was a total failure.

FLAX (DRY LAND)—TEST OF VARIETIES

Variety	1916	1917	1918	1919	1920	1921	1922	Average for 7 years
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	bush.
Novelty	705	600	480	Nil	Nil	Nil	Nil	4·6
Longstem	585	570	540	Nil	9	Nil	Nil	4·4
Common	570	540	360	Nil	18	Nil	Nil	3·8
Premost	.....	.....	.....	.....	.....	.....	Nil	.....

PEAS

Seven varieties of peas were seeded May 10, 150 pounds of seed being used per acre. The yields were much better than they were for the preceding three seasons but well below the nine years' average.

PEAS (DRY LAND)—TEST OF VARIETIES

——	Date of ripening	Number of days maturing	Average length of straw	Yield per acre, 1922	Average yield for 9 years
			inches	bush.	bush.
Prussian Blue	Aug. 18	100	43·0	13·0	21·8
English Grey	" 18	100	23·0	14·0	21·3
Chancellor, Ottawa 26	" 14	96	24·0	17·0	21·2
Mackay, Ottawa 25	" 20	102	39·0	4·5	20·5
Solo	" 15	97	40·0	14·0	19·3
Golden Vine	" 18	100	36·0	15·0	17·3
Arthur, Ottawa 18	" 18	100	34·0	8·0	12·9

Chancellor, Ottawa 26, gave the best yield for the year with Golden Vine second. The nine years' averages show Prussian Blue in the lead, English Grey a close second and Chancellor, Ottawa 26, third.

SPRING RYE

Common spring rye was sown on the dry land May 10 and matured in ninety-nine days. The yield was 21·4 bushels per acre, with an average yield for seven years of 15 bushels per acre.

WINTER RYE

Three varieties of winter rye were seeded September 29, 30 pounds of seed per acre being used.

WINTER RYE (DRY LAND)—TEST OF VARIETIES

Variety	Yield per acre
	bush.
Common	18·2
Dakold	17·1
Rosen	4·8

There was little difference in the yield of common rye and Dakold grown from the seed obtained from the University of Alberta. The Rosen rye, however, winter-killed badly causing a very low yield for that variety.

IRRIGATED LAND VARIETY TESTS

All cereal varieties were seeded May 18 on land which was in hoed crop the previous year and were irrigated July 3 and July 24.

WHEAT

Eleven varieties of spring wheat were under test, only three of which have been carried for a long enough time to give averages for a period of years. All

the wheat varieties made normal growth, the yields of none of them being seriously affected by adverse environmental conditions.

WHEAT (IRRIGATED)—TEST OF VARIETIES

Name of Variety	Date of ripening	Number of days maturing	Average length of straw and head	Yield per acre 1922	Average yield for 9 years
			inches	bush.	bush.
Marquis, Ottawa 15	Aug. 28	102	40·0	52·5	64·7
Huron, Ottawa 3	" 28	102	38·0	41·5	59·2
Red Fife, Ottawa 17	Sept. 5	110	48·0	37·8	49·4
Kubanka, Ottawa 37	" 7	112	48·0	65·5	
Red Bobs	Aug. 23	97	33·0	48·0	
Dicklow	Sept. 9	114	43·0	44·0	
Kitchener	" 2	107	42·0	44·5	
Supreme	Aug. 26	100	31·5	43·5	
Ruby, Ottawa 623	" 21	95	41·0	38·0	
Early Triumph	" 23	97	36·0	34·0	
Reward, Ottawa 928	" 22	96	30·0	31·8	

Kubanka, a durum wheat, gave a yield for the season of 13 bushels above the next highest which was Marquis while the average yields for nine years show Marquis and Huron in the lead with Marquis 5·5 bushels over Huron. For a period of four years Kubanka was first, being five bushels ahead of Marquis, which is second. The superior yielding qualities of Kubanka, however, do not offset the lower prices this grain brings on the market.

A comparison of the yield of Kubanka on the dry and irrigated land shows this interesting feature that Kubanka excels other varieties in yield when it receives plenty of moisture but not under dry conditions, which appears to be in contradiction to the widely accepted idea that Kubanka excels as a drouth resisting wheat. This is further substantiated by the results on our dry land variety plots where, in every dry year except 1920, Marquis has given a better yield than has Kubanka while in the wet years Kubanka is in the lead.

OATS

Seven varieties of oats were tested on the irrigated land; three of these have been grown for a number of years; 102 pounds of seed was used per acre.

OATS (IRRIGATED)—TEST OF VARIETIES

Name of Varieties	Date of ripening	Number of days maturing	Average length of straw and head	Yield per acre 1922	Average yield for 8 years
			inches	bush.	bush.
Danish Island	Aug. 26	100	38·0	102·8	125·3
Banner, Ottawa 49	" 26	100	41·0	93·6	115·2
Gold Rain	" 29	103	35·0	106·8	110·4
Leader	" 26	100	41·0	105·9	
Victory	" 26	100	36·0	103·3	
Longfellow, Ottawa 478	" 25	99	47·0	89·1	
Liberty (Hulless), Ottawa 480	" 23	97	43·0	63·6	

Gold Rain was the best yielder this year with Leader second and Victory third. An average of four years' results shows Danish Island as first, Victory second and Liberty third. Danish Island leads in the nine years' average but its weakness of straw makes it less suitable for the irrigated farm than are some of the other varieties. A field of 4·87 acres of Banner oats, on land which was in hoed crop the previous year, produced 83·4 bushels per acre. This crop received one irrigation.

BARLEY

Thirteen varieties of barley were included in the variety tests on the irrigated land; of these three, Bearer, Chinese and Himalayan were grown here for the first time this year. Seven varieties have been grown for a number of years, so for these a seven years' average is given.

BARLEY (IRRIGATED)—TEST OF VARIETIES

Name of Variety	Date of ripening	Number of days maturing	Average length of straw and head	Yield per acre 1922	Average yield for 7 years
			inches	bush.	bush.
Bark's Excelsior	Aug. 28	102	35·0	95·0	100·7
Invincible	Sept. 2	107	46·0	70·9	79·3
Swedish Chevalier	" 2	107	41·0	64·1	77·7
Gold	Aug. 26	100	34·0	61·3	76·3
O. A. C. 21	" 22	96	44·0	78·8	65·0
Early Chevalier, Ottawa 51	" 24	98	42·0	51·3	57·3
Odessa	" 22	96	38·0	65·6	65·4
Bearer, Ottawa 475	" 28	102	39·0	76·3	
Trebi	" 22	96	31·0	74·4	
Cape	" 22	96	33·0	70·2	
Himalayan, Ottawa 59	" 21	95	28·0	64·7	
Mariout	" 23	97	33·0	63·1	
Chinese, Ottawa 60	" 24	98	41·0	57·8	

Bark's Excelsior again heads the list in yield for the year. In the seven years' average it exceeds all other varieties by 21·4 bushels per acre.

Swedish Chevalier is a beautiful two-row barley and yields well. Its straw is weak, however, causing it to lodge badly if grown on rich soil and given a liberal supply of water. The yield of O.A.C. 21 barley on 4·03 acres of fall ploughed wheat-stubble, irrigated once during the season, was 45·6 bushels per acre.

FLAX

Four varieties of flax were seeded May 19. Three of these have been grown for seven years while the fourth, Premost, was tested for the first time this year.

FLAX (IRRIGATED)—TEST OF VARIETIES

Name of Variety	Date of ripening	Number of days maturing	Average length of plants	Yield per acre, 1922	Average yield per acre for 7 years
			inches	bush.	bush.
Novelty, Ottawa 53	Aug. 23	96	27	27·9	25·2
Common	" 22	95	30	28·9	24·2
Longstem, Ottawa 52	" 25	98	32	32·1	23·2
Premost	" 20	93	28	37·0	

There was but little difference in the average yields of the varieties over a period of seven years. Premost gave the highest production this year, being five bushels ahead of Longstem which came second.

Flax does well on irrigated land, providing the land is clean, as is usually the case following a hoed crop. It is not recommended as a general crop, but there may be circumstances such as necessity for late seeding or long distance from market, that will make flax more profitable as a cash crop than is wheat.

PEAS

Seven varieties of peas were seeded on the irrigated land at the rate of 150 pounds of seed per acre.

PEAS (IRRIGATED)—TEST OF VARIETIES

Name of Variety	Date of ripening	Number of days maturing	Average length of straw	Average length of pod	Yield per acre, 1922	Average yield per acre for 9 years
			inches	inches	bush.	bush.
Golden Vine	Aug. 26	100	79·0	1·5	40·0	38·6
Mackay, Ottawa 25	" 26	100	53·0	2·0	42·0	38·0
Chancellor, Ottawa 26	" 30	104	81·0	2·0	43·0	37·4
Prussian Blue	" 30	104	57·0	3·0	43·0	37·3
English Gray	" 26	100	77·0	2·5	28·0	35·1
Arthur, Ottawa 18	" 26	100	82·0	2·5	29·0	36·7
Solo	" 26	100	61·0	3·0	33·0	32·5

Golden Vine gave the best returns for a period of nine years but the other varieties were but slightly lower with the exception of Solo, an early variety, which was six bushels lower in yield than Golden Vine.

FORAGE CROPS

DRY LAND

The returns from the forage crops on the dry land were better this year than for any year since 1917 but were still only fair. All annual forage crops were grown on summer-fallowed land.

VARIETY TESTS OF INDIAN CORN

Nineteen varieties and strains of corn were seeded in rows three feet apart at the rate of 24 pounds of seed per acre. The corn was cut for ensilage September 14 and weighed as soon as cut and the yields taken from areas where a perfect stand prevailed.

CORN (DRY LAND)—TEST OF VARIETIES

——	Height	Stage of maturity	Yield per acre
	inches		tons
Disco, 90-day White Dent	48	Tasseled	11·0
Longfellow	54	Silked	11·0
Compton's Early	60	Tasseled	10·0
Disco North Western Dent	48	Tasseled	10·0
Improved Leaming	48	Tasseled	9·5
White Cap Yellow Dent	48	Tasseled	9·0
Golden Glow	60	Tasseled	9·0
Wisconsin No. 7	48	Tasseled	8·0
Gehu	54	Silked	8·0
Leaming	65	Silked	8·0
Rusk's Montana	42	Milk	8·0
Disco Pride Yellow Dent	42	Tasseled	8·0
Brooks North Western Dent	54	Silked	8·0
North Dakota	54	Tasseled	7·5
Bailey	51	Tasseled	7·0
Kaffir Corn	36	No heads formed	6·0
Early Amber Sugar Cane	54	Started to head	5·5
North Western Dent	48	Tasseled	5·5
White Alberta	36	Ripe	2·0

The corn on the dry land grew very well during the early part of the season but growth practically stopped by August 1 due to the dry weather prevailing after July 15. The deficiency of moisture prevented all but one variety, White Alberta (Squaw), from maturing seed, the plants simply drying up. It would undoubtedly be a good practice to cut the corn when growth stops due to lack of moisture, as the plants shrivel up after that time.

SUNFLOWERS

Ten varieties and strains of sunflowers were seeded in rows three feet apart with 12 pounds of seed per acre. The crop was harvested September 14 and weighed as soon as cut. The yields given are for areas where a perfect stand prevailed.

SUNFLOWERS (DRY LAND)—TEST OF VARIETIES

Variety	Height	Stage of maturity	Yield per acre
	inches		tons
Dakota Mammoth Russian	60	5 p.c. in bloom	19·0
Common-Mammoth Russian	54	5 p.c. in bloom	14·5
Manteca	60	90 p.c. in bloom	12·0
Lethbridge Mammoth Russian	54	5 p.c. in bloom	11·5
Early Ottawa	60	95 p.c. in bloom	11·0
Prolific White	54	In bloom	11·0
Early Mammoth Russian	48	90 p.c. in bloom	10·5
MacDonald Mammoth Russian	48	3 p.c. in bloom	9·5
Brook's Dwarf	42	Ripe for seed	8·5
Mennonite	44	Ripe for seed	7·5

The sunflowers made good growth during the early part of the season but the weather after July 15 seriously inhibited growth and prevented most of the varieties from properly maturing.

IRRIGATED LAND

VARIETY TESTS OF INDIAN CORN

The varieties and strains of corn, nineteen in number, grown on the irrigated farm, were planted on fall-ploughed land that had grown a mixture of oats and peas the previous season. The varieties were seeded May 19 in rows three feet apart with 24 pounds of seed per acre. Two irrigations were given, the first July 7 and the second July 24, with a cultivation before and after each irrigation. Yields are computed from areas where a perfect stand prevailed.

INDIAN CORN (IRRIGATED)—TEST OF VARIETIES

Variety	Height	Stage of maturity	Yield per acre
	inches		tons
Disco 90-day White Dent	108	Silked	48·5
Compton's Early	108	Silked	46·5
Longfellow	108	Silked	45·5
North Dakota	96	Silked	45·5
Wisconsin No. 7	102	Kernels in milk	43·5
Leaming	114	Kernels in milk	42·5
White Cap Yellow Dent	108	Silked	41·0
Golden Glow	112	Silked	40·0
Improved Leaming	114	Silked	39·0
Rusk's Montana	75	Glazed	38·5
Gehu	84	Glazed	36·5
Bailey	120	Silked	36·0
Disco Yellow Dent	87	Kernels in milk	36·0
North Western Dent	90	Kernels in milk	30·5
Disco North Western Dent	96	Kernels in milk	30·0
Disco Pride Yellow Dent	94	Kernels in milk	29·0
White Alberta	65	Ripe	20·5
Early Amber Sugar Cane	80	Started to head	16·5
Kaffir Corn	54	No heads formed	13·0

The extremely high yields recorded in the above table result from the fact that they are computed from short lengths of rows where there was one hundred per cent stand. This was necessary in order to place all varieties on an equal basis. Under field conditions the yields would likely be somewhat less.

The last two seasons have been exceptionally favourable for corn growing, even some of the late varieties ensiloing well. For the average year it is perhaps advisable to grow one of the medium varieties, such as North Western Dent, to ensure the corn reaching a satisfactory stage for ensilage.

SUNFLOWERS

Nine varieties and strains of sunflowers were seeded May 19, in rows three feet apart, with 12 pounds of seed per acre. The land, which produced a crop of oats and peas the previous year, was fall ploughed, irrigated twice during the growing-season—July 7 and July 24—and was cultivated before and after the first irrigation. The yields of sunflowers were also taken from areas where perfect stands prevailed.

SUNFLOWERS (IRRIGATED)—TEST OF VARIETIES

Variety	Height	Stage of maturity	Yield per acre
	inches		tons
Early Mammoth Russian	108	80 p.c. seed formed..	70·0
MacDonald Mammoth Russian	132	10 p.c. in bloom.....	47·5
Manteca	99	90 p.c. seed formed..	42·0
Common Mammoth Russian	126	50 p.c. in bloom.....	39·0
Dakota Mammoth Russian	120	50 p.c. in bloom.....	38·0
Brook's Dwarf	78	Ripe for seed.....	31·5
Early Ottawa	78	Ripe for seed.....	29·0
Prolific White	106	90p.c. ripe for seed..	28·5
Mennonite	84	Ripe for seed.....	24·5

The yields of Mammoth Russian sunflowers have been very satisfactory for several years and the crop has made good ensilage. The Dwarf varieties mature well but the yields are too small to consider these seriously for ensilage purposes in competition with the mammoth varieties or with corn.

SUNFLOWERS, DATE OF SEEDING, ETC.

Tests were conducted again this year to obtain additional information as to the most satisfactory date to seed, the proper distance apart to place the rows and the distance to have the plants spaced in the rows. All seeding was delayed this year due to the late spring, on the irrigated land the soil remaining too wet for seeding until about the middle of May. Two irrigations were given, July 22 and August 5.

SUNFLOWERS (IRRIGATED)—DATES OF SEEDING

Date	Yield per acre
	tons
May 19	31·0
May 26	35·5
June 12	33·0
June 21	10·5

The best yields this year were obtained from seeding May 26 with a slight decrease for June 12 and a decided falling-off for June 21 seeding. Last year the highest yield was obtained from May 14 seeding. As this spring was abnormally late, the proper date of seeding corresponds very well with previous findings and would put this date at about the middle of May.

DISTANCE OF ROWS APART

In this test, sunflowers were seeded May 19, in rows four different distances apart, as shown with the respective yields, in the following table.

SUNFLOWERS (IRRIGATED)—DISTANCE OF ROWS APART

Distance of Rows Apart	Yield per acre	Average yield for 2 years per acre
	tons	tons
Rows 21 inches apart	39·0	27·5
Rows 28 inches apart	40·0	23·6
Rows 35 inches apart	43·0	32·0
Rows 42 inches apart	25·0	22·7

Results this season agree with those of previous years and seem to justify the conclusion that three feet is about the proper distance apart for the rows of sunflowers to be placed.

DISTANCE THINNED

The sunflowers in this test were seeded May 19 in rows three feet apart with 12 pounds of seed per acre and thinned to the distances given in the table when the plants were three inches to six inches high.

SUNFLOWERS (IRRIGATED)—DISTANCES THINNED

Rows 35 Inches Apart	Yield per acre	Average yield per acre for 2 years
	tons	tons
Unthinned	43·0	34·4
Thinned 6 inches	37·0	33·5
Thinned 9 inches	25·5	30·5
Thinned 12 inches	26·5	38·6
Thinned 18 inches	21·0	25·1

The average yields for the past two years indicate that there is little gained by thinning providing a reasonably evenly spaced stand is obtained and the plants are not closer together than four to six inches.

YIELD OF CORN AND SUNFLOWERS

Frequent inquiries are received as to the relative yield that can be expected from corn and sunflowers. The following tables give some data on this point which may be of interest, as the corn and sunflowers in each instance were

grown under similar field conditions. The preparation of the seed bed was particularly poor in 1921 and a poor stand was obtained.

YIELD OF CORN AND SUNFLOWERS (IRRIGATED)

Year	Area	Corn. Yield per acre	Area	Sunflowers. Yield per acre
	acres	tons	acres	tons
1922	1·0	8·2	5·4	11·8
1921	1·0	4·8	10·58	8·3
1920	1·75	6·7	1·75	15·0
Average for 3 years	.....	6·6	.....	11·7

YIELD OF CORN AND SUNFLOWERS (DRY LAND)

Year	Corn. Yield per acre	Sunflowers. Yield per acre
	tons	tons
1922	2·7	4·4
1921	1·2	6·9
1920	2·1	4·3
Average for 3 years	2·0	5·2

It will be observed that on the irrigated land the yield of sunflowers was almost double the yield of corn and that on the dry land it was more than double.

As the crops are weighed green, sunflowers have an advantage over the corn, as they contain more water. This advantage is slight, however, usually amounting to less than five per cent.

FIELD ROOTS

DRY LAND

This year, in addition to testing varieties of roots, comparisons were also made of strains and varieties grown from seed supplied to the market by several commercial seedsmen. In the tables giving the year's results the name of the seedsman who supplied the seed is given in the column headed "Source". All of the roots were grown on land summer-fallowed the previous season. They were seeded May 23 and lifted October 30.

The yields given were computed from 17 feet of row where a perfect stand prevailed and are, in consequence, high.

TURNIPS (DRY LAND)—TEST OF VARIETIES

Variety	Source	Yield per acre
		tons
Hall's Westbury	McKenzie	17·5
Selected Westbury	Steele-Briggs	15·0
Hazard's Improved	Rennie	13·5
New Century	Rennie	13·0
Imperial	McKenzie	12·5
Kangaroo	Steele-Briggs	12·5
Canadian Gem	Steele-Briggs	12·0
Canadian Gem	Rennie	12·0
Kangaroo	McKenzie	11·8
Best of All	Rennie	11·5
Ditmar's Swede	R. P. Ditmar	11·0
Good Luck	Steele-Briggs	10·5
Perfection	Steele-Briggs	10·5
Universal	McKenzie	10·0
White Swede	McKenzie	10·0
Monarch Swede	McKenzie	10·0
Hazard's Improved	Steele-Briggs	10·0
Kangaroo	Rennie	10·0
Bangholm Swede	Steele-Briggs	9·5
Bangholm Swede	Charlottetown	8·5
Bangholm Swede	McKenzie	8·5
Jumbo	Steele-Briggs	8·5
Westbury	Rennie	8·0
Jumbo	Rennie	7·3
Bangholm	Rennie	7·3
Monarch Swede	Nappan	4·3

MANGELS (DRY LAND)—TEST OF VARIETIES

Variety	Source	Yield per acre
		tons
Prize Taker	McKenzie	41·5
Giant White Sugar	Rennie	41·0
Giant White Sugar	Steele-Briggs	41·0
Giant Yellow Half Long	Rennie	41·0
Yellow Globe	Steele-Briggs	32·5
Giant Long Red	McKenzie	32·5
Giant Yellow Globe	Rennie	32·0
Ideal	Rennie	32·0
Golden Tankard	Rennie	32·0
Golden Tankard	Steele-Briggs	31·5
Giant Yellow Globe	Steele-Briggs	31·0
Mammoth Long Red	Rennie	30·0
Manitoba Giant Yellow	McKenzie	29·0
Yellow Intermediate	Ottawa	29·0
Yellow Intermediate	McKenzie	29·0
Giant Yellow Globe	McKenzie	28·0
Mammoth Long Red	Steele-Briggs	25·0
Selected Golden Tankard	McKenzie	24·0
Giant Yellow Intermediate	Steele-Briggs	21·9

SUGAR BEETS (DRY LAND)—TEST OF VARIETIES

Variety	Yield per acre
	tons
Waterloo	10·0
Sidney, B.C.	9·0
Chatham	8·5
Denmark	8·5
B.C. Grown	8·0

IRRIGATED LAND

The same tests were made with field roots on the irrigated farm as were made on the "dry farm," that is, the varieties and strains supplied by various seedsmen were tested. The roots were seeded May 23 on fall-ploughed land which had grown a mixed crop of peas and oats the previous year. Two irrigations were applied during the season, one July 7 and the other August 5. The roots were lifted October 30.

Yields were calculated from 17 feet of row where perfect stands prevailed and are in consequence high. Where there were no yields the failure was due to poor germination.

TURNIPS (IRRIGATED)—TEST OF VARIETIES

Variety	Source	Yield per acre
		tons
White Swede	McKenzie	35·0
Westbury	Rennie	34·0
Hall's Westbury	McKenzie	33·0
Perfection	Steele-Briggs	32·0
Kangaroo	Rennie	31·0
Kangaroo	Steele-Briggs	30·5
Jumbo	Steele-Briggs	29·5
Selected Westbury	Steele-Briggs	29·0
Bangholm Swede	Steele-Briggs	27·5
Best of All	Rennie	27·5
Bangholm Swede	Rennie	27·0
Monarch Swede	Nappan	27·0
Hazard's Improved	Steele-Briggs	27·0
Canadian Gem	Steele-Briggs	26·5
Universal	McKenzie	26·0
Jumbo	Rennie	26·0
Imperial	McKenzie	25·5
Monarch Swede	McKenzie	25·0
Good Luck	Steele-Briggs	24·0
Bangholm Swede	McKenzie	24·0
Bangholm Swede	Charlottetown	24·0
Ditmar's Swede	R. P. Ditmar	24·0
Canadian Gem	Rennie	22·5
New Century	Rennie	22·0
Hazard's Improved	Rennie	17·0
Kangaroo	McKenzie	Nil

MANGELS (IRRIGATED)—TEST OF VARIETIES

Variety	Source	Yield per acre
		tons
Mammoth Long Red	Rennie	60·0
Giant Yellow Half Long	Rennie	59·5
Giant Yellow Intermediate	Steele-Briggs	57·5
Giant White Sugar	Steele-Briggs	49·0
Giant White Sugar	Rennie	49·0
Giant Yellow Globe	McKenzie	46·5
Yellow Intermediate	Ottawa	45·5
Giant Long Red	McKenzie	44·5
Golden Tankard	Rennie	44·5
Mammoth Long Red	Steele-Briggs	43·0
Mammoth White Giant	McKenzie	38·5
Giant Yellow Globe	Steele-Briggs	Nil
Yellow Intermediate	McKenzie	Nil
Prize Taker	McKenzie	Nil
Golden Tankard	Steele-Briggs	Nil
Ideal	Rennie	Nil
Selected Golden Tankard	McKenzie	Nil
Yellow Globe	Steele-Briggs	Nil
Giant Yellow Globe	Rennie	Nil

SUGAR BEETS (IRRIGATED)—TEST OF VARIETIES

Variety	Yield per acre
	tons
Chatham	38·0
Waterloo	28·0
B C. Grown	27·0
Sidney, B.C.	27·0
Denmark	25·0

ALFALFA FIELDS—IRRIGATED

There was serious winter-killing of alfalfa in many parts of the Lethbridge district this year, on fields that had been cut late or pastured in the fall and winter, although not all such fields were affected. This is the first winter-killing of serious proportions that has occurred in this locality since alfalfa raising became general.

There was practically no winter-killing of alfalfa on the Station and production was about normal. The area and yields for the season of various fields are given in the following table. The alfalfa was irrigated the previous fall and twice during the growing season.

ALFALFA FIELDS (IRRIGATED)—YIELDS

Area	Yield per acre
acres	tons
4·42	3·18
4·78	3·22
2·03	3·82
0·80	5·00
10·68	2·94
6·04	4·29

GRASSES

A field of 6·98 acres of timothy and blue grass gave a yield of 1·11 tons per acre. This field was pastured with sheep until late in May.

POULTRY

The winter of 1921-22 was more severe than its predecessor, frequent spells of cold weather being experienced. Notwithstanding this, some excellent results in egg production were obtained and several outstanding records made. Intensified interest was manifested by farmers and poultrymen in the work and production of the Barred Rocks kept at the Station, the demands for cockerels and hatching eggs being so great that they could be only partially met.

WINTER FEEDING

The scratch feed consists of equal parts corn, wheat and crushed oats, thrown in the litter. A small portion of the scratch feed is fed in the morning to induce exercise and at night a liberal feed is given before the birds go to

roost. A dry mash hopper stands open before the fowls all the time. This mash is composed of equal parts bran, shorts, middlings, corn meal, beef scraps and one-half part of oat chop. A little fine salt and some charcoal is also added. A moist mash fed at noon on each alternate day consists of the above ingredients with the exception of the salt and charcoal. No more of the moist mash is fed than will be eagerly consumed in about five minutes. Oyster shell, grit, charcoal and beef scrap are fed in small hoppers kept before the birds at all times. By way of variety, a small quantity of wheat and peas, boiled until ready to burst, is mixed in with the moist mash and is greatly relished by the fowls. Green feed consists of mangels, cabbage, table beets, and alfalfa leaves. Alfalfa meal mixed with the mash is a fair substitute for other green feeds.

SUMMER FEEDING

For summer use the scratch feed is changed to one part crushed oats, five parts wheat and one-half part cracked corn, and a smaller quantity of corn meal is fed in the mash. The runways are sown down to green crop, mostly rye, which augments the supply of green feed. All other feeds are the same as used in winter.

PEDIGREE BREEDING

The necessity for pedigreeing all birds becomes more imperative each year and an effort will be made in the spring of 1923 to pedigree all stock raised. The value of this work cannot be overestimated as only the very best and most suitable should find a place in the breeding pens. Great care is exercised in selection as it is here the standard is set that will in future stamp the strain. The most desirable must show good winter and yearly records and possess the type, size, and conformation that is required by the standard of perfection for the breed. It is most desirable that such birds possess vigour and vitality, as only too often sound constitution is neglected when selecting for other valuable factors. The male must be well and fully developed, very active, robust and vigorous, carrying the characteristics of his sex. His ancestors must also have possessed like qualities and proved merit, as must also his sisters. Just prior to hatching, the eggs from each individual hen are placed in bags made of mosquito netting or in pedigree trays made for the purpose. When the chicks are removed from the incubator they are leg banded. Afterwards this leg band is removed and placed on the wing for future identification. The males used in the breeding pens are kept until their progeny have been trapnested and tested out. Unless some such precautions are taken, a high producing male might be marketed before his worth is realized.

The effects of pedigree breeding are already manifest in the Station flock, as shown by larger birds of more desirable type and higher producing qualities. That the production is keeping up to a high standard is attested by the fact that of the sixty pullets entered by the Station in the Alberta Egg Laying contest, only twelve failed to qualify for Record of Performance A. A. (150 eggs). Fourteen laid the 225 eggs necessary for a certificate of Advanced Record of Performance A. A. while twenty-six birds produced over 200 eggs each. Three made records of 295, 281 and 256 eggs respectively.

MARKETING HENS IN EARLY SUMMER VERSUS MARKETING IN THE FALL

During the past summer, an experiment was conducted to ascertain whether summer or fall marketing of old hens is the more profitable. The flock consisted of 20 two-year-old hens and 20 three-year-old hens of the average stock kept on the farm, no selection being made to obtain the best specimens.

The test started on July 1, 1922 and was completed on September 30, 1922, a period of ninety-two days. The birds had but limited range, so practically all feed they obtained was that fed, a careful record of which was kept and charged against the pens.

Table number one gives the value of eggs laid and cost of feed consumed for the two-year-old hens and table number two for the three-year-old hens.

EGG PRODUCTION TWO AND THREE-YEAR OLD HENS

Two-year old hens

Month	Eggs laid	Value	Cost feed	Gain over cost of feed
July	269	5·60	2·65	2·95
August	269	6·72	2·57	4·15
September	242	7·07	2·46	4·61
Total	780	19·39	7·68	11·71
Three-year old hens				
Juiy	217	4·52	2·35	2·17
August	182	4·56	2·27	2·29
September	94	2·77	2·16	0·57
Total	493	11·81	6·78	5·03

A comparison of these tables shows that the two-year-old hens were more profitable to keep over than were the three-year-old hens, the net returns being $11.71 and $5.03 respectively. The results, however, indicate that even three-year-old hens can profitably be kept over the summer instead of being marketed in the spring as is a common custom. Especially would it be a good practice to keep hens until fall on farms where the poultry have free range and can therefore rustle much of their own feed.

Had the pens been culled, the net returns would have been more satisfactory as nine hens failed to lay during the period of the test. Of these, four were two-years-old and five were three-years-old. The best two-year-old hen's score for the period was 66 eggs and the best three-year-old hen's score was 54 eggs.

After the 30th of September, the production dropped off rapidly, the three-year-old hens laying but 17 eggs and the two-year-old hens but 50 eggs, during the first twelve days of October. As this production did not pay for the cost of feed, it would appear that the latter part of September is about the latest date that hens can be profitably kept unless being retained for some special reason such as breeding operations the following spring.

APRIL VERSUS MAY HATCHED PULLETS

A test to compare the pullet year production of April and May hatched birds has been carried on during the year. Pen No. 1 was hatched the first week in April and pen No. 2 the second week in May.

PULLET YEAR PRODUCTION OF APRIL AND MAY HATCHED BIRDS

Pen	Hatched	Birds in pen	Nov.	Dec.	Jan.	Feb.	Winter	Total year total
2	April	50	644	771	856	826	3,097	9,462
3	May	50	27	431	817	765	2,040	6,487

The marked difference in egg production in favour of the April hatched pullets shows that they are more profitable than are the later hatched birds. It might also be stated that the late-hatched birds did not give a greater fall production than did the early hatch as both pens went into the fall moult at about the same time.

ALRERTA EGG LAYING CONTEST

The third Alberta Egg Laying Contest was concluded October 30, 1922, and for the first time the contest was won by a light breed, the White Leghorn. Several other pens made very creditable records. These contests do much to encourage the keeping of pure bred-to-lay stock and to improve the type and quality of the various breeds kept by the farmers and poultrymen of the province. Increasing interest is shown in this work as evidenced by the fact that eight more pens were entered in the third contest than in the second. The table shows the total production of each hen and pen for fifty-two weeks, beginning November 1, 1921, and ending October 30, 1922. Each pen consists of ten birds of a standard breed.

ALBERTA EGG LAYING CONTEST

NOTE:—B. R.-Barred Rocks; W. W.-White Wyandottes; R. I. R.-Rhode Island Reds; Anc.-Anconas; W.L.-White Leghorns.

Pen	Owner and Address	Breed	1	2	3	4	5	6	7	8	9	10	F	Total
1	F. Edwards. Edmonton, Alta.	B.R.	165	127	183	75	173	120	204	156	158	162	6	1,529
2	W. A. Fraser, Medicine Hat, Alta.	"	186	114	187	213	229	167	142	126	176	249	1	1,800
3	B. E. Rogers, Lethbridge, Alta	"	163	208	251	230	114	150	203	189	159	147	4	1,818
4	Wm. Northcott, Beddington, Alta.	"	151	53	112	108	58	150	79	106	132	89	2	1,041
5	M. Bolinger, Gleichen, Alta....	"	71	154	82	103	163	90	97	101	77	93	8	1,039
6	H. Higginbotham, Calgary, Alta.	"	71	190	124	77	138	104	152	215	59	122	1	1,252
7	Westbrookes Bros., Lethbridge, Alta.	"	186	80	134	69	53	181	101	166	156	102	....	1,228
8	Miss H. J. Garrow, Brooks, Alta.	"	101	113	91	147	111	116	42	155	76	66	5	1,023
9	Dept. of Agriculture, Edmonton Alta.	W.W.	147	121	183	221	128	165	147	163	171	164	5	1,615
11	Experimental Farm, Lacombe, Alta.	"	24	48	161	151	152	188	138	123	163	144	6	1,298
12	C. M. Baker, Calgary, Alta....	"	122	165	156	189	113	191	72	143	35	195	3	1,385
13	H. T. Luther, Winnifred, Alta..	"	98	167	234	141	152	203	156	100	77	85	6	1,419
14	J. F. Canning, MacLeod, Alta..	"	215	122	159	210	23	73	124	42	152	179	8	1,305
18	R.I.R. Club, Calgary, Alta...	RIR	156	83	95	144	110	110	179	131	165	111	5	1,289
19	C.P.R. Demonstration Farm, Strathmore.	"	151	130	68	94	112	96	80	148	138	179	5	1,101
20	Experimental Farm, Lethbridge, Alta.	B.R.	180	151	100	184	167	219	199	110	195	178	5	1,688
21	T. H. Enderton, Lethbridge, Alta.	Anc.	56	152	135	134	178	177	85	185	78	127	1	1,308
22	H. C. Graham, Lethbridge, Alta.	"	132	120	164	170	169	179	118	140	133	170	....	1,505
23	R. H. Ennismore, Edmonton, Alta.	W.L.	235	168	167	146	210	261	211	257	145	204	5	*2,027
24	E. J. Forner, Medicine Hat, Alta.	"	143	136	16	152	75	112	71	132	68	47	....	952
25	Experimental Farm, Lethbridge, Alta.	B.R.	169	198	216	281	196	295	233	226	154	203	9	2,180
26	Experimental Farm, Lethbridge, Alta.	"	217	201	88	165	177	202	129	159	128	235	6	1,707
27	Experimental Farm, Lethbridge, Alta.	"	114	202	149	237	256	225	140	152	212	228	6	1,922
28	Experimental Farm, Lethbridge, Alta.	"	189	170	215	110	225	228	223	239	124	97	6	1,826
29	Experimental Farm, Lethbridge, Alta.	"	227	178	186	203	95	152	229	173	168	210	6	1,827

*Leading pens.

Experimental Station Pens were entered for Record of Performance and did not compete for any prizes that were offered.

In the contest of 1921-22, some creditable scores were made, Pen 23, White Leghorns, taking premier honours with a total of 2,027 eggs. Second position was a hard-fought battle between the two Barred Rock Pens, Nos. 2 and 3, the victory ultimately resting with No. 3 Pen, which scored 1,818 eggs, No. 2 Pen doing 1,800. Fourth place was captured by White Wyandottes in Pen No. 9. These made a total of 1,615 eggs. Pen 23 White Leghorns also captured the prize for the highest profit over cost of feed, the second position in this respect falling to Pen 2, Barred Rocks. There were several outstanding individual records, of these Pen 23 claimed first and second place with 261 and 257 eggs respectively. A Barred Rock in Pen 3 came next with 251 eggs, followed closely by a Barred Rock in Pen 2 which scored 249 eggs.

BEES

The results obtained from bees at the Station continue to be satisfactory, each year's work proving more conclusively that bee keeping in the irrigated districts can be made a profitable industry. Hundreds of tons of nectar are being produced in the bloom of the extensive alfalfa fields already established, needing only the assistance of the bee to be formed into valuable honey. Surely here is a by-product of the farm now wasted that should be turned into a revenue producer. Several farmers on irrigated lands in Southern Alberta have become convinced of this and are helping make the farm pay by keeping a few colonies of bees. Some fair-sized commercial apiaries have also been started.

WINTERING

Nine colonies were put into winter quarters at the close of the season of 1921; seven of these were wintered outside in wintering cases and two in a dug-out cellar. The cases used for outside wintering were boxes made large enough to hold one, two, or four hives with sufficient room between the hive boxes and the bottom, sides and top of the cases to pack in four to six inches of planer shavings. A tunnel was made from the hive entrances to the outside of the packing cases so that the bees could get out at will.

The colonies wintered in the cellar were placed on a swinging shelf to eliminate damage from mice. The covers of the hives were replaced with cloth and covered with five inches of chaff to prevent moisture gathering in the hive.

Two of the seven colonies wintered outside were found dead in the spring while both of the colonies wintered in the cellar survived. The two colonies wintered in the cellar, however, were weak in the spring, the first examination showing only three frames covered with bees in one hive, and four in the other. At the same examination the number of frames covered with bees in the colonies wintered outside were six, three, eight, seven, and six respectively. The weak condition of the colonies wintered in the cellar as compared with the stronger condition of those wintered outside agrees with our previous experience that wintering outside is more satisfactory than wintering in the cellar.

IMPORTING PACKAGE BEES

Two three-pound packages of bees with queen were imported from Texas. One was placed in a Langstroth hive and the other in a Jumbo hive on drawn comb and fed on comb honey until the middle of June. Both colonies increased rapidly and did well throughout the season. Those in the Jumbo hive produced 204 pounds of extracted honey and the others 143 pounds.

Good results have been obtained each year from bees imported in packages and as this furnishes a cheap method of transportation and, due to the absence of combs, is practically free from danger of disease, it appears to be a very satisfactory method for obtaining bees as foundation stock for an apiary.

PRODUCTION

The strongest hive in the apiary was placed on scales June 1st and a record of the daily weight was kept. Little gain was recorded before June 23 and from that date until July 3 the increase in weight was less than one pound per day. From July 3 to September 12 the production was good, the highest for any one day being nineteen pounds. A slight increase in weight was made until October 1 but after that date a decrease was shown. The honey flow was principally from alfalfa but this year the bees gathered some early honey from dandelion and caragana, thus requiring less spring feeding than in previous years.

The average weight of honey produced per colony, spring count, was 138 pounds which, after deducting the price of container, sold at 23 cents per pound, thus giving a gross return for honey of $31.74 per colony. To prepare the bees for winter required the feeding of 154 pounds of sugar which cost $14.35, or $1.58 per colony. The value of honey over cost of feed was $30.16 per colony.

EXHIBITION WORK

An exhibit that fitted into a tent of 18 feet by 26 feet dimensions was prepared for the rural fair circuit and was shown at the fairs held at Taber, Macleod, Raymond, Cardston and Pincher Creek. This method of exhibiting is very satisfactory as it facilitates moving from one fair to another with ease and dispatch, eliminates all difficulty in securing suitable quarters for a booth and makes possible the selection of a satisfactory location on the grounds. The tent exhibit was well received by fair officials and farmers. In addition to the rural fairs visited, an exhibit was also made at the Lethbridge Summer Fair and at the Calgary Horticultural Exhibition.

The attendance at the fairs where the Station exhibit was shown, as estimated by the secretaries of the respective fair boards, was:—

Taber	6,500
Macleod	2,800
Raymond	2,000
Cardston	3,000
Pincher Creek	3,000
Lethbridge	7,500
Calgary Horticultural Exhibition	3,750

A large number of farmers' meetings were attended and lectures given by the superintendent and members of the staff during the year.