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 1924

Printed by Authority of the Hon. W. R. Motherwell, Minister of Agriculture,
Ottawa, 1925

TABLE OF CONTENTS

DOMINION EXPERIMENTAL STATION, LETHBRIDGE, ALBERTA

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

THE SEASON

The season of 1924 began with great promise. Generous rains in June gave grain in southern Alberta a particularly good start, but the dry weather which followed in July did much damage in certain parts, so that the crop produced in the area that is served by the Lethbridge Station could be said to vary from remarkably good to extremely poor. Near the foothills grain crops generally were excellent, but became gradually poorer in districts further east. The total production of wheat in the Lethbridge district was distinctly less than in 1923, but the increased price on the whole was sufficient to offset the lessened yield, so that the total 1924 wheat crop of the district represented more money than did the previous year's crop.

As usual the acreage seeded to barley and oats was relatively small as compared to wheat. Hay on the irrigated farms, both alfalfa and timothy, went into the stack in excellent condition. The dry weather during July was particularly favourable for haying operations and as a result the quality and grade of the hay offered for sale by the farmers was high. The yields generally were satisfactory.

The season did not prove satisfactory for corn. Although the growth was fair, so that the returns in roughage obtained were satisfactory, the grain itself developed so slowly that very little of it was mature at time of harvest. The interest taken, and the splendid progress made with this crop, during the last few seasons in the district will not, it is believed, be interrupted by this one unfavourable year.

The first work done on the land at the Station was disking on April 4.

METEOROLOGICAL RECORDS AT LETHBRIDGE, 1924

Month	Temperature F.			Bright sunshine	Wind			Evaporation free surface water	Precipitation	
	Highest	Lowest	Mean		Hourly Mean	Greatest mileage in one hour			1924	Average 23 yrs.
				Hours	miles	miles	direction	inches	inches	inches
	°	°	°							
January	48·0	−31·0	13·7	86·2	14·2	54	S.W.	.....	0·66	0·68
February	58·0	−19·0	30·5	120·8	13·3	50	W.	.....	1·04	0·64
March	50·0	7·0	29·3	154·3	8·7	41	N.W.	.....	0·69	0·66
April	65·5	12·0	39·4	207·9	13·6	50	W.	.....	0·56	0·91
May	87·5	25·5	52·0	281·4	8·6	27	N.	5·97	1·17	2·55
June	79·5	33·0	55·1	226·4	7·9	32	N.W.	4·43	3·82	2·71
July	92·5	39·5	64·3	324·4	7·3	48	W.	6·13	0·54	1·89
August	86·5	36·5	60·0	243·0	8·2	47	S.W.	4·14	2·91	1·74
September	86·5	26·0	54·8	227·0	10·5	39	S.W.	3·93	1·48	1·50
October	76·0	21·0	46·8	151·9	12·4	45	S.W.	2·29	0·52	0·85
November	60·0	−14·0	26·9	108·7	14·6	54	S.W.	.....	1·02	0·61
December	61·0	−44·5	9·6	61·9	11·4	63	S.W.	.....	1·54	0·62
Average	70·9	7·7	40·2	182·8	10·9	45·8	.....	*26·89	*16·00	*15·36

Latest spring frost occurred on May 26, 1924 ..... 31·5°
First fall frost occurred on September 20, 1924 ..... 28·5°
First killing frost occurred on September 26, 1924 ..... 26·0°
Total precipitation for the four growing months of April, May, June and July, 1924 6·09"
Twenty-three year average for the four growing months of April, May, June and July, 1924 ..... 8·03"

* Total.

A limited number of farmers in the district, as well as Illustration Station Operators over the province, are supplied with rain gauges and they have been good enough to report their observations of precipitation monthly to this office. The table that follows gives the locations and the names of the observers who have sent in complete returns for the twelve calendar months of 1924.

OBSERVERS' PRECIPITATION RECORDS, 1924

Station and Observer	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total, 1924
	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.
Acadia Valley—E. C. Hallman	0·30	Nil	Nil	0·26	0·53	1·39	2·51	1·11	1·00	0·69	0·57	0·70	9·06
Alsask, Saskatchewan—Andrew Anderson	0·04	0·03	0·70	0·60	1·02	0·58	1·74	1·97	1·33	0·95	0·69	1·00	10·65
Barons—S. R. Hunt	1·10	1·10	0·90	Nil	0·26	2·63	1·08	2·69	0·85	1·30	1·20	1·50	14·61
Bow Island—M. Mortensen	0·40	0·30	0·25	0·34	0·53	1·83	0·35	1·73	1·04	0·33	0·90	0·70	8·70
Cardston—J. F. Parrish	0·90	0·50	1·55	0·85	0·50	6·64	0·60	3·38	0·41	1·21	0·60	2·50	19·44
Carmangay—W. R. Henderson	0·30	0·70	0·65	0·36	0·30	2·97	0·75	2·45	0·68	0·38	0·90	1·00	11·44
Claresholm—School of Agriculture	0·93	0·11	1·66	0·64	0·35	3·46	0·79	3·05	0·91	0·32	0·15	0·95	13·32
Coaldale—N. F. Priestly	0·80	0·60	0·62	0·46	0·40	3·88	0·30	3·10	1·33	0·49	1·07	1·70	14·75
Delacour—A. H. Fennessey	0·80	1·10	1·20	1·60	0·79	4·64	2·45	2·06	0·55	1·30	0·80	1·40	18·69
Foremost—T. H. Frankish	1·10	0·50	0·30	Nil	0·46	3·20	0·67	2·72	0·48	Nil	0·50	0·80	10·73
Grassy Lake—Jas. Palmer	0·70	0·70	0·49	0·32	0·70	2·35	0·26	2·34	1·18	0·69	0·70	0·80	11·23
High River—B. F. Kiser	1·00	0·20	2·00	0·50	0·70	2·87	2·50	2·43	0·22	1·52	0·90	1·60	16·44
Kippenville—D. Kippen	0·60	0·40	0·45	0·85	0·28	3·88	0·56	1·76	0·17	0·29	0·65	1·10	10·99
Lethbridge—Experimental Farm	0·66	1·04	0·69	0·56	1·17	3·82	0·54	2·91	1·46	0·59	1·02	1·54	16·00
Magrath—M. F. R. Lloyd, C.P.R.	1·50	0·65	2·00	0·40	1·32	6·31	0·85	4·37	0·46	1·07	0·85	1·90	21·68
Mannyberries—John Downie	1·80	Nil	Nil	0·61	0·25	2·13	1·62	0·76	0·65	0·63	0·70	0·80	9·95
Milk River—P. W. Stimson	0·60	0·70	1·55	0·76	0·47	5·01	0·63	3·60	0·67	1·04	1·00	0·80	16·83
Munson—R. R. Fraser	0·50	0·45	0·40	1·10	0·77	1·30	2·48	1·32	0·54	1·08	0·85	1·55	12·34
New Dayton—R. W. Risinger	0·95	0·70	2·00	0·93	0·85	4·30	0·46	3·90	0·65	0·77	1·20	1·20	17·91
Nobleford—E. L. Woodbury	0·70	1·55	1·35	0·60	0·19	3·75	0·43	3·84	1·00	0·66	1·26	1·50	16·83
Orion—S. Eggleston	0·80	0·24	0·30	0·28	0·46	2·41	1·00	1·24	0·81	0·76	0·80	0·85	9·95
Pincher Creek—W. W. Henderson	1·20	0·68	2·20	1·05	0·63	3·99	0·80	4·92	0·40	1·35	0·80	1·60	19·62
Raymond—School of Agriculture	1·25	.....	0·42	0·80	1·21	4·83	0·34	2·46	0·81	0·69	0·95	1·00	.....
Wainwright—G. C. Boyd	0·30	0·45	1·25	0·90	1·00	0·56	1·76	2·33	0·80	0·40	0·55	1·00	11·30
Whitla—R. H. Babe	0·70	0·70	0·60	0·80	0·83	2·12	2·34	1·86	1·10	0·46	1·00	1·20	13·71
Youngstown—G. S. Coad	0·45	0·20	1·02	0·44	0·63	1·23	2·54	1·02	2·01	0·35	0·60	1·80	12·29
Macleod—Norman Grier	1·10	1·00	1·60	0·51	0·44	4·68	0·07	2·01	0·56	0·44	0·90	1·60	15·51
Grassy Lake—J. E. James	0·60	0·60	0·30	0·19	0·79	1·83	0·14	2·03	1·09	0·37	0·90	0·70	9·54

ANIMAL HUSBANDRY

Experimental work in animal husbandry was under the supervision of Mr. V. Matthews, Assistant Superintendent, who has assisted in the preparation of the report under this heading.

CATTLE

STEER FEEDING EXPERIMENT

The objects of the experiment were:—

1. To compare alfalfa fed alone with alfalfa and silage.

2. To compare corn silage with corn fodder as a supplement when fed in conjunction with alfalfa.

Forty-eight head of steers were purchased in the fall of 1923 on the Calgary market. They were thousand-pound steers, and laid down at Lethbridge cost $4.44 per cwt. This cost included buying price, feed before shipping, brand inspection, commission, loading, and freight. They were divided into four groups and fed roughages as follows:—

Group 1. Alfalfa.
Group 2. Alfalfa and corn silage.
Group 3. Alfalfa and sunflower silage.
Group 4. Alfalfa and corn fodder.

The quantity of chop fed to each group was the same, and consisted of a mixture of barley and oats. During the first part of the feeding period the mixture consisted of $\frac{2}{3}$ barley and $\frac{1}{3}$ oats, and towards the end $\frac{3}{4}$ barley and $\frac{1}{4}$ oats with the addition of $\frac{1}{3}$ of a pound of ground flax to the daily ration.

The steers were fed in the open, and their only protection was a straw shelter at one end of each corral.

The following table gives the results of the steer feeding experiment:—

STEER FEEDING EXPERIMENT

—	Group 1 — Straight alfalfa grain	Group 2 — Corn silage alfalfa grain	Group 3 — Sunflower silage alfalfa grain	Group 4 — Corn fodder alfalfa grain
Number of days in experiment	129	129	129	129
Number of steers in experiment	12	12	12	12
Total initial weight (Nov. 17, 1923) lb.	12,081	12,048	12,083	12,060
Average initial weight "	1,006·75	1,004	1,006·92	1,005
Total final weight (March 25, 1924) "	14,410	15,170	14,330	14,450
Averge final weight "	1,200·83	1,264·17	1,194·17	1,204·17
Total gain for period "	2,329	3,122	2,247	2,390
Average gain per head for period "	194·08	260·17	187·25	199·17
Average gain per head per day "	1·50	2·02	1·45	1·54
Quantity of silage fed for period "	.....	52,908	52,908	.....
Quantity of corn fodder fed for period "	.....	.....	.....	12,575
Quantity of alfalfa hay fed for period "	37,140	19,370	20,110	19,450
Quantity of barley chop fed for period "	8,922	8,922	8,922	8,706
Quantity of oat chop fed for period "	3,930	3,930	3,930	3,858
Quantity of ground flax fed for period "	400	400	400	400
Quantity of salt fed for period "	25	25	25	25

Total cost of feed	$	262·78	315·29	317·51	244·39
Cost of feed per head	"	21·90	26·27	26·46	20·37
Cost of feed per head per day	"	0·17	0·20	0·21	0·16
Cost to produce 100 pounds of gain	"	11·28	10·10	14·13	10·23
Initial cost of steers including commission, insurance, etc	"	536·40	534·93	536·49	535·46
Initial cost of steers per cwt	"	4·44	4·44	4·44	4·44
Total cost plus cost of feed	"	799·18	850·22	854·00	779·85
Necessary selling price to break even (per cwt.)	"	5·56	5·60	5·96	5·40
Appraised selling price at $5.60, $6.00, $5.50, $5.75 per cwt	"	806·96	910·20	788·15	830·88
Profit or loss per group	"	7·78	59·98	−65·85	51·03
Profit or loss per head	"	0·65	5·00	−5·49	4·25

The prices charged for the feeds per ton were: silage $4, corn fodder $6, alfalfa $6, barley chop $20.75 (45 cents per bushel and $2 per ton for crushing), oat chop $22.59 (35 cents per bushel and $2 per ton for crushing), ground flax $70, and salt $32.80.

The feed cost of one hundred pounds gain varies with the ration fed. This information is given in the following table:—

FEED COST FOR EACH HUNDRED-POUND GAIN

Average ration	Daily gains	Feed for 100 lb. gain				
		Grain	Hay	Silage	Corn fodder	Feed cost of 100 lb. gain
lb.	lb.	lb.	lb.	lb.	lb.	$
Group 1, no silage—						
Alfalfa hay 23·99						
Chop 8·56	1·50	569	1,594	.....	.....	11 28
Group 2, corn silage—						
Corn silage 34·16						
Alfalfa hay 12·51						
Chop 8·56	2·02	424	620	1,694	.....	10 10
Group 3, sunflower silage—						
Sunflower silage 34·16						
Alfalfa hay 12·99						
Chop 8·56	1·45	589	894	2,354	.....	14 13
Group 4, corn fodder—						
Corn fodder 8·12						
Alfalfa hay 12·56						
Chop 8·37	1·54	542	814	.....	526	10 23

Deductions.—In order to arrive at a financial statement and compare the results with those of the two previous years, the steers were appraised on March 25 by Mr. W. Shaw, Manager of P. Burns & Co., Lethbridge. Group 1 was valued at $5.60 per cwt., Group 2 at $6, Group 3 at $5.50, and Group 4 at $5.75. This resulted in a net profit of 65 cents per head in the group getting straight alfalfa, $5 per head profit in the group getting corn silage, $5.49 loss per head in the group getting sunflower silage, and $4.25 profit per head on the steers getting corn fodder.

It will be seen from the appraised valuation that the steers getting corn silage were worth ½ cent per pound more than the steers getting sunflower silage, ¼ cent per pound more than the steers getting straight alfalfa, and ¼ cent per pound more than the steers getting corn fodder. These valuations were based on degree of finish. The group getting corn silage attained a much higher degree of finish than any of the other groups with the group getting corn fodder a close second. In point of finish there was a greater difference in the other groups. This may be accounted for by the fact that the alfalfa fed during the winter of 1923-4 was of very low quality, so much so that 27 per cent of the alfalfa fed was not eaten by the steers, although actually charged against them.

Sunflower silage has little or no feed value when fed in conjunction with poor alfalfa hay.

When the increased gains from the roughage supplement are taken into consideration, 1.72 pounds of corn silage replaced 1 pound of alfalfa hay, and by valuing the alfalfa at $10 per ton, the corn silage was worth $5.81 per ton. In like manner, 3·12 pounds of sunflower silage replaced 1 pound of alfalfa and had a replacement value of $3.20 per ton. Similarly, 0·67 pounds of corn fodder replaced 1 pound of alfalfa hay and had a replacement value of $14.92 per ton.

Corn Silage for Fattening Steers.—Corn silage is an excellent supplement to combine with alfalfa for fattening steers. The deductions from three years' feeding tests are:—

1. When the increased gains from the roughage supplement are taken into consideration, 1.57 pounds of corn silage replaced 1 pound of alfalfa.

2. Valuing the alfalfa at $10 per ton, the corn silage was worth $6.37 per ton

3. Compared with a straight alfalfa roughage, corn silage when fed in conjunction with alfalfa, not only resulted in more gains and cheaper gains, but gives a better finish in a shorter time.

4. The daily gains from alfalfa and corn silage are larger and slightly cheaper and the steers reach a finished condition sooner than those fed alfalfa and corn fodder.

Sunflower Silage for Fattening Steers.—In districts where the season is much shorter than it is at Lethbridge and too cool for corn, sunflowers have a place, but as many sections of southern Alberta are favoured with a long growing season, there appears to be no reason why the farmer on the irrigated land should prefer sunflowers to corn. This may not be true on the United Project or in parts of the Western Section of the C.P.R. Block.

The results of the feeding tests to date indicate that sunflowers will not stand comparison with corn because they produce lower gains at a greater cost per 100 pounds—slower gains with a decided lack of finish—and when compared with straight alfalfa, a sunflower supplement also produces lower and slower daily gains at a higher cost.

The average replacement value over three years, when the increased gains from the roughage supplement are taken into consideration, shows that 2·57 pounds of sunflower silage replaced 1 pound of alfalfa and by valuing the alfalfa at $10 per ton, the sunflower silage was worth $3.88 per ton.

Corn Fodder for Fattening Steers.—1. A combination of alfalfa and corn fodder makes a very good roughage for steers.

2. Compared with a straight alfalfa roughage, corn fodder, when fed in conjunction with alfalfa, not only results in more and cheaper gains, but gives a better and quicker finish.

3. The daily gains from alfalfa and corn fodder are smaller and cost slightly more and the steers reach a finished condition more slowly than those getting alfalfa and corn silage.

4. Under present economic conditions, an acre of corn fodder is worth as much as a supplement fed with alfalfa as an acre of corn silage because:—

(*a*) There is a higher overhead charge for harvesting and ensiling the corn silage.

(*b*) The ensiling period comes when labour is at the peak—i.e. when harvesting and haying operations are on.

5. Basing calculations on corn fodder being 50 per cent that of corn silage in point of yield, an acre of both has about the same replacement value. The average replacement value over two years, when the increased gains from the roughage supplement are taken into consideration, shows that 0.73 pounds of corn fodder replaced 1 pound of alfalfa as compared to 1.50 replacement value for corn silage. By valuing the alfalfa at $10 per ton, the corn fodder was worth $13.70 and the corn silage $6.81 per ton.

FEED CHANGES TO SECURE UNIFORM FINISH

At the conclusion of the experiment on March 25, group 1 was fed corn fodder in addition to the alfalfa and group 3 was fed corn silage in place of sunflower silage. The quantity of ground flax fed was increased from $\frac{1}{3}$ to $\frac{1}{2}$ pound daily. Corn meal was included in the grain mixture and fed in the following proportion:—3 parts of corn, 8 parts of barley, and 2 parts of oats. This was increased on April 30 to 5 parts of corn, 5 parts of barley, and 3 parts of oats. On May 8 two cars of steers were consigned for export to Great Britain. The remaining ten steers, not required for export, were fed alfalfa hay and corn silage and a grain mixture consisting of 6 pounds of barley, 5 pounds of corn meal, and 3 pounds of oats. This was changed on May 25 to 8 pounds of barley and 5 pounds of oats. In addition to the grain mixture, the steers received $\frac{6}{10}$ of a pound of ground flax daily. On June 13 these ten steers were sold locally to Delaney & Co. at $6.75 per cwt. live weight, less 3 per cent shrink. This meant a net profit of only $1.39 per steer after taking into account the original cost plus the cost of the feed, which was $8.23 per head more than the thirty-eight head consigned for export a month sooner.

MARKETING OF STEERS IN GREAT BRITAIN

As stated, two cars of steers were consigned for export to Great Britain. These were shipped from Montreal on May 15, consigned to Messrs. Chapman & Everett, Fakenham, Norfolk, England via SS. *Manchester Brigade* and included in a shipment of 140 cattle from the Experimental Farms at Scott, Sask.; Rosthern, Sask.; and Lennoxville, P.Q. All cattle comprising the shipment had been utilized for feeding tests during the winter and were representative of the class of cattle available for the overseas trade in the districts from which they came.

The reader who desires full information on the different phases of the cattle shipping industry should write the Animal Husbandry Division, Experimental Farm, Ottawa, as to the experimental shipment of live cattle and chilled beef made in May, 1923, and 1924.

Cost of Shipping to Montreal.—It costs $16.61 per head to take steers from Lethbridge to Montreal or $1.35 per hundred pounds. This cost includes freight and other rail charges to Montreal as well as attendant charges of $2.50 per day.

Shrinkage in Rail and Ocean Shipping.—Fat cattle lose more than thinner cattle. The short-keeps lost 38 pounds per steer from Lethbridge to Moose Jaw or 2·9 per cent, from Lethbridge to Winnipeg 43 pounds per steer or 3·3 per cent, and from Lethbridge to Montreal 88 pounds or 6·7 per cent; while the feeders lost from Lethbridge to Moose Jaw 28 pounds per head of 2·2 per cent, from Lethbridge to Winnipeg 26 pounds per head or 2·1 per cent, and from Lethbridge to Montreal 68 pounds per head or 5·4 per cent. The fill in Montreal, that is the difference between the weight off cars and when they were fed and watered, was the same for both groups, namely, 2 per cent. The shrinkage during the ocean travel was very light. The short-keeps lost 36 pounds per head or 2·8 per cent on the ocean, while the feeders lost 30 pounds per head or 2·4 per cent. The short-keeps sold in England at a total

loss of 98 pounds per head or 7·5 per cent, while the feeders sold at a loss of 73 pounds per head or 5·8 per cent. When it is considered that it is customary to sell cattle in Canada for so much per hundred based on farm weights, less 3 per cent shrink, the shrink on which they sold for in England was only 4·5 per cent greater than this on the short-keeps and 2·8 per cent on the feeders.

COST OF SHIPPING TO ENGLAND.—It costs $43.14 to land Lethbridge cattle in England. This amount was made up of charges to Montreal as already stated plus reloading to wharf, tags (5 cents each), tagging (5 cents each), ropes, roping, pails, handling (50 cents each), wharfage (15 cents each), marine insurance ($130 at $\frac{5}{8}$ per cent), ocean feed, ocean freight ($20 per head) and the charge at port of debarkation which includes lairage (2 shillings), tolls (1 shilling each), droving (2 shillings 6 pence each), and veterinary inspection fees of sixpence each.

The cost of shipment to England is slightly less than that of the previous season. This is due to feeds being slightly cheaper and to a $2.50 per head lower charge on ocean freight.

RETURNS FROM SHIPMENT.—The cattle sold well and would have netted far greater returns, but for the fact that the value of the pound sterling had depreciated considerably as compared to its value when the shipment was sent over a year previous; so much so that a steer selling for £30 this year because of the depreciation in the value of the pound suffered a net loss of $8.63 per head to the shipper. Had the pound sterling remained at the same value as the year previous, the net receipts would have been $\frac{3}{4}$ of a cent more per pound.

The nineteen short-keeps were choice butcher cattle—averaging 1,309 pounds live weight at Lethbridge. These steers sold for short keeps at an average price of £30-12-1¼ which represents a gross price of $11.20 per cwt. Manchester weights. These steers were appraised at Lethbridge at $7 per cwt. live weight, and they realized a net price at Lethbridge of $7.02 per cwt. after allowing 3 per cent shrinkage on farm weights.

The reader must bear in mind that steers which are classified in Canada as "good to choice butcher cattle" are really only "short keeps" in Great Britain or else suitable for immediate slaughter, depending on the market.

The nineteen feeders were handy-weight export butcher cattle averaging 1,255 pounds live weight at Lethbridge. They sold for feeders at an average price of £28-5-3¼, which represents a gross price of $10.60 per cwt. on Manchester weights. These steers were appraised at Lethbridge at $6.50 per cwt. live weight, and they realized a net price of $6.54 per cwt. at Lethbridge, after allowing for 3 per cent shrinkage on farm weights.

COMPARISON OF SHORT-KEEPS WITH FEEDERS.—Comparing short-keeps with feeders, it may be stated that while the original cost of both lots was the same, the net receipts on the farm were on a par with the appraised valuations. Provided the class of cattle represented as short-keeps is exported in season to arrive in May, June, or July, and do not exceed an 800 pound carcass when fat, these steers will realize more per pound live weight than feeders of the weight and finish represented by the feeders. A "store" arriving in England in June or July to command profitable prices must be forward enough in condition to finish on grass.

FINANCIAL RETURNS—THE TOTAL NET RECEIPTS FROM SHIPPING THIRTY-EIGHT HEAD OF LETHBRIDGE STEERS TO GREAT BRITAIN—amounted to $3,205.90. The original cost of the steers was $1,667.06, while the cost of feed was $1,259.48 leaving a total balance or net profit of $279.36. This represents a net profit of $7.35 per steer, sufficient to allow the farmer a good market price for his feeds and wages at $50 per month for a third of his time during the winter period (5½ months) taking care of and feeding two cars of steers.

SHEEP

LAMB FEEDING EXPERIMENT

The object of the experiment was to determine the value of using one of the following roughages in conjunction with alfalfa hay.

1. To compare alfalfa fed alone with alfalfa fed with silage.

2. To compare alfalfa fed alone with alfalfa fed with oat sheaves.

3. To compare corn silage with sunflower silage used as a supplement to alfalfa.

4. To compare silages with oat sheaves used as a supplement to alfalfa.

PLAN OF THE EXPERIMENT.—Two hundred and ninety-five lambs were divided into five groups and fed roughages as follows:—

Group 1.—Alfalfa.

Group 2.—Alfalfa and corn silage.

Group 3.—Alfalfa and sunflower silage.

Group 4.—Alfalfa and oat sheaves.

Group 5.—Alfalfa and corn silage.

Groups 1 to 4 consisted of fifty lambs each, selected as to type and size, while group 5 consisted of the "throw backs" weighing on an average about ten pounds less per head.

The feeding was carried on in the open, the only shelter provided being a shed open to the east of each corral.

The quantity of grain fed per head was the same for all groups and consisted of a mixture of barley and oats. During the first part of the feeding period the mixture consisted of two-thirds barley and one-third oats and toward the end three-quarters barley and one-quarter oats. The lambs were started on half pound whole grain and at the close of the feeding period were getting 2 pound per head per day.

The following table gives the results of the lamb feeding experiment:—

No ENSILAGE VS. ENSILAGE
No ENSILAGE VS. OAT SHEAVES
CORN SILAGE VS. SUNFLOWER SILAGE
ENSILAGES VS. OAT SHEAVES

—	Group 1 — Straight alfalfa grain	Group 2 — Corn silage alfalfa grain	Group 3 — Sunflower silage alfalfa grain	Group 4 — Oat sheaves alfalfa grain	Group 5 — Corn silage alfalfa grain
Number of days in experiment (Jan. 19–April 29)	101	101	101	101	101
Number of lambs in group at beginning	50	50	50	50	95
Number of lambs in group at end of period	50	49	50	50	95
Total initial weight lb.	3,885	3,987	3,847	3,980	6,140
Average initial weight "	77·70	79·74	76·94	79·6	64·63
Total weight at beginning after deducting wt. loss "	3,885	3,907·26	3,847	3,980	6,140
Total final weight "	5,810	5,910	5,845	5,920	10,160
Average final weight "	116·20	120·61	116·90	118·40	106·94
Total gain for period "	1,925	2,002·74	1,998	1,940	4,020
Average gain per head for period "	38·50	40·87	39·96	38·80	42·32
Average gain per head per day "	·381	0·404	0·395	0·384	0·419
Quantity of silage fed for period "	.....	6,310	6,375	.....	12,765
Quantity of oat sheaves fed for period "	.....	.....	.....	3,350	.....
Quantity of alfalfa hay fed for period "	10,935	10,585	10,550	7,335	11,775
Quantity of whole oats and barley fed for period "	7,252	7,193	7,252	7,252	14,534
Quantity of salt fed for period "	150	150	150	125	150

Cost of Feed and Returns

Total cost of feed	$	105·07	115·97	116·67	103·91	203·13
Cost of feed eaten by the 50, 49, 50, 50 and 95 resp.	$	105·07	114·31	116·67	103·91	203·29
Cost of feed per head	$	2·10	2·33	2·33	2·08	2·14
Cost of feed per head per day	$	0·0208	0·0230	0·0230	0·0208	0·0214
Cost to produce 100 lb. gain	$	5·46	5·70	5·84	5·35	5·57
Initial cost of lambs (Gr. 1-4 $9, Gr. 5 $8)	$	349·65	351·65	346·23	358·29	491·20
Initial cost of lambs per pound	$	0·09	0·09	0·09	0·09	0·08
Total cost plus cost of feed	$	454·72	465·96	462·90	462·20	694·49
Selling price at $13.27, $13.27, $13.27, $13.27 and $13.10 per cwt., less 4½% shrink	$	736·29	748·96	740·73	750·23	1,271·07
Net profit on group	$	281·57	283·00	277·83	288·03	576·58
Net profit per head	$	5·63	5·77	5·55	5·76	6·07

The prices charged for the feeds were: silage $4 per ton, oat sheaves $6 per ton, alfalfa hay, $6 per ton, whole oats $20.59 per ton (35 cents per bushel), whole barley $18.75 (45 cents per bushel), and salt $32.80 per ton.

To assist the reader in analyzing the experiment, the average daily ration, the daily gains, and the cost of 100 pounds gain are given in the following table:—

COST OF EACH HUNDRED POUNDS OF GAIN

Average ration		Feed for 100 lb. gain					
		Daily gains	Grain	Hay	Silage	Oat sheaves	Feed cost of 100 lb. gain
	lb.	lb.	lb.	lb.	lb.	lb.	$ cts.
Group 1, no silage—							
Alfalfa hay	2·17						
Whole oats and barley	1·44	0·381	377	568	.....	.....	5 46
Group 2, corn silage—							
Corn silage	1·25						
Alfalfa hay	2·09						
Whole oats and barley	1·42	0·404	359	528	315	.....	5 70
Group 3, sunflower silage—							
Sunflower silage	1·26						
Alfalfa hay	2·09						
Whole oats and barley	1·43	0·395	363	528	319	.....	5 84
Group 4, oat sheaves—							
Oat sheaves	0·66						
Alfalfa hay	1·45						
Whole oats and barley	1·43	0·384	374	381	.....	172	5 35
Group 5, corn silage—							
Corn silage	1·33						
Alfalfa hay	1·23						
Whole oats and barley	1·51	0·419	361	293	317	.....	5 57

From the foregoing table, it will be seen that the daily gains were high. This was the result of the heavy feeding of grain—the average ration being about 1½ pounds for the entire period. The cost of 100 pound gain was low due to the fact that alfalfa was charged at $6 per ton (the current price) in place of $10 as in previous years. Due to the high and cheap gains made by the lambs and to the unusually high selling price in the spring making a wide spread between the buying and selling prices, lamb feeding in the winter of 1923-24 was a very profitable venture.

Deductions.—In degree of finish at the close of the experiment, the groups getting straight alfalfa, alfalfa and corn silage, and alfalfa and oat sheaves

were uniformly good; while the group getting alfalfa and sunflower silage was not as well finished as any of the other groups, tending to show that a sunflower supplement has the tendency to produce growth rather than finish.

Silage and oat sheaves fed as a supplement with alfalfa give variety to the ration and for this reason the lambs eat more and so make slightly higher gains than those getting a ration of straight alfalfa. Group 1, getting no silage, made slightly cheaper gains than the groups getting silage, but the slightly larger gains made by the silage-fed groups resulted in a slightly larger profit per head. Group 4, getting oat sheaves, in addition to alfalfa made slightly larger and cheaper gains than group 1, getting straight alfalfa, which only resulted in 13 cents more profit per head. Corn silage was found to be superior to sunflower silage for fattening lambs as it gave greater gains at a lower cost, thus returning a greater profit per head.

When the increased gains from the roughage supplement are taken into consideration, 5.92 pound of corn silage replaced 1 pound of alfalfa; 7.87 pound of sunflower silage replaced 1 pound of alfalfa; 0.89 pound of oat sheaves replaced 1 pound of alfalfa; and by valuing the alfalfa at $10 per ton, the corn silage was worth $1.68 per ton, sunflower silage $1.27 per ton, and oat sheaves $11.24 per ton. From the foregoing figures it is evident that it would be more economical to grow oat sheaves than silage for supplying a variety to the ration, and that more economical gains would be produced with oat sheaves at $10 per ton than with silage at $4 per ton. Since the replacement value of silage is less than half the cost of production and since it costs the irrigation farmer more to grow a ton of oat sheaves than a ton of alfalfa, these supplements are not likely to be employed for winter feeding of lambs when plenty of good alfalfa hay and grain are available.

The average results from three winters' trials to determine the value of using a silage supplement in conjunction with alfalfa rather than feeding straight alfalfa shows that when the increased gains from the roughage supplement are taken into consideration, 3.35 pound of corn silage replaced 1 pound of alfalfa and 4.20 pound of sunflower silage replaced 1 pound of alfalfa. If the alfalfa is valued at $10 per ton the corn silage was worth $2.98 per ton and the sunflower silage $2.38 per ton.

The average results from two winter feeding trials when oat sheaves were compared with silage as a supplement to alfalfa for fattening lambs show that, when the increased gains from the roughage supplement are taken into consideration, it took 4.07 pounds of corn silage to replace 1 pound of alfalfa, 5.62 pounds of sunflower silage, 1.005 pounds of green oat sheaves; and if the alfalfa is valued at $10 per ton, corn silage was worth $2.45, sunflower silage $1.78, and oat sheaves $9.95.

These feeding trials to date would indicate that, when good alfalfa and a full ration of grain are fed to fattening lambs, the value of a silage or oat sheaves supplement is questionable. In small farm lots it may be found profitable to feed such supplements but in fattening larger bands the increased profits from the supplements would not pay the extra handling charges.

PASTURING SHEEP IN FOREST RESERVE

OBJECTS OF EXPERIMENT.—To determine the feasibility of alfalfa growers on the irrigated land utilizing the nearby forest reserve in the Rocky Mountains for summer pasture of sheep.

PLAN OF EXPERIMENT.—In the fall of 1919, nine hundred grade Merino ewes were provided for the foundation stock and since that time the experiment has been continued.

During the fall and winter months the band is either run on stubble fields or fed at the Station, the amount of feeding required depending upon the severity of the weather. During the summer months from early June till late September, they are pastured in the Crowsnest Forest Reserve, being shipped by rail from Lethbridge to Coleman and returned by rail again in the fall. The ewes are bred to lamb fairly early, that is, from the middle of March to the latter part of April. In order to accommodate them during the lambing period, a shed 140 feet by 64 feet is used. As the grass in the Forest Reserve, as a rule is ready for pasturing early in June, it has been the custom to shear the sheep the latter part of May. After shearing they are dipped and branded, completing these operations in time to allow the sheep to be shipped to the mountains during the first week in June. The sheep have been returned to Lethbridge either the last week in September or during the first week in October.

October, 1924, completed the fifth year of the experiment, and the following statement gives the expenses and returns from October, 1923 to October, 1924.

PASTURING SHEEP ON FOREST RESERVE

Expenses October, 1923, to October, 1924—	
Winter pasture on stubble fields	$ 1,030 42
Mixed hay, 27 tons at $7	189 00
Alfalfa hay, 85·6 tons at $6	513 60
Oat sheaves, 2 tons at $6	12 00
Silage, 77 tons at $4	308 00
Whole oats, 43,200 lb. at $20.59 per ton	891 37
Salt, 1·6 tons at $32	51 20
Summer pasture on Forest Reserve	81 00
Total freight to and from Forest Reserve	621 81
Shearing	145 88
Purchase of bucks	297 50
Labour, total for 12 months	1,740 00
	5,881 78
Inventory, October, 1923—	
Number of ewes to be bred 901 at $8	$ 7,208 00
Number of ewe lambs on hand, 133 at $7	931 00
Number of feeder lambs on hand, 302 at $6.50	1,963 00
Number of bucks on hand, 17 at $15	255 00
	$10,357 00
Sales—	
57 ewes, net receipts	607 00
659 lambs, net receipts	7,370 70
5 bucks	40 00
Net wool receipts, less dip and supplies	2,512 70
	$10,530 40
Inventory, October, 1924—	
Number of ewes to be bred, 905 at $12	$10,860 00
Number of ewe lambs on hand, 113 at $8.75	988 75
Number of feeder lambs on hand, 295 at $7.75	2,286 25
Number of bucks on hand, 19 at $20	380 00
	$14,515 00

FINANCIAL SUMMARY

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

DETAILS OF TEST.—The sheep reached Lethbridge from the Forest Reserve on September 29, 1923, and were put on stubble pasture, the lambs being separated from the ewes and run in a different field.

After the breeding season the ewe lambs retained for maintaining the flock were put with the ewes, and the band was carried on stubble fields in the neighbourhood rented for the purpose until March 3, and were fed hay only during storms. On this date they were returned to the Station. The ewes started to lamb about the middle of March. Of the 901 which were bred, 66 failed to have lambs. Shearing was begun May 13 and was completed May 17. The average weight of fleece for the entire flock was 7.72 pounds per head, and brought 37.2 cents per pound at Lethbridge. On May 27 the ewes were dipped. Owing to the fact that so few ticks were present in the flocks, the lambs were not dipped, this being a change from our previous custom, for in the past the entire flock has been dipped.

On June 6, 1924, the sheep were shipped to the Forest Reserve at Coleman, Alberta. There was included in the shipment 990 ewes and 835 lambs. A small loss from poisoning is sometimes experienced the first day the sheep reach the mountain pasture, but this year this was not the case. The sheep were shipped back to Lethbridge on October 2.

The losses during the summer were higher than usual, due in the main to the inexperience of the men in charge. Experienced herders accustomed to mountain ranges are not always available, and during the past summer it was found necessary to use men rather new to the work. The total losses between the time the sheep were shipped up and shipped back were 22 ewes and 62 lambs.

For the past four years the results of each season's work have been given in detail in the annual reports, these including a financial statement showing expenses and returns. It was thought this year that the collective summaries for the respective seasons might also interest the general reader who cares to analyse the experiment.

FINANCIAL SUMMARY COVERING PERIOD FROM OCTOBER, 1919, TO OCTOBER, 1924

For the year ending October, 1920

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

For the year ending October, 1921

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

For the year ending October, 1922

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

For the year ending October, 1923

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

FINANCIAL SUMMARY COVERING PERIOD FROM OCTOBER, 1919, TO OCTOBER, 1924—*Concluded*

For the year ending October, 1924

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

Five Years' Results

Total sales	$ 33,259 09	
Increase, inventory October 1924 over inventory October 1919	4,465 00	
Total expenses		26,839 32
Total gross profit		10,884 77
	$ 37,724 09	$ 37,724 09

FIELD HUSBANDRY

TWO FARMS

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

CULTURAL EXPERIMENTS ON DRY LAND

Experiments to determine the best cultural methods to follow on the dry land have been conducted every year since the Station was established. The investigations conducted on the dry farm at the present time are divided into three groups: first, the culture of summer-fallowed land; second, the culture of stubble land; and third, the value of different summer-fallow substitutes. The following summaries give the most important deductions so far made.

SUMMER-FALLOW

Ploughing summer-fallow after the middle of June gave lower yields than ploughing before that date. The later the ploughing was after June 15 the lower was the yield obtained. With our soil, six inches seems to be most satisfactory depth to plough summer-fallow. Deeper ploughing than this did not give increased yields, but required more power, while weeds were harder to control with shallower ploughing. The use of the packer, either the surface or the subsurface, has given neutral results in practically every instance.

CULTIVATION BEFORE PLOUGHING.—Yields were not increased by disking or otherwise destroying the stubble in the fall before the land was summer-fallowed. Where the ploughing was done in *early* June nothing was gained by cultivating in the spring, but if the land was not ploughed until later, a thorough cultivation in the spring was very beneficial.

CULTIVATION AFTER PLOUGHING.—The rotary rod weeder has proved to be an excellent implement for keeping weeds in check on the summer-fallow, but when using this implement it has been found necessary to use the duck-foot cultivator in the fall to ridge the land to aid in reducing the possibility of soil drifting during the winter. It has also been found necessary to use the duck-foot at times to loosen up the soil if the rod weeder has been used extensively.

CULTIVATION VS. PLOUGHING FOR SUMMER-FALLOW.—Cultivation as a substitute for ploughing gave satisfactory results for two consecutive summer-fallows on the same land, one in 1922 and the other in 1924. With this particular test but one crop of grain is raised following the fallow. In another similar test where two crops of grain are raised after the fallow, the land is spring-ploughed for the second crop. How long the practice of cultivating without ploughing can be continued is a matter for further experiment.

STUBBLE TREATMENT

Fall ploughing of land that had been in crop the preceding season was found to decrease yields materially almost every year. In some seasons the yield of wheat on fall-ploughed land has been only one-tenth as great as similar land ploughed in the spring. Fall-ploughed land is also more likely to drift than is spring-ploughed land.

DEPTH OF PLOUGHING.—Experiments with spring ploughing indicate that ploughing to a depth of six inches gives no better results than four inches, if the four-inch ploughing is well done. These results were obtained on land that is in a rotation of summer-fallow, wheat, wheat. The summer-fallow is ploughed six inches deep so that the field is ploughed six inches when summer-fallowed.

DISKING OF STUBBLE.—Disking instead of ploughing for spring seeding has not proved to be a good practice except where the stubble was burned in the spring before disking. Where a good "burn" of stubble was made, satisfactory yields of wheat were obtained on the disked land.

SUMMER-FALLOW SUBSTITUTES

The feasibility of growing an intertilled crop instead of summer-fallowing land being prepared for grain the following year has been investigated at the Station since 1915. The substitute crops used were corn and potatoes. The corn has in some years been a tall-growing sort and has been used for silage, while in other years it has been an extra early, small-growing sort and the yield of mature corn has been determined. In the following table the average yields for eight years of wheat following the substitute crops and summer-fallow are given, also the average total value of the substitute crops and wheat raised on each field in two years. Sunflowers and wheat in rows have been tested for three years but neither has been as satisfactory as corn.

COMPARISON OF RETURNS FROM SUMMER-FALLOW SUBSTITUTES AND SUMMER-FALLOW

Crop preceding wheat	8-year average yield of wheat following	Average value of crop for 8 years		
		Substitute	Wheat	Total for 2 years
	bushels	$	$	$
Corn	20·16	6·83	22·39	29·22
Potatoes	19·35	36·43	21·21	57·64
Summer-fallow	23·44	.....	26·03	26·03

Potatoes as a substitute have given the highest average gross returns. The market for this crop is so uncertain, however, that it is a crop of doubtful value to raise on a large scale. Another difficulty with this crop is that in the driest years the tubers are so small that most of them are not fit for market.

Corn has given the best satisfaction as a summer-fallow substitute. It is possible to grow an early-maturing variety for hogging off or a later variety for fodder or ensilage. The principal objection to corn growing is difficulty in keeping the weeds in check. If a farmer is growing corn, he must prepare to cultivate it sufficiently to keep the field clean, for if the weeds are allowed to grow as has been done in many of the cornfields in southern Alberta, the crop cannot be considered as a summer-fallow substitute; it is then more like a wheat crop in its effect on the next year's crop. Another mistake that has been made with corn has been the planting a late-maturing variety for fodder, and then failing to harvest it before it becomes severely frosted, thus losing much of the feeding value of the crop.

CROP ROTATIONS

It is becoming more apparent each year that one of the principal paths of progress that successful farming practice in Western Canada must follow is intelligent crop rotation. Straight wheat growing has been almost the sole cropping system followed in southern Alberta as has been the case over much of the prairie region. In the more favoured sections it still appears to be satisfactory, but each year's operations makes straight wheat farming more difficult, as weed problems increase and soil fertility, especially soil fibre, is depleted.

Realizing the need that would develop for rotations fitted to the conditions found in the various parts of the country, the Experimental Farms' system started early in its history to secure data on the problem. At the Lethbridge Station, rotations were established on both dry and irrigated portions of the farm, and careful records have been kept each year of expenses and returns so that it is possible to determine the cost of producing each crop in each rotation and the returns from the various crops.

COST VALUES FOR THE SEASON OF 1924

Rent and taxes dry land	per acre	$ 2 50
Rent and taxes irrigated land	per acre	8 00
Manure	per ton	1 00
Seed wheat	per bushel	1 00
Seed oats	per bushel	0 68
Seed barley	per bushel	0 96
Seed peas	per bushel	3 00
Seed rye	per bushel	1 12
Seed corn	per pound	0 05
Alfalfa seed	per pound	0 35
Sweet clover	per pound	0 10
Rye grass	per pound	0 10
Brome grass	per pound	0 10
Sugar beet seed	per pound	0 25
Twine	per pound	0 14
Machinery	per acre	1 00
Manual labour	per hour	0 30
Horse labour, per horse	per hour	0 10
Threshing wheat and peas	per bushel	0 12
Threshing barley	per bushel	0 10
Threshing oats	per bushel	0 08
Ensiling	per ton	1 30

RETURN VALUES FOR THE SEASON OF 1924

Wheat	per bushel	$ 1 40
Oats	per bushel	0 50
Barley	per bushel	0 80
Rye	per bushel	1 00
Peas	per bushel	2 50
Alfalfa hay, and pea and oat hay	per ton	10 00
Corn ensilage	per ton	3 50
Wheat straw	per ton	Nil
Oat and barley straw	per ton	2 00
Pea straw	per ton	Nil
Pasture one horse or cow	per month	1 50
Pasture one sheep	per month	0 30
Sugar beets	per ton	8 00

DRY-LAND ROTATIONS

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

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

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

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

SUMMARY OF YIELDS AND PROFITS PER ACRE ON DRY-LAND ROTATIONS

Rotation "J"—6 Years' Duration

Rotation year	Crop	Yields		Profit or loss (−)	
		1924	Average for 3 years	1924	Average for 3 years
				$ cts.	$ cts.
1	Summer-fallow				
2	Wheat	22·2 bush.	24·57 bush.	9 25	0 46
3	Wheat	5·7 bush.	17·12 bush.	−3 81	0 27
4	Oats (seeded down)	55·3 bush.	28·72 bush.	13 96	−0 45
5	Hay	0·57 ton	0·19 ton	−2 84	−5 46
6	Hay	0·44 ton	0·15 ton	−4 09	−3 43
	Field average			2 08	−1 43

Rotation "Z"—5 Years' Duration

1	Summer-fallow				
2	Wheat	17·3 bush.	19·0 bush.	2 92	0 54
3	Oats	15·6 bush.	21·4 bush.	−4 96	−2 89
4	Oats seeded with sweet clover	12·9 bush.	9·3 bush.	−5 15	−6 41
5	Hay or pasture	0·81 ton	0·27 ton	−0 71	1 30
	Field average			−1 58	−2 01

Field A—Wheat Continuously

Rotation year	Crop	Yields		Profit or loss (−)	
		1924	Average for 13 years	1924	Average for 13 years
				$ cts.	$ cts.
1	Wheat	6·3 bush.	19·41 bush.	0 26	4 74

SUMMARY OF YIELDS AND PROFITS PER ACRE ON DRY LAND ROTATIONS—*Concluded*

Rotation "B"—2 Years' Duration

1	Summer-fallow				
2	Wheat	38·3 bush.	32·4 bush.	33 83	7 37
	Field average	19·1 bush.	16·2 bush.	16 91	3 68

Rotation "C"—3 Years' Duration

1	Summer-fallow				
2	Wheat	28·2 bush.	28·99 bush.	22 96	7 00
3	Wheat	10·1 bush.	*	5 23	5 87
	Field average	12·77 bush.	.....	9 40	4 29

Rotation "M"—6 Years' Duration

1	Summer-fallow				
2	Wheat	45·1 bush.	23·37 bush.	37 05	2 44
3	Oats	41·2 bush.	42·69 bush.	7 33	3 58
4	Summer-fallow				
5	Peas and oats	2·46 ton	2·23 ton	−1 11	0 55
6	Oats	14·2 bush.	51·96 bush.	−4 63	5 10
	Field average	.....	.....	6 44	1 95

Rotation "S"—9 Years' Rotation

1	Summer-fallow				
2	Corn	8·18 tons	8·84 tons	−12 70	−2 15
3	Wheat	11·4 bush.	31·56 bush.	4 72	11 76
4	Summer-fallow				
5	Wheat	23·2 bush.	27·58 bush.	11 23	2 70
6	Oats	12·5 bush.	41·19 bush.	−5 09	3 38
7	Summer-fallow				
8	Peas and oats	1·82 ton	2·19 tons	−6 40	−0 97
9	Winter rye	4·3 bush.	.....	−8 68	−4 84
	Field average	.....	.....	−1 88	1 10

Rotation "T"—10 Years' Duration

1	Summer-fallow				
2	Winter wheat	35·9 bush.	45·69 bush.	27 90	6 54
3	Oats	13·2 bush.	57·40 bush.	−3 69	6 26
4	Alfalfa seeding	.....	.....	−41 33	−13 61
5	Alfalfa seed	.....	0·78 bush.	−8 24	7 92
6	Alfalfa seed	.....	0·83 bush.	−8 24	10 62
7	Alfalfa seed	.....	0·58 bush.	−8 24	6 09
8	Summer-fallow				
9	Corn or hoed crop	5·86 tons	.....	−14 88	−1 97
10	Spring wheat	19·2 bush.	26·27 bush.	15 92	10 22
	Field average	.....	.....	−4 08	3 20

* Rotation "C" was summer-fallow, wheat, oats until 1924. The average yield for 12 years was 35·6 bushels of oats.

ROTATIONS ON IRRIGATED LAND

The establishment of rotations on the irrigated farm is much more simple than on the dry farm, as almost any crop adapted to a temperate climate can be grown in southern Alberta if sufficient moisture is available. Alfalfa has been, and undoubtedly will continue to be, the basic crop on the irrigated farms except where specialized crops are grown that do not fit into a rotation with alfalfa.

The two irrigated rotations established are rotations with alfalfa; the problem under investigation being the sequence of crops following the alfalfa to take advantage of the nitrogen and organic matter left in the soil by alfalfa, to clear the land from alfalfa that may grow after having been ploughed, and the length of time that alfalfa may profitably be left before ploughing and following with another crop.

From results obtained it would seem that hardy strains of alfalfa, such as Grimm, will stand for a number of years with little deterioration. One field seeded in 1909 is still producing good crops. Alfalfa should not be broken up until the third year after seeding as it is the third year before a maximum crop is obtained. The number of years after the third year that the crop should be left is determined by the relative acreage of alfalfa and other crops that it is desired to raise. The rotation should be so planned that each field will be seeded back to alfalfa every four or five years, for example, if a ten-year rotation is desired, half the farm to be in alfalfa and the balance in annual crops, the alfalfa should be ploughed up after it has been down five years exclusive of the year it was seeded. The proper method then to follow would be to plough up one-fifth of the alfalfa each fall and seed a like acreage to alfalfa each spring. In each case the alfalfa that was the oldest would be ploughed and the field that had been raising other crops for the longest period would be seeded to alfalfa. The sequence of the annual crops raised should be planned so that the crops requiring the most fertile soil would be nearest the alfalfa.

Rotation " U " and Rotation " X " show good arrangements of annual crops in a rotation with alfalfa as a base where a large amount of hay is required for feed. Rotation " U " is a straight ten-year rotation with three-fifths of the farm in alfalfa and two-fifths in annual crops. Each field is in alfalfa for six years and annual crops for four years. The annual crops are arranged so that wheat follows alfalfa, a cultivated crop follows wheat, oats follow the cultivated crop, and barley follows the oats. Alfalfa is seeded with the barley, and for the next six years alfalfa hay is produced. Wheat is placed immediately following alfalfa as the land is sufficiently fertile to ensure a heavy crop of wheat, and any alfalfa that may come up in the wheat does not interfere seriously with the crop, then the land is clear of other grain or weeds so the wheat is not contaminated. The hoed crop follows the wheat as it is easier to cultivate this crop after the alfalfa is killed and the roots rotted than immediately following alfalfa. Where sugar beets are used as the hoed crop this arrangement is not a good one as beets do not produce well following wheat. For this crop such a rotation would have to be modified. The oats following the hoed crop are uniformly heavy and the hoed crop has cleaned up the land so that seed oats may be raised on this field if desired. The barley following the oats makes a good nurse crop for alfalfa and furnishes a feed grain crop of barley with a sprinkling of volunteer oats.

Too much stress cannot be laid on the necessity of the irrigation farmer rotating his crops. The practice of planting part of the field to alfalfa and another part to grain and other crops year after year without interchanging the crops can only result in low yields of the annual crops and of that part of the field becoming foul with weeds, while if each field is planted to alfalfa occasionally and alfalfa broken for the other crops, good yields can be obtained and the field kept clean. Consistent rotation with alfalfa ensures heavy yields and a clean farm.

The data given in the following table show that yields have been good year after year and that it is possible by properly rotating crops to keep up production. The two rotations cannot be compared, as the location and topography of "X" is not as satisfactory for irrigation as is " U ". For a fuller description of these rotations see the report of this Station for 1923.

SUMMARY OF YIELDS AND PROFITS PER ACRE ON IRRIGATED ROTATIONS

Field "V"—Alfalfa continuously

Rotation year	Crop	Yields		Profit	
		1924	Average for 13 years	1924	Average for 13 years
		tons	tons	$ cts.	$ cts.
	Alfalfa	1·94	4·02	7 19	35 80
	Rotation "U"—10 Years' Duration				
1	Alfalfa	2·19	1·88	6 97	6 95
2	Alfalfa	2·39	3·68	8 29	27 86
3	Alfalfa	2·29	4·12	7 56	32 89
4	Alfalfa	2·72	4·23	11 83	34 10
5	Alfalfa	4·80	4·51	32 36	36 84
6	Alfalfa	2·78	4·70	13 27	39 53
7	Wheat	32·0 bush.	46·9 bush.	19 38	27 79
8	Potatoes or beets	10·24 tons (beets)	12·14 tons (beets)	12 05	148 91
9	Oats	124·7 bush.	190·6 bush.	36 36	17 41
10	Barley and alfalfa seeding	37·1 bush.	149·8 bush.	7 76	10 48
	Field average			15 58	38 26
	Rotation "X"—15 Years' Duration				
			Average for 10 years		Average for 10 years
1–5	Alfalfa	17·3 bush. *(barley)	3·87 tons	−6 25	8 61
6–10	Alfalfa	3·54 tons	4·22 tons	22 72	26 97
11	Barley	27·3 bush.	38·0 bush.	−1 80	3 47
12	Corn	7·33 tons	6·40 tons	−15 21	0 26
13	Wheat	17·0 bush.	28·3 bush.	0 62	13 95
14	Oats	36·3 bush.	58·3 bush.	−3 82	4 46
15	Peas	15·9 bush.	18·0 bush.	10 01	8 94
	Field average			4 81	13 93

*Alfalfa seeded with barley.

IRRIGATION EXPERIMENTS

The work in irrigation is under the charge of Mr. A. E. Palmer, Assistant Superintendent, who has prepared most of the report dealing with this subject.

A new set of irrigation experiments was started in 1922 for the purpose of studying the proper use of irrigation water for various crops. The first year wheat and potatoes were under test, the next sunflowers, alfalfa and a mixture of permanent pasture grasses were added, and this year brome grass was included. Timothy plots were also prepared, but it will be another year before the stand of timothy on the various plots will be uniform enough to furnish reliable data.

The purpose of this investigation and the methods used in carrying on the experiment are treated in detail on pages 22 to 26 inclusive of the Annual Report of this Station for 1923.

CULTURAL NOTES

WHEAT.—Two sets of wheat plots were under test. One set was located on land that was in wheat the preceding year, sunflowers two years previous, and alfalfa for five years preceding the sunflowers. The other set was in potatoes the previous year, sunflowers two years previous, and clover for the two preceding years.

Both sets of plots were ploughed 7 inches deep in the spring, harrowed soon after ploughing, and seeded with a press drill April 30. Marquis was the variety of wheat used, and 90 pounds of seed were sown per acre. A good stand was obtained on all plots.

ALFALFA.—The alfalfa was seeded in 1922 and a uniform stand was obtained on all the plots. Two crops were taken from all but four of the plots. These four were cut three times. Where only two crops were obtained, the alfalfa was almost in full bloom when cut on July 11 and September 9. Where three crops were taken, the dates of cutting were June 28, August 13, and October 8. The plants were about one-tenth in bloom when cut the first and second times, and the third crop was just starting to bloom when nipped by frost on October 7.

PASTURE GRASS.—The pasture grass mixture of Kentucky Blue grass, meadow fescue, western rye grass, and alfalfa was seeded in 1922, and a good mixture of the grasses was growing this year. One thousandth of an acre was cut on each plot, and weighed green on May 31, June 28, July 29, and September 12. Immediately after cutting, sheep were turned on the plots and allowed to pasture them off in about three days.

BROME.—The brome was a uniform stand, and was cut once on July 11.

SUNFLOWERS.—The same set of plots was used for sunflowers this year as the previous year. The only preparation given the sunflower stubble before planting was a cultivation with a duck-foot cultivator. Russian Giant seed was planted May 14, at the rate of 22 pounds per acre, in rows 3 feet apart. When the plants were 5 inches high they were thinned to 6 inches apart in the rows. The heavy seeding and subsequent thinning gave a uniform stand on all plots. Two cultivations and hoeings were given before the plants were large enough to shade the ground. The crop was harvested September 11 when the seeds were in the glazed stage.

POTATOES.—The potato field was in wheat last year, and corn on alfalfa sod the year before. The ground was ploughed in early May 7 inches deep. Irish Cobbler was the variety used, and 1,200 pounds of seed per acre were planted in rows 3 feet apart on May 23. The crop was dug October 3 to 8; the potatoes on all plots appearing to be well matured.

The following tables give some of the data obtained and are of interest to those making a study of the use of water for farm crops.

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

Wheat following wheat

	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	Yield per acre
	1st irrigation		2nd irrigation		3rd irrigation		4th irrigation								
	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					
									ft.	ft.	ft.	ft.	ft.	ft.	bush.
0	No irrigation										0·79	1·51	0·67	0·84	4·0
1	Fall	Oct. 15							0·50	0·50	1·16	2·38	0·82	1·56	27·5
1	Two Leaf	May 22							0·50	0·50	1·00	2·22	0·75	1·47	26·8
1	Five Leaf	June 10							0·50	0·50	0·94	2·16	0·97	1·19	28·2
1	Five Leaf	June 10	(Harrowed	after irrigating)					0·50	0·50	1·03	2·25	0·86	1·39	28·4
1	Shot blade	June 20							0·50	0·50	0·87	2·09	0·78	1·31	31·3
1	Boot	July 4							0·50	0·50	0·84	2·06	0·84	1·22	33·1
1	Flowering	July 18							0·50	0·50	0·91	2·13	0·85	1·28	21·2
2	Fall	Oct. 15	Shot blade	June 20					0·50	1·00	1·43	3·15	0·96	2·19	27·3
2	Fall	Oct. 15	Flowering	July 18					0·50	1·00	1·32	3·04	1·05	1·99	35·3
2	Five leaf	June 10	Flowering	July 18					0·33	0·66	0·97	2·35	0·98	1·37	29·8
2	Five leaf	June 10	Flowering	July 18					0·50	1·00	1·17	2·89	1·12	1·77	33·4
2	Five leaf	June 10	Flowering	July 18					0·66	1·32	1·17	3·21	1·08	2·13	29·1
2	Shot blade	June 20	Flowering	July 18					0·50	1·00	1·17	2·89	0·99	1·90	27·1
3	Fall	Oct. 15	Shot blade	June 20	Flowering	July 18			0·50	1·50	1·38	3·60	1·07	2·53	36·7
3	Five leaf	June 10	Shot blade	June 20	Flowering				0·50	1·50	1·31	3·53	1·21	2·32	33·8
4	Fall	Oct. 15	Five leaf	June 10	Shot blade	June 20	Flowering	July 18	0·50	2·00	1·24	3·96	1·32	2·64	31·5
4	Five leaf	June 10	Shot blade	June 20	Flowering	July 18	Soft dough	Aug. 14	0·50	2·00	1·22	3·94	1·34	2·60	33·3
	Wheat after Potatoes														
0	No irrigation										1·55	2·31	1·33	0·98	39·2
1	Fall	Oct. 14							0·50	0·50	1·50	2·76	1·29	1·47	45·9
1	Two leaf	May 21							0·50	0·50	1·63	2·89	1·40	1·49	42·6
1	Five leaf	June 11							0·50	0·50	1·34	2·60	1·26	1·34	39·4
1	Five leaf	June 11	(Harrowed	after irrigation)					0·50	0·50	1·28	2·54	1·18	1·36	35·4
1	Shot blade	June 23							0·50	0·50	1·29	2·55	1·19	1·36	40·1
1	Boot	July 4	(Crop needs	water)					0·50	0·50	1·43	2·69	1·28	1·41	44·4
1	Flowering	July 16							0·50	0·50	1·47	2·73	1·36	1·37	41·4
2	Fall	Oct. 14	Shot blade	June 23					0·50	1·00	1·57	3·33	1·29	2·04	45·0
2	Fall	Oct. 14	Flowering	July 16					0·50	1·00	1·61	3·37	1·52	1·85	48·4
2	Five leaf	June 11	Flowering	July 16					0·33	0·66	1·37	2·79	1·42	1·37	41·2
2	Five leaf	June 11	Flowering	July 16					0·50	1·00	1·49	3·25	1·44	1·81	43·7
2	Five leaf	June 11	Flowering	July 16					0·66	1·32	1·30	3·38	1·61	1·67	45·3
2	Shot blade	June 23	Flowering	July 16					0·50	1·00	1·30	3·06	1·40	1·66	39·6
3	Fall	Oct. 14	Shot blade	June 23	Flowering	July 16			0·50	1·50	1·55	3·81	1·48	2·33	48·4
3	Five leaf	June 11	Shot blade	June 23	Flowering	July 16			0·50	1·50	1·36	3·62	1·50	2·12	36·9
4	Fall	Oct. 14	Five leaf	June 11	Shot blade	June 23	Flowering	July 16	0·50	2·00	1·42	4·18	1·38	2·80	44·1
4	Five leaf	June 11	Shot blade	June 23	Flowering	July 16	Soft dough	Aug. 12	0·50	2·00	1·32	4·08	1·54	2·49	39·0

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

Alfalfa

	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 crop evaporated and percolated	Yield per acre hay
	1st irrigation		2nd irrigation		3rd irrigation		4th irrigation		5th 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	Per irrigation	Total for season					
											ft.	ft.	ft.	ft.	ft.	ft.	tons
0	No irrigation												0·71	1·50	0·65	0·85	1·96
1	Fall										0·50	0·50	0·96	2·25	0·63	1·62	2·44
1	E. spring	May 10									0·50	0·50	0·69	1·98	0·66	1·32	2·69
1	12 in. high	" 26									0·50	0·50	0·68	1·97	0·64	1·33	3·00
1	Before 1sr cut	June 24									0·50	0·50	0·81	2·10	0·77	1·33	2·04
1	After 1st cut	July 23									0·50	0·50	0·78	2·07	0·77	1·30	2·73
2	Fall		12 in. high	May 26							0·50	1·00	1·06	2·85	0·67	2·18	2·58
2	Fall		Before 1st cut	June 24							0·50	1·00	1·11	2·90	0·61	2·29	2·78
2	Fall		After 1st cut	July 23							0·50	1·00	1·05	2·84	0·68	2·16	2·69
2	S. spring	May 10	12 in. high	May 26							0·50	1·00	0·77	2·56	0·69	1·87	2·87
2	E. spring	" 10	Before 1st cut	June 24							0·50	1·00	0·77	2·56	0·71	1·85	2·43
2	E. spring	" 10	After 1st cut	July 23							0·33	0·66	0·72	2·16	0·70	1·46	3·49
2	E. spring	" 10	After 1st cut	" 23							0·50	1·00	0·79	2·58	0·89	1·69	3·52
2	E. spring	" 10	After 1st cut	" 23							0·66	1·32	0·81	2·92	0·87	2·05	3·45
3	Fall		12 in. high	May 26	After 1st cut	July 23					0·50	1·50	0·95	3·24	0·79	2·45	3·12
3	Fall		After 1st cut	June 30	After 2nd cut	Aug. 21	3 cuttings taken				0·50	1·50	1·09	3·38	.....	.....	4·17
3	E. spring	May 10	12 in. high	May 26	After 1st cut	July 23					0·50	1·50	0·81	3·10	0·84	2·26	3·59
3	E. spring	" 10	After 1st cut	June 30	After 2nd cut	Aug. 21	3 cuttings taken				0·50	1·50	0·83	3·12	.....	.....	3·91
4	E. spring	" 10	12 in. high	May 26	After 1st cut	July 23	2nd, 12 in. high	July 29			0·50	2·00	0·81	3·60	0·94	2·66	3·15
5	Fall		E. spring	" 10	12 in. high	May 26	After 1st cut	" 23	2nd, 12 in. high	July 29	0·50	2·50	1·08	4·37	0·92	3·45	3·05
3	4 in. high	May 12	18 in. high	June 9	36 in. high	July 7					0·50	1·50	1·30	3·29	1·38	1·91	3·40
3	4 in. high	" 12	15 in. high	" 2	36 in. high	June 23					0·50	1·50	1·22	3·21	1·16	2·04	3·18
3	4 in. high	" 12	10 in. high	May 27	18 in. high	" 9	30 in. high	June 23	36 in. high	July 7	0·50	2·50	1·28	4·27	1·44	2·83	3·63
5	3 in. high	May 12	Subsequent irrigations—Every four weeks								0·05	2·50	1·15	4·55	1·245	3·31	10·75
7	3 in. high	" 12	Subsequent irrigations—Every three weeks								0·50	3·50	1·15	5·55	1·380	4·170	12·45
10	3 in. high	" 12	Subsequent irrigations—Every two weeks								0·50	5·00	1·20	7·10	1·345	5·755	12·15

Irrigation, Soil Moisture and Crop Yield Data from Plots Irrigated at Different Stages of Plant Growth

Potatoes

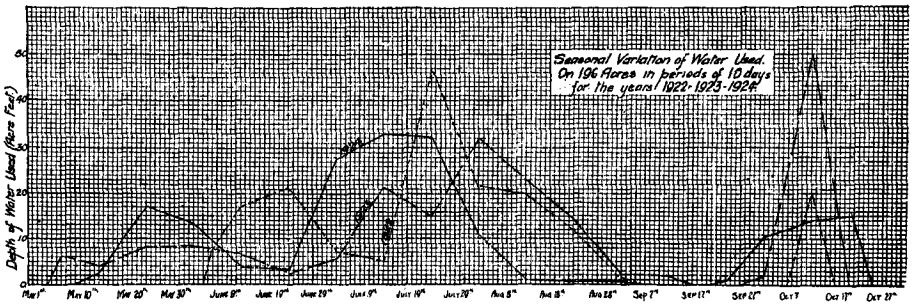
Number of irrigations	Time of irrigation: 1st irrigation — Stage of plant growth	1st irrigation — Date	2nd irrigation — Stage of plant growth	2nd irrigation — Date	3rd irrigation — Stage of plant growth	3rd irrigation — Date	4th irrigation — Stage of plant growth	4th irrigation — Date	5th irrigation — Stage of plant growth	5th irrigation — Date	6th irrigation — Stage of plant growth	6th irrigation — Date	Depth of water applied — Per irrigation	Depth of water applied — Total for season	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	Yield per acre
													ft.	ft.	ft.	ft.	ft.	ft.	tons
0	No irrigation														1·52	2·39	1·45	0·94	10·24
1	Fall												0·33	0·33	1·77	2·97	1·64	1·33	13·10
1	Half grown	July 5											0·33	0·33	1·38	2·58	1·45	1·13	6·54
1	Full bloom	" 31											0·33	0·33	1·66	2·86	1·67	1·19	10·09
1	10 d. after f. b.	Aug. 12											0·33	0·33	1·55	2·75	1·45	1·30	11·91
2	Fall		Early bloom	July 21									0·33	0·66	1·60	3·14	1·61	1·53	12·03
2	Fall		Full bloom	July 31									0·33	0·66	1·54	3·08	1·59	1·49	11·56
2	Half grown	July 5	"	" 31									0·25	0·50	1·56	2·93	1·69	1·24	8·67
2	Early bloom	" 21	"	" 31									0·25	0·50	1·61	2·94	1·69	1·25	10·35
2	Full bloom	" 31	10 d. after (1)	Aug. 12									0·25	0·50	1·66	3·03	1·67	1·36	12·23
3	Early bloom	" 21	Full bloom	July 31	10 d. after (2)	Aug. 12							0·25	0·75	1·46	3·08	1·74	1·34	11·69
3	Fall bloom	" 31	10 d. after f. b.	Aug. 12	" "	Aug. 22							0·25	0·75	1·69	3·31	1·85	1·46	11·33
3	Early bloom	" 31	30 d. after (1)	" 22	" "	Sept. 3							0·25	0·75	1·62	3·24	1·78	1·46	13·21
4	Early bloom	" 31	Full bloom	July 31	" "	Aug. 12	10 d. after (3)	Aug. 22					0·16	0·66	1·54	3·07	1·70	1·37	9·10
4	Early bloom	" 31	"	" 31	" "	" 12	" "	" 22					0·25	1·00	1·65	3·52	1·72	1·80	8·82
4	Early bloom	" 31	"	" 31	" "	" 12	" "	" 22					0·33	1·33	1·62	3·82	1·83	1·99	10·48
5	Early bloom	" 31	"	" 31	" "	" 12	" "	" 22	10 d. after (4)	Sept. 3			0·25	1·25	1·50	3·61	1·61	2·00	10·90
6	Early bloom	" 31	"	" 31	" "	" 12	" "	" 22	" "	" 3	10 d. after (5)	Sept. 13	0·25	1·50	1·53	3·90	1·68	2·22	10·06

Sunflowers

0	No irrigation														1·10	1·92	1·08	0·84	9·87
1	Fall	Oct. 10											0·25	0·25	1·18	2·25	1·17	1·08	11·67
1	6 in. high	July 4											0·25	0·25	1·02	2·10	1·10	1·00	13·60
1	8 in. high	" 11											0·25	0·25	0·85	1·92	0·96	0·96	9·85
1	18 in. high	" 18											0·25	0·25	0·90	1·97	0·99	0·98	9·87
1	18 in. high	" 18											0·25	0·25	0·88	1·94	0·93	1·01	8·87
2	Fall	Oct. 10	18 in. high	July 18									0·25	0·50	1·15	2·47	1·13	1·34	14·10
2	6 in. high	July 4	24 in. high	" 24									0·25	0·50	0·89	2·21	1·00	1·21	11·62
2	27 in. high	Aug. 1	51 in. high	Aug. 21									0·25	0·50	0·82	2·14	1·06	1·08	9·00
2	6 in. high	July 4	24 in. high	July 24									0·25	0·50	0·94	2·26	1·10	1·16	11·92
2	6 in. high	" 4	33 in. high	Aug. 1									0·25	0·50	1·04	2·36	1·11	1·25	11·75
2	18 in. high	" 18	39 in. high	" 7									0·25	0·50	0·83	2·15	0·97	1·18	9·87
3	6 in. high	" 4	21 in. high	July 24	57 in. high	Aug. 14							0·42	1·26	1·17	3·25	1·27	1·98	15·72
3	6 in. high	" 4	24 in. high	" 24	57 in. high	" 14							0·33	1·00	1·10	2·91	1·20	1·71	13·17
3	6 in. high	" 4	24 in. high	" 24	54 in. high	" 14							0·162	0·50	1·06	2·38	1·10	1·28	13·07
3	6 in. high	" 4	24 in. high	" 24	51 in. high	" 14							0·25	0·50	0·91	2·23	0·92	1·31	11·80
4	6 in. high	" 4	18 in. high	" 18	33 in. high	" 1	51 in. high	Aug. 14					0·25	1·00	0·89	2·71	0·98	1·73	10·67
8	6 in. high	" 4	10 in. high	" 11	18 in. high	July 18	24 in. high	July 24	33 in. high	Aug. 1	48 in. high	Aug. 14	0·25	2·00	0·92	3·74	1·04	2·70	8·75

SEASONAL USE OF WATER ON THE STATION FARM

The accompanying chart gives graphically the seasonal variations of water used on the Station farm in periods of ten days for three seasons, 1922, 1923 and 1924. An analysis of the chart shows that there is a close conformity in the use of water at the same seasons of the year in different years. The demand is light until about the 1st of July, most of the water used in the spring being for hay and pasture crops. The heaviest use begins about July 1, reaches its peak between July 15 and 30, and drops off rapidly during the first half of August. In this summer period almost all crops are irrigated. The grain requires most of its water at this stage, the second crop of alfalfa is irrigated, pastures must have frequent irrigation and about the first of August cultivated crops reach a stage of maximum water requirement.



THREE YEARS' USE OF WATER ON 196 ACRES IN PERIODS OF 10 DAYS

(In acre-feet)

Period	May 1 to May 9	May 10 to May 19	May 20 to May 29	May 30 to June 8	June 9 to June 18	June 19 to June 28	June 29 to July 8	July 9 to July 18	July 19 to July 28	July 29 to Aug. 7	Aug. 8 to Aug. 17
1911	.....	.....	.....	7·28	17·68	21·41	6·91	4·99	46·81	21·94	19·99
1923	6·02	3·97	7·82	8·58	6·29	2·08	5·21	21·52	15·08	30·23	23·46
1924	.....	3·64	17·50	13·54	3·72	2·60	27·41	33·04	22·41	11·65	1·36

Period	Aug. 18 to Aug. 27	Aug. 28 to Sept. 6	Sept. 7 to Sept. 16	Sept. 17 to Sept. 26	Sept. 27 to Oct. 6	Oct. 7 to Oct. 16	Oct. 17 to Oct. 2.	Total
1911	11·96	1·30	.....	.....	.....	19·25	.....	179·52
1923	14·40	1·91	1·81	.....	2·00	50·34	13·03	213·75
1924	0·39	0·26	.....	1·22	10·40	14·07	15·36	173·57

An interesting feature shown by the chart is that almost no water is used from the 20th of August to the 1st of October. By careful planning of the farm operations such as stacking early cut grain it would be possible to start fall irrigation earlier, and thus lengthen out the fall irrigating season. There appears to be a period, however, of about a month, from August 20 to September 20, not only at the Station but on all farms in the irrigated area of Alberta, when little use can be made of the water. If it were possible for the project operators to turn the water out of the canals at this time, use the month for repairing the

system and then turn the water in again about September 20 and leave it until November 1 for fall irrigation, much better use would be made of the water. Experiments conducted at the Station and the experience of farmers have proved beyond question the merits of fall irrigation so that anything that can be done to lengthen out the time that water can be used in the fall will greatly increase the crop-producing power of the irrigation system.

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

HORTICULTURE

Two phases of the horticultural work are carried on at the Station, that dealing with the 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 from a horticultural standpoint opened favourably. Trees and shrubs of all kinds came through the winter of 1923-24 in excellent condition. No winter-killing worth noting was observed. There was enough moisture in the soil to germinate seeds, so that both the dry-land and the irrigated gardens started well. July, however, was very dry, and August was cool, which resulted in slow development of certain crops such as corn, tomatoes, and melons. These crops, therefore, made a poorer showing in the fall than is usually the case. Due to the favourable winter considerable fruit was set in apple and plum trees and on the small fruits. The last frost in the spring was on May 26 when 31.5 degrees were registered. The first frost was on September 20 when 28.5 degrees were recorded, and the first killing frost occurred on September 26 when 26 degrees were registered.

DRY-LAND GARDEN

VEGETABLE GARDEN

As has been mentioned in previous reports, the vegetables are planted each year on summer-fallowed land; the garden is sheltered by single rows of cottonwood trees placed 200 feet apart. The barnyard manure applied is turned under when the land is being ploughed for summer-fallow; the application of manure, therefore, is made the year previous to the planting of the seeds. This plan of planting the dry-land garden on summer-fallow is well worth the consideration of the dry-land farmer. Particularly is this plan advantageous if the windbreaks are so arranged as to act as snow traps. The conserved moisture in the soil resulting from the previous season's fallow, supplemented by any snow that may be caught during the winter, will go a long way in ensuring a profitable garden, even in quite a dry season. The vegetables, even such small-growing sorts as lettuce and radishes, are planted in rows three feet apart to allow the horse cultivator ample room to operate between the rows. Such a practice reduces the hand labour very materially, and also ensures the plants greater space in which their roots may forage for moisture.

One or more varieties were grown of each of the common garden vegetables. The results obtained were, on the whole, not as satisfactory as usual. The very dry spell during July retarded growth in quite a marked manner.

In comparing the results of the dry-land garden with the irrigated garden, it is worth mentioning that the vegetables in the former are as a rule ready for use a few days earlier. This advantage, especially in such a season as the one just past, is more than offset by the more bountiful yield of all vegetables in the irrigated garden. There was nothing outstanding in the results of the season's work to deserve special comment. The yields of all crops, although much lighter than during the previous summer, were still quite satisfactory and the garden, as a whole, would have produced in variety and quantity ample to supply the needs of a dry-land farmer's family in a very satisfactory manner.

POTATOES—TEST OF VARIETIES

Fifteen varieties were grown; these were planted on summer-fallowed land on May 21, and were dug October 4. The following table gives the yields, and also the average yields for the past twelve years for the varieties that have been grown for that length of time.

POTATOES (DRY-LAND)

Variety	Yield of marketable potatoes	Yield of unmarketable potatoes	Total yield	Per centage small	Average yield of marketable potatoes for 12 years
	bush.	bush.	bush.		bush.
Table Talk	216	35	251	13·9	251·4
Factor	265	46	311	14·8	213·0
Gold Coin	140	28	168	16·7	212·9
Morgan Seedling	203	36	239	15·0	204·2
Empire State	223	48	271	17·7	203·9
Irish Cobbler	170	30	200	15·0	202·6
Reeves Rose	255	45	300	15·0	190·5
Dalmeny Beauty	210	41	251	16·4	182·4
Wee Macgregor	191	36	227	15·8	181·9
Early Ohio	191	31	222	13·9	*
Sutton Abundance	185	38	223	17·1	*
Gold Nugget	181	38	219	17·3	*
Netted Gem	168	30	198	15·2	*
Eight Weeks	165	30	195	15·4	*
Royal Russet	116	23	139	16·4	*

* Grown only one to four years.

It will be noted that Table Talk heads the list as to average yield for the past twelve years. Although this variety appears to be a consistently heavy yielder, it lacks quality when grown in this district. Among the early varieties the Irish Cobbler should be mentioned. It is reliable as to yield and is good in quality, its chief fault is its irregular shape and a tendency to have eyes somewhat deeper than is desired.

SMALL FRUITS

The yield of fruit from three varieties of black currants under test and from Houghton gooseberry averaged 50 per cent more than in 1923. The three varieties of red currants averaged over 50 per cent less, and the three varieties of white currants yielded about the same as last year.

The results of several years' tests with currants on dry land indicate that fruit may be expected every year provided the plantation is given some protection from the prevailing winds by some form of shelter, and the bushes are placed far enough apart to allow clean cultivation of the land between them.

IRRIGATED LAND

VEGETABLE GARDEN

The irrigated garden was ploughed and a fine surfaced seed-bed was obtained by harrowing during a mild spell in March. This early harrowing while the surface lumps are still moist is a great aid in obtaining a fine seed-bed, for if the lumps are allowed to dry out they soon become hard and difficult to handle.

The usual variety tests of a number of different varieties of each kind of vegetable were carried out, also cultural experiments with a certain number of sorts.

It is suggested that the reader interested in the detailed results might profitably refer to the 1922 report, where the results for that season are dealt with at some length, and in which there is a table listing the varieties which our experiments have indicated are most suitable for our local conditions. The dates recommended for planting and quantity of seed required are also given, and in addition the dates are given when the various kinds can be expected to be ready for use.

POTATOES—TEST OF VARITIES

Eighteen varieties were under test. These were planted May 20, and were dug October 2. The following table gives the yields, and also the average yields for the past twelve years for the varieties that have been grown that length of time.

POTATOES (IRRIGATED)

Variety	Yield of marketable potatoes	Yield of unmarketable potatoes	Total yield	Per centage small	Average yield of marketable potatoes for 12 years
	bush.	bush.	bush.		bush.
Dalmeny Beauty	416	43	459	9·4	481·5
Empire State	403	53	456	11·6	473·3
Table Talk	350	46	396	11·6	473·0
Irish Cobbler	346	48	394	12·2	470·2
Gold Coin	405	46	451	10·2	465·3
Factor	341	40	381	8·2	465·2
Wee MacGregor	400	55	455	12·1	456·8
Morgan Seedling	403	48	451	10·6	454·4
Reeves Rose	388	53	441	12·0	454·1
Royal Russet	423	48	471	10·2	*
Netted Gem Invermere	400	51	451	11·3	*
Cambridge Russet Invermere	395	48	443	10·8	*
Eight Weeks	392	51	443	11·5	*
Sutton Abundance	391	41	432	9·5	*
Royal Russet Invermere	390	43	433	9·8	*
Gold Nugget	331	30	361	8·3	*
Early Ohio	328	35	363	9·6	*
Netted Gem	263	28	291	9·6	*

* Grown only one to four years.

SMALL FRUITS

The results from the small fruits for the season although on the whole reasonably satisfactory were not as good as has often been the case.

STRAWBERRIES.—The Senator Dunlap still remains at the top of the list so far as yield and apparent suitability is concerned. It is a vigorous grower, prolific in runners and so produces many plants. This latter characteristic sometimes becomes an inconvenience although, considering local conditions, it

cannot in justice be called a serious fault. Much interest is taken by townspeople as well as farmers in the everbearing varieties. For the kitchen garden these possess attractive characteristics, but our experience has been that the total yield of fruit for the season is materially less than with the standard varieties that produce their fruit at one period only during the season. It would seem advisable for the commercial grower to use a standard variety such as the Senator Dunlap, and for the farmer or townsman growing only enough for his own use to use both kinds, the standard sort for his main supply and some everbearing for the novelty of occasionally having strawberries for his table out of season.

CURRANTS.—The current plantation, consisting of a number of varieties each of black, red and white currants, has now been set out for sixteen years, and is beginning to show lack of vigour. Winter injury was quite in evidence among some of the varieties of blacks, and to a lesser degree among some varieties of reds. There are three bushes of each variety set six feet apart each way. Among the red currants the red English gave the highest yield, producing 57 pints from the three bushes, which would be at the rate of 11,485 quarts per acre. Among the black currants the Merveille de la Gironde made the best showing, producing 13 pints, or yielding at the rate of 2,619 quarts per acre.

RASPBERRIES.—A satisfactory crop of fruit was produced. It should be remembered that raspberry canes will not come through the winter satisfactorily in this district unless they are laid over and completely covered with moist soil.

TREE FRUITS

APPLES.—Dr. Saunders' cross-bred crab apples as usual made a good showing so far as fruit production was concerned. The standard apple trees under test came through the winter in good condition, and a number of the larger specimens set fruit. Among these Patten Greening, Yellow Transparent, and Hibernal made the best showing.

PLUMS.—But little fruit was set on any of the plums, although the trees came through the winter with no apparent injury.

FLOWERS

The season proved particularly favourable for all kinds of flowers under test, both annual as well as perennials, although the somewhat cool weather during August was not conducive to early blooming of the former. Perhaps the tulips deserve special mention. There are large numbers of these, practically all of them having been propagated on the Station. They made a wonderful showing while in bloom.

TREES AND SHRUBS

The flowering shrubs bloomed more fully than usual, due no doubt to the favourable conditions prevailing during the winter. Trees, both ornamental and those in the shelter-belts, came through the winter very satisfactorily.

CEREALS

CEREAL CROPS ON DRY LAND

The season of 1924 proved an exceptionally dry one for the growth of cereal crops. All varieties under test commenced to suffer from drought about July 1, and a continual decline in the vigour of the plants was apparent from then almost until the time of ripening. A rather severe hailstorm occurred August

1, and the damage done to the different varieties depended mostly upon their stage of maturity at that time. The oats and barley being nearest ripe suffered most injury.

The land on which the variety testing was carried out was summer-fallowed the previous year. In almost all cases the varieties were sown in duplicate and on one-sixtieth-acre plots.

WHEAT

Fifteen varieties of wheat were seeded May 1 at the rate of one and a quarter bushels per acre. Early Triumph and Supreme, two selections of Red Bobs, and Red Bobs itself were our highest yielders this year.

Over a period of the past ten years Marquis Ottawa 15, and Red Fife are the leading varieties in the order mentioned.

OATS

There were eight varieties of oats tested. These were seeded May 1 at the rate of two bushels per acre, with the exception of Laurel, Ottawa 477, a hulless variety, when the rate of seeding was one and a quarter bushels per acre. Gold Rain, Banner Ottawa 49, and Danish Island have the highest record for the past nine years. It will be observed that these are the highest-yielding varieties on irrigated land also, but the order is reversed.

The yield from one of the Victory plots became damaged just previous to threshing. The yield of the other, when compared with the average yield of two plots of each other variety, puts it in the lead for this year.

BARLEY

Sixteen varieties of barley were tested. These were also seeded May 1, and the rate of seeding was one and a half bushels per acre. A few of these varieties were cut before the hailstorm on August 1, and thus escaped any damage, while several had just reached the ripening stage and were injured considerably.

The past eight years' average shows the seven highest varieties standing as follows:—Bark's Excelsior, Swedish Chevalier, Gold, O.A.C. 21, Invincible, Early Chevalier, Odessa. Bark's Excelsior although our highest average yieder on dry land has a much greater lead on irrigated land over all other varieties.

Mariout holds a much higher place among the varieties this year than it has been accustomed to hold in the past. Feeder, a hooded variety, and one which was tried here this year for the first time, proved a fair yielder, but was found to shatter badly. Swedish Chevalier also yielded favourably, but its susceptibility to smut has always been an objectionable characteristic.

PEAS

Seven varieties of peas were grown for test purposes. These were sown on one-sixtieth-acre plots. The date of seeding was May 2, and the rate two and a half bushels per acre, except in the case of Golden Vine, a much smaller variety than the others, which was seeded at two bushels per acre. One hundred per cent stand was obtained in all cases excepting the original plot of English Grey.

A ten-year test has been completed on seven varieties of peas, which shows their standing to be as follows:—Prussian Blue; English Grey; MacKay, Ottawa 25; Chancellor, Ottawa 26; Solo; Golden Vine; Arthur, Ottawa 18.

The MacKay variety ranked much higher this year than it had done in previous years, while Solo made a poorer showing than usual. Cartier was tested for the first time and it did not compare very favourably with the other varieties tested.

FLAX

Four varieties of flax were grown for comparative purposes. They were seeded May 9 at the rate of one-half bushel per acre and one hundred per cent stand was obtained on all plots.

The yields were small in all cases, and there was little difference in the yield of the three lowest varieties.

Novelty, Long Stem and Common, over an eight-year period have given best results, although the difference in yield between any two of these is very small.

ROD-ROW WORK

The rod-row system of testing cereals was adopted this year for the first time. This system is now becoming popular throughout Canada and the United States at all Experimental Stations where variety testing is being carried on. The chief value of it is that in growing a number of varieties in rod rows replicated sufficiently often, one is able to determine the different characteristics and relative merits of each variety and decide which ones are worthy of being given more time and space in further testing in larger plots. It is also true that results obtained from small plots replicated three, four or more times are as accurate as those obtained from larger plots, such as 1/60-acre plots in duplicate.

This year 26 varieties of wheat, 16 of oats, and 14 of barley were tested in rod-row plots on both dry and irrigated land. These plots consisted of three rows, one rod in length with seven inches between them. No space was left between plots, the whole being sown in a solid block. On the dry land each variety was replicated once and on the irrigated three times. The outer two rows were seeded with a Planet Junior and were discarded at harvest time, the only purpose in growing them being to provide absolute field conditions for the centre rows. Special care was given to the seeding of the centre rows as all observations and comparative yields were taken entirely from them. These were seeded by hand, and the seeds were placed approximately one inch apart.

This system has proved very satisfactory this year in giving us comparatively definite results on only a small area of ground, and it will no doubt be our chief means of testing new varieties in the future. Comparative yields of varieties tested by this method will probably be given after another year's trial.

CEREAL CROPS ON IRRIGATED LAND

As in past years all variety testing of cereals under irrigation was conducted on land that had been in a hoed crop the previous year, either corn, sunflowers or roots. Over a seventeen-year period, 1908 to 1924 inclusive, in the case of wheat and oats, and a sixteen-year period in the case of barley and peas, irrigating has increased the yields of wheat 117 per cent, oats 91 per cent, barley 108 per cent and peas 71 per cent. While the yields this year from these crops on irrigated land compare favourably with the yields obtained in former years, the percentage increase due to irrigation has been considerably lower on account of the summer-fallowed land having a larger storage of moisture than is ordinarily found, as a result of the wet season in 1923.

As on dry land, all varieties, with the exception of a few which were tested for the first time, were sown in duplicate.

The hailstorm of August 1 struck the plots of the duplicate range doing them considerable damage, but those of the original range escaped with only slight losses.

The original range of plots received only one irrigation on July 2, while the duplicate range received two, on July 3 and July 24.

WHEAT

Sixteen varieties of wheat were tested under irrigation. These were seeded April 26, at the rate of one and a half bushels per acre. Of the varieties tested during the last ten years, Marquis Ottawa 15 and Red Fife Ottawa 17, in the order mentioned, have proved the highest yielders.

Red Bobs is the leading variety this year on irrigated land as well as dry land, and was the third highest-yielding variety over a period of the five previous years. A decided weakness in the straw was noticeable in the Kota and Durum wheats although these varieties compared favourably with the others from the standpoint of yield. Kota and Kubanka were the only varieties in which any smut was found. The ability to withstand rust is no doubt the most outstanding quality of Kota, but as rust is never very prevalent in southern Alberta, there seems to be little reason for advocating the growth of it in preference to varieties which are superior in other respects.

OATS

The same eight varieties of oats tested on dry land were compared under irrigation. These were seeded April 30 and the rate was two and a half bushels per acre.

Over a period of the past nine years Danish Island, Banner Ottawa 49 and Gold Rain, in the order mentioned, have been the leading varieties.

Danish Island, though proving our highest yielder during this period, was outyielded this year by Leader. Alaska and Laurel, two varieties tested for the first time, were very much lower in yield than our older varieties.

BARLEY

Sixteen varieties of barley were grown for comparative purposes. The date of sowing was April 30, and the rate two bushels per acre.

The following are the leading varieties over the past eight-year period in their order of merit: Bark's Excelsior, Invincible, Swedish Chevalier, Gold. O.A.C. 21, Early Chevalier Ottawa 51, Odessa.

Bark's Excelsior, which in the past has yielded decidedly more than other varieties under irrigation, was this year excelled by Junior and Trebi. Junior is a hulless variety and was tested this year for the first time, with very good results.

PEAS

The same varieties of peas tested on dry land were tested under irrigation. These were seeded May 5, at the rate of three bushels per acre. It was found that irrigating this year produced a much greater increase in yield in the case of peas than in any other class of cereals, the average increase of all varieties being about 200 per cent.

The standing of the pea varieties from the average results of the past ten years is: Golden Vine, Mackay Ottawa 25, Chancellor Ottawa 26, Prussian Blue, English Grey, Arthur Ottawa 18, Solo.

BEANS

Although the past year has been a very discouraging one for the raising of beans, this appears to be a crop well worthy of more consideration by farmers in southern Alberta. A large proportion of the beans consumed in Alberta, and also in the other western provinces, is imported from the United States and the Orient. There is every reason to believe that this import can be largely replaced by home-grown material and that an effort to secure this trade will prove profitable.

Probably one of the chief obstacles to the growing of this crop in Alberta is the lack of proper equipment for harvesting. This should not prove an insurmountable difficulty, and it has been solved to a very large extent in the United States. One essential for success with this crop, however, so far as the disposal of the same is concerned, is to keep in mind the fact that the present market demands a small white bean, and varieties such as Luther Burbank, Lady Washington, Imperial Pea Bean, Robust Pea Bean, or Michigan Early Wonder are most likely to meet the requirements.

The following varieties of beans were tested on both dry and irrigated land:—

Navy, Beauty, Large White, Meyer, Lady Washington, Great Northern, Imperial Pea Bean, Luther Burbank, Robust Pea Bean (Edmonton), Robust Pea Bean (Burpee Seed Co.), Kotenashi, Michigan Early Wonder, Yellow Six Weeks, Norwegian, Cranberry, Bayo, Quito, Australian Brown, Red Kidney.

These were seeded on May 16 with a corn planter in rows three feet apart and 72.6 feet long. There were two rows of each variety, which constituted a plot 1/100 acre in size. No distance was left between plots; the whole range was seeded in a solid block in order that the varieties would be grown under field conditions and could be compared in the fall from the standpoint of yield. Very little early growth was made on account of the cool spring, with the result that only two of the varieties, Yellow Six Weeks, and Norwegian were fully matured on September 15, when harvesting should be done in order to avoid frost. These two were harvested then and the others got frozen before they became fully mature. From each of the others sufficient mature pods were picked to supply next year's seed and in many cases considerably more, but not sufficient to make a profitable crop from them.

It is expected, however, that with planting our beans about five days earlier in the spring, and with a slightly more favourable growing season, practically all of these varieties will be found to mature seed satisfactorily in this district.

FORAGE CROPS

The work with cereals, as well as forage crops, is under the supervision of Mr. W. D. Hay, Assistant Superintendent, who has largely prepared the part of this report under these two headings.

ENSILAGE CROPS ON DRY LAND

All variety testing of corn and sunflowers was carried out upon summer-fallowed land.

VARIETY TESTS OF INDIAN CORN

On account of the cool weather throughout May and the early part of June, and the extreme dry weather in the latter part of June and throughout July, this year must be considered as being somewhat below the average for corn growing. Twenty-two varieties were tested, most of which were best adapted for ensilage purposes. These were seeded on May 12 on summer-fallowed land, at the rate of twelve pounds per acre, in rows three feet apart and 72.6 feet long, this making a plot 1/100 of an acre in size. These were harvested September 11 and as there was a wide variation in the stand of the different varieties, it was necessary to compute the yields from a small portion of each plot where 100 per cent stand could be found.

CORN (DRY LAND)—TEST OF VARIETIES

Variety	Source	Height of plant	Date of cutting	Maturity when cut	Yield per acre	Percentage dry matter	Yield per acre dry matter
		ft. in.			tons		tons
Compton's Early	J. O. Duke	6 0	Sept. 9	Milk	18·9	13·28	2·50
Disco N. W. Red Dent		4 10	" 9	Dough	14·6	16·02	2·34
N. W. Dent	Nebraska grown	5 3	" 9	Firm dough	13·7	16·80	2·30
White Cap Yellow Dent		6 1	" 9	Dough	13·2	17·19	2·27
N. W. Dent	N. Dakota grown	4 9	" 9	Dough	13·1	16·80	2·20
Burr Leaming	Carter	5 6	" 9	Tasselling	14·6	14·84	2·17
N. W. Dent	E. F. Brandon	5 5	" 9	Firm dough	11·9	17·58	2·09
Twitchell's Pride	E. F. Fredericton	5 3	" 9	Firm dough	12·2	16·80	2·05
Wisconsin No. 7	J. Parks	5 8	" 9	Milk	15·0	13·67	2·05
Disco Longfellow		5 4	" 9	Silking	12·6	16·02	2·02
Golden Glow	J. O. Duke	6 0	" 9	Soft dough	11·5	16·41	1·89
Wisconsin No. 7	J. O. Duke	5 7	" 9	Milk	11·2	16·80	1·88
Disco Pride Yellow Dent.	Dakota Imp. Seed Co.	4 9	" 9	Soft dough	10·1	17·97	1·81
Leaming	J. O. Duke	6 0	" 9	Soft dough	9·7	18·36	1·78
N. Dakota	Steele Briggs	5 7	" 9	Silking	9·2	17·97	1·65
Bailey	J. O. Duke	6 3	" 9	Soft dough	10·4	15·63	1·62
W. C. Y. Dent	Steele Briggs	5 9	" 9	Milk	8·1	17·97	1·45
Disco 90 Day White Dent		5 7	" 9	Milk	10·6	13·28	1·40
North Dakota		5 9	" 9	Firm dough	8·1	16·80	1·36
Longfellow	J. O. Duke	5 10	" 9	Dough	8·1	13·28	1·07
Quebec 28	Macdonal College	4 10	" 9	Firm dough	6·5	15·63	1·02
Leaming	J. Parks	6 0	" 9	Soft dough	Not sufficient stand		
Total					243·30	339·10	38·92
Average					13·52	18·84	2·16

A great deal of reliance cannot be placed upon one year's results in testing varieties, but as most of those above have been grown for only a few years in succession, it has been impossible to include averages in the table.

SUNFLOWERS—TEST OF VARIETIES

Ten varieties of sunflowers were seeded on summer-fallowed land on May 12 at the rate of seven to nine pounds per acre. As in the case of corn these were seeded in rows three feet apart and 72.6 feet long, and the yield was determined from the green weight of portions having 100 per cent stand. A dry matter determination was made of these. The following shows the yields per acre of the different varieties and these also are considerably lower than the yields obtained in former years.

Black (C.P.R.) 13.5 tons; Manteca (C.P.R.) 12.87 tons; Russian Giant (Dakota) 12·25 tons; Mammoth Russian (K. McDonald & Sons) 12·25 tons; Mammoth Russian (C.P.R.) 12.00 tons; Manchurian (C.P.R.) 11.75 tons; Mixed (C.P.R.) 11.12 tons; Ottawa 76 11.00 tons; Manchurian (A. E. McKenzie) 9.75 tons; Mennonite (Rosthern) 4.62 tons.

ENSILAGE CROPS ON IRRIGATED LAND

VARIETY TESTS OF INDIAN CORN

Twenty-two varieties of corn were tested on irrigated land. These were seeded on May 12 at the rate of twelve pounds per acre in rows three feet apart and 72·6 feet long, and were harvested September 16. The cool weather in the early part of the growing season prevented all varieties from getting well started

and making much early growth, but the hot weather which followed later and the application of two irrigations produced yields which compared very favourably with those obtained other years. Irrigating increased the yield threefold in most cases, but it retarded the maturity. Only two varieties reached the dough stage.

CORN (IRRIGATED)—TEST OF VARIETIES

Variety	Source	Height of plant	Date of planting	Maturity when cut	Yield per acre	Per centage dry matter	Yield per acre, dry matter
		ft. in.			tons		tons
Longfellow	J. O. Duke	7 8	Sept. 15	Milk	44·0	12·89	5·67
Disco Longfellow		8 0	" 15	Milk	36·6	14·84	5·43
Compton's Early	J. O. Duke	7 10	" 15	Milk	41·6	12·89	5·36
Twitchell's Pride	E. F. Fredericton.	6 9	" 15	Dough	30·0	16·41	4·92
Golden Glow	J. O. Duke	8 6	" 15	Milk	30·0	15·63	4·69
North Western Dent	Nebraska grown	6 2	" 15	Dough	27·0	17·19	4·64
Disco 90 Day White Dent		8 2	" 15	Milk	31·1	14·84	4·61
North Dakota		7 3	" 15	Milk	32·25	14·06	4·53
Bailey	J. O. Duke	8 2	" 15	Milk	28·25	16·02	4·52
Disco North Western Red Dent		6 10	" 15	Milk	27·1	16·41	4·45
Leaming	J. O. Duke	7 10	" 15	Milk	31·6	14·06	4·44
North Western Dent	E. F. Brandon	7 0	" 15	Milk	24·0	18·36	4·41
Quebec 28	McDonald	6 3	" 15	Milk	26·5	16·41	4·35
Disco Pride Yellow Dent		6 6	" 15	Milk	25·75	16·41	4·22
Burr Leaming	Carter	7 4	" 15	Silking	30·5	12·89	3·93
North Western Dent	N. Dakota grown.	6 6	" 15	Milk	22·1	17·19	3·80
North Dakota	Steele Briggs	7 4	" 15	Silking	24·0	13·28	3·19
W. C. Yellow Dent	Steele Briggs	6 10	" 15	Silking	15·7	17·58	2·76
Wisconsin No. 7	J. Parks	8 6	" 15	Milk	Not sufficient stand.		
Leaming	J. Parks	8 6	" 15	Milk	"	"	
Wisconsin No. 7	J. O. Duke	7 10	" 15	Milk	"	"	
White Cap Yellow Dent		7 2	" 15	Milk	"	"	
Total					528·05	277·36	79·92
Average					29·34	15·41	4·44

As mentioned in the case of dry-land corn, averages over a period of years should be given in order to make results most dependable, but this has been impossible also up to the present with varieties tested under irrigation.

SUNFLOWERS (IRRIGATED)—TEST OF VARIETIES

Along with varieties of corn were tested ten varieties of sunflowers. These were seeded on May 12 at the rate of seven to nine pounds per acre and were harvested September 9. The plots were irrigated twice, at the same time as the corn plots. Two of the varieties, Mammoth Russian (C.P.R.) and Manteca (C.P.R.) had too thin a stand to permit of taking a yield, the others yielded as follows:—Russian Giant (Dakota) 35.75 tons, Mammoth Russian (K. McDonald & Sons) 31.0 tons, Mixed (C.P.R.) 26.0 tons, Manchurian (C.P.R.) 26.0 tons, Black (C.P.R.) 25.12 tons, Ottawa (No. 76) 22.5 tons, Manchurian (A. E. McKenzie) 21.25 tons, Mennonite (Rosthern) 11.5 tons.

GRASSES AND CLOVERS ON DRY LAND

There were under test twenty varieties of grasses, seven strains of timothy and nine strains of varieties of clover. Records were kept regarding the habit of growth, yield per acre, etc., and the dry matter content was determined by drying samples in an oven at 100° to 110° C. Eight different permanent pasture mixtures were seeded, for comparison in subsequent years from the standpoint of quality of feed produced and yield per acre.

The most promising varieties for dry-land hay or pasture purposes appear to be sweet clover, brome, western rye grass, and possibly alfalfa in rows.

STRAINS OF WESTERN RYE GRASS

In May 1923, eighty strains of western rye grass were seeded on dry land in rows three feet apart. While many of these strains were very similar in habit of growth and other respects, certain others possessed characteristics peculiar only to themselves which brought about a difference in appearance from the ordinary types. Some strains were decidedly erect in growth with a heavy leaf-system extending high up the plant, while others were much more spreading with the leaf-system confined mostly to the lower part of the plant. A considerable difference in the texture of leaf and stem was also apparent, as well as a difference between certain strains of about 7 per cent dry matter. Another year's test will be given these grasses, after which the results will be compiled for the three years' work and published in a later report.

GRASSES AND CLOVERS ON IRRIGATED LAND

Experimental work was carried on with varieties of grasses and clovers and strains of western rye grass as explained in the section on dry-land work, the chief difference being that the rows of western rye grasses were considerably shorter, and all other varieties were tested in small plots.

Alfalfa stands in a class by itself as a hay crop for irrigated land. It may also be used advantageously to a limited extent in pasture mixtures. Brome grass also proves an abundant yielder under irrigation, and promising results are being obtained from orchard grass when seeded with alfalfa for hay purposes, but this mixture has not yet been tested for a sufficient number of years to warrant the expression of a definite opinion.

POULTRY

Only Barred Rocks are kept at the station and all females are trap-nested the year round, the culls being removed at various periods and disposed of for table use. In the main the stock is pedigreed and line-bred, and only such individuals as possess the standard requirements as to number and weight of eggs and size and type of body are retained for breeding operations.

PRODUCTION

The laying season of 1923-1924 was fairly open and good production was maintained. Two pullets made the high record of 305 and 302 eggs in 365 days. One of these, pullet H49, laid 117 eggs in 117 consecutive days, the other, pullet H130, laid 109 eggs in 109 consecutive days and 297 in her year, both being somewhat remarkable achievements. Twenty pullets from the Station entered in the Alberta Egg-Laying Contest laid an average of 237 eggs each. Of these twenty pullets, nine laid 250 eggs and over. One bird laid over 300 eggs and only two failed to reach the 200 mark. One pen of 50 early-hatched pullets laid an average of 221 eggs per bird in 365 days and were still in full lay when their year ended. Three of these birds laid over 350 eggs from the date of the first egg until they ceased to lay, a period of from 14 to 15 months.

The average production of all pullets kept was 201 eggs.

FEEDING

The feeds used were the same as those fed the preceding year. For a detailed description of feeds and feeding methods see the report of this Station for 1923.

LINE-BREEDING VS. OUT-CROSSING

Two good males of high-producing strains, that were not related in any way to the females used, were obtained in 1923 and mated that year to hens bred at the Station. Other Station hens of about equal merit were mated to related cockerels of the same blood lines as the females. All the matings were of males and females of high-producing strains.

The following table shows the fertility and hatchability of eggs and mortality of chicks from the 1923 matings as shown in the 1923 report, and the average production in the season of 1923-1924 of the pullets raised from these matings.

Pen	Breeding of cockerel	Fertility of eggs	Hatchability of eggs	Mortality of chicks	Average production of eggs by pullets
		%	%	%	
1	Line bred	78·5	64·4	10·9	219
4	Line bred	82·0	70·8	9·7	203
3	Line bred	73·4	58·3	12·5	191
9	Out-cross	75·0	59·2	13·5	168
2	Out-cross	76·8	65·2	8·0	147

The highest line-bred pullet laid 305 eggs, and the lowest 130 eggs. The highest out-cross pullet laid 243 eggs, and the lowest 96 eggs. It would appear from the above that no advantage in vitality or egg production was obtained from out-crossing.

COMPARISON OF FERTILITY AND HATCHABILITY OF EGGS AND MORTALITY OF CHICKS FROM HENS AND PULLETS

For the past two years comparisons have been made of the fertility and hatchability of eggs from hens and early-hatched pullets. The mortality of the chicks from these eggs have also been noted. Eighty hens and eighty pullets were used in each test.

Year	Fertility of eggs from—		Hatchability of eggs from—		Mortality of chicks from—	
	Pullets	Hens	Pullets	Hens	Pullets' eggs	Hens' eggs
	%	%	%	%	%	%
1923	72·0	77·8	.....	.....	13·8	8·6
1924	76·0	92·3	55·9	73·0	3·2	1·6
Average	74·1	85·1	.....	.....	8·5	5·1

The results of the two years' tests were decidedly in favour of hens' eggs for hatching, as the hatchability and fertility were higher, and the mortality of chicks lower than from the pullet eggs.

RELATION OF TEMPERATURE IN INCUBATORS TO HATCHING RESULTS

The variations of temperature during incubation and at different periods were checked with the following results:—

Incubator	Temperature 1st 7 days	Temperature average	Per cent blood rings	Per cent dead germs
			%	%
No. 1	101	103	2·0	15·0
No. 2	102	103·1	2·5	14·8
No. 1	103	103·4	8·2	19·6
No. 2	104	105	10·1	35·5

There was but very little difference noted where the temperatures were operated at 101 and 102 degrees respectively, during the first seven days. However, when this was exceeded, blood rings and dead germs were much more numerous. The result of this test substantiates the claim made by other investigators that high temperatures during the first week of incubation are not conducive to good hatches.

RELATION OF HUMIDITY IN INCUBATORS TO HATCHING RESULTS

There is almost universal complaint on the part of those using incubators in southern Alberta that it is extremely difficult to obtain good hatches in March and early April, even of the fertile eggs. Several lines of investigations have been followed to determine the reason for this condition and so far the control of the factor of humidity in the incubators seems to offer the most relief. Not only in the early months of hatching, when the difference in the outside temperature and that inside the incubators is greatest causing a naturally low humidity in the warm air of the incubator, but also later in the season, moisture is an important factor.

In tests made during the season of 1923 and again in 1924 it was found that none of the incubators under test gave satisfactory hatches when operated at the low humidity usually obtained, but that when more moisture was added up to a humidity of 55 per cent to 60 per cent, there was an increase in the number of eggs hatched and the vitality of the chicks produced. To get this high humidity the use of moisture pans under the eggs or other devices usually used were entirely inadequate. The most successful method tried, and a very simple one, was to use a pad of paper and burlap, made by wrapping alternate layers of the two around a piece of cardboard until a pad about 1 inch thick, 3 inches wide, and 5 inches long was formed. This was saturated with water and hung in the top of the incubator about 3 inches from the radiator pipes. It was found that with pads of this kind it was not difficult to get all the humidity desired, the amount being regulated by the number of pads used. In a 200-egg machine the use of one pad moistened whenever the eggs were turned, if the pad was dry, was sufficient to maintain 55 per cent to 60 per cent humidity. The pad was removed on the twelfth day and the machine run dry until the last turning of the eggs, when the saturated pad was again hung in the incubator and left until the chicks hatched. The results of the two years were almost identical, and seem to show quite conclusively that in this climate the relative humidity in the incubator for the first twelve days should be kept above 50 per cent; for the next week it should be a little drier to permit proper evaporation of the egg contents; and then made moist again at the last turning. If this is done, and other conditions are favourable, there appears to be no reason why satisfactory hatches cannot be obtained at any time with good eggs.

The following tables show the average results of six tests carried on in 1923 and 1924, each test having been conducted in duplicate so that the figures give the data from twenty-four hatches.

HUMIDITY IN INCUBATORS

Range of humidity	Range of fertile eggs hatched
%	%
33 to 35	36 to 44
35 to 41	43 to 45
52 to 60	68 to 85

For results of early and late hatches with different humidities see the 1923 report of this Station.

CHICK-FEED TESTS

In this test various lots of chicks were selected of as nearly the same vitality as possible and reared with colony, coal-heated brooders.

Feed	Per cent mortality
Dry mash, scalded wheat, and boiled eggs	5·2
Dry mash and boiled eggs	8·3
Moist mash and boiled eggs	11·5
Moist mash, no eggs	19·9

It will be observed that in this test the best results were obtained with dry mash with a little scalded wheat and boiled eggs. The mortality was greatest among the chicks fed moist mash without eggs.

EFFECT OF INHERITANCE OF SIRE ON EGG-COLOUR OF PROGENY

In this test an effort was made to ascertain if the sire possessed any determining influence on the colour of the shells of the eggs laid by his pullet progeny. The male used descended from three generations of dams that laid attractive brown eggs, and he was mated to hens that laid whitish-shelled eggs, not typical of the Barred Rock breed. It was found that from the first mating the number of whitish shelled eggs laid by the resultant pullets were reduced almost 75 per cent as compared with the eggs laid by their dams, and when mated again to his daughters, the pullets laid almost 100 per cent brown eggs. The same practice of using males from a brown-egg strain was adopted in the general breeding pens with similar results.

From the results obtained it appears that egg colour is an inherent character, with brown as dominant in the Barred Rock breed, and that by selection, uniformity of egg colour can be obtained in a flock.

REARING TURKEYS IN CONFINED RUNS AND ON FREE RANGE

An endeavour was made to raise turkeys in confined runways similar to those used for laying hens. The runways were about 60 feet long and 10 feet broad. Twelve turkey chicks with a broody hen were kept in each run, and a small coop was provided for shelter. A similar number of turkey chicks, also with broody hens, were allowed unlimited range.

The turkeys raised in the confined runs were retained in their runways until about six weeks to two months following the "Shooting the Red" period, when they were turned on range. However, it was noticed that many of them positively refused to leave the runways for the range, and had to be removed for some distance before they would range with the others.

Time of hatching	Mortality at 10 weeks		Weight at 10 weeks	
	Confined runs	Free range	Confined runs	Free range
	%	%	lbs.	lbs.
April 23	12	85	6·25	3·50
May 20	0	58	5·50	3·75

The above would seem to indicate that raising turkey chicks in confinement is practicable, but doubtless clean sanitary conditions are imperative. The feed should be fed in clean hoppers and if milk is given to drink, the pans must be washed out once daily. Turkey chicks should be kept on the hungry side, must have clean wholesome food, an abundance of green feed, and a dry place in which to find shelter from the storms and heavy winds. With the above conditions and healthy parent stock, the raising of turkeys should be fairly successful.

Turkeys reared in confinement are more docile and are not so likely to stray far away. This may mean smaller loss from coyotes and other beasts of prey.

THE ALBERTA EGG-LAYING CONTEST

As the Alberta Egg-Laying Contest is reported in full in the report of the Canadian National Egg-Laying Contests only a summary is given here.

The highest producing pens and birds are listed in the following tables:—

LEADING PENS

Breed	Owner	Address	Production
1. White Leghorn	Winter Egg Poultry Farm	Lethbridge	2,331
2. Barred Rock	W. A. Fraser	Medicine Hat	2,317
3. Barred Rock	F. Edwards	Edmonton	2,186
4. S.C. White Leghorn	Pioneer Poultry Farm	Medicine Hat	2,106
5. S.C. White Leghorn	Cloverlea Stock Farm	Edmonton	2,069
6. S.C. White Leghorn	Mrs. J. W. Cookson	Tofield	2,038
7. Barred Rock	H. G. L. Strange	Fenn	2,036

LEADING BIRDS

1. S.C. White Leghorn	Winter Egg Poultry Farm	Lethbridge	303
2. S.C. White Leghorn	Mrs. J. W. Cookson	Tofield	301
3. S.C. White Leghorn	Cloverlea Stock Farm	Edmonton	291
4. S.C. White Leghorn	Winter Egg Poultry Farm	Lethbridge	281
5. Barred Rock	F. Edwards	Edmonton	278
6. W. Wyandotte	Dept. of Agriculture	Edmonton	274
7. S.C. White Leghorn	E. R. Nicholls	Big Valley	274

NOTE.—Experimental Farm birds are not included in the above.

That the production of birds entered in the contests is steadily improving, is shown by comparing the results of the five years the contest has been in operation.

PRODUCTION IN THE CONTEST FOR FIVE YEARS

Contest year	Production of		Average of three highest pens	Average for contest per bird
	Leading pen	Leading bird		
1919–1920	1,660	237	1,518	121·5
1920–1921	1,668	246	1,576	127·9
1921–1922	2,027	261	1,882	136·4
1922–1923	2,216	288	2,208	168·2
1923–1924	2,331	303	2,278	178·2

NOTE.—Experimental Farm birds not included.

BEES

The transition of beekeeping in southern Alberta from an experiment to an established farming industry may now be considered to have been accomplished. Many farmers are keeping a few bees and several individuals are operating large apiaries, some keeping as many as 400 colonies. So far the honey produced has not been sufficient to supply local markets, but if the present expansion of the industry continues, which seems probable, it will not be many years before more honey will be produced than can be consumed in the district.

PRODUCTION

The season of 1924 was less satisfactory for honey production than any season for several years, for while May was very good, June and early July were cooler than usual, and the secretion of nectar in the alfalfa seemed to be much less than common. Sweet clover gave a better honey flow than alfalfa, as was shown by the greater production obtained from apiaries located in the vicinity of sweet clover fields.

The average honey production of the 35 colonies wintered at the Station, all of which came through the winter in good condition, was 60·6 pounds of extracted honey per colony. The preceding year the average was 189 pounds. The low production this year was not entirely due to the season as but little increase was made last year, while this year 29 new colonies were started by division. The colonies not divided produced an average of 79·8 pounds of extracted honey. In addition to the increase, 900 shallow combs, 550 standard Langstroth combs and 50 Jumbo combs were drawn out from foundation.

MAKING INCREASE

Three methods of making increase were tried, five ten-framed Langstroth colonies being used in each trial.

The early divisions were made June 12, when the colonies first appeared to be ready for supers. Five combs of capped brood with adhering bees were taken from the parent colony and placed in a ten-framed hive on a new stand in a distant part of the apiary. The remaining five frames to complete this hive were made up of three frames of drawn comb and two of foundation, and a young laying queen introduced. The old queen was left in the parent hive and the frames of brood taken out for the increase were replaced with three frames of drawn comb and two of foundation.

The late divisions were made in a similar manner on July 6.

For the double brood chamber division ten-frame Langstroth full-depth supers were placed on the hives July 12, and the queen given the run of both chambers. On July 12, the second week of the honey flow, the divisions were made. All the capped brood was placed in the top chambers and the uncapped brood in the bottom chambers, the queens being put in the bottom chambers. All combs of honey were removed from each chamber and replaced by drawn comb. The top chambers were given floor boards and covers and placed alongside the bottom chambers. A young laying queen was introduced in what had been the top chamber, and this new colony was removed to a new location ten days after dividing.

None of the increase made a surplus of honey during the season, but all built up to good strength. In other years, when the honey flow was better, increase made at the same time usually produced a good honey crop.

The average strength of the increase and parent colonies of the three sets were about equal in the fall, so in the following table only the honey produced and the value of honey and increase are given. The honey is valued at 20 cents per pound, and the increase at $7. The value of $7 for increase is about the cost of package bees delivered from the south.

AVERAGE HONEY PRODUCED AND GROSS FINANCIAL RETURNS FROM COLONIES SPLIT JUNE 12 AND JULY 6, OR DIVIDED BY DOUBLE CHAMBER METHOD JULY 12

—	Honey produced	Value of honey and increases
	pounds	$ cts.
Not split	79·8	15·96
Split June 12	41·8	15·36
Split July 6	56·3	18·26
Divided by double brood chamber July 12	52·5	17·40

As all colonies divided were of about equal strength in the fall, the best returns this year were from the colonies producing the most honey, or those divided in July. There was little difference in the production of those divided by splitting the single brood chamber, and those divided by the double chamber method. The undivided colonies made almost twice as much honey as the early June-divided and about one-third more than the later-divided. No data were obtained this year on the value of the different methods for swarm control as none of the colonies showed any tendency to swarm.

JUMBO VS. LANGSTROTH BROOD CHAMBER

Two colonies in Jumbo brood chambers and two in Langstroth chambers of about the same average strength were selected in the spring to compare the merits of the two chambers as determined by honey production. All frames used in supers were drawn comb.

PRODUCTION OF BEES IN JUMBO AND SINGLE LANGSTROTH BROOD CHAMBERS

Kind of brood chamber	Weight of honey	Value of honey
	lb.	$ cts.
Jumbo	147·0	29 40
Langstroth	83·5	16 70

The colonies with the Langstroth brood chambers produced only 57 per cent as much honey as those with Jumbo brood chambers. These results are in accord with the results from similar experiments conducted elsewhere, and substantiate the statement often made that a single Langstroth brood chamber is not large enough for a prolific queen.

FOUNDATION VS. DRAWN COMB FOR EXTRACTED HONEY PRODUCTION

Two colonies in ten-frame Jumbo hives were given supers filled with drawn comb and four similar colonies were given foundation in the supers. The honey production and value of honey produced indicates the honey cost of drawing out foundation during the honey flow.

AVERAGE WEIGHT OF HONEY PRODUCED ON DRAWN COMB AS COMPARED TO FOUNDATION

Kind of frames in supers	Weight of honey produced	Value of honey produced
	lb.	$ cts.
Drawn comb	147·0	29 40
Foundation	59·3	11 86

The bees working on foundation drew out an average of 18 full-depth Langstroth frames of comb. As these colonies produced 87.7 pounds less honey per colony than the colonies working on drawn comb, the apparent honey cost of drawing out the comb was 4.87 pounds per frame. As this honey sold at 20 cents per pound, it cost 97 cents per frame to draw out the comb. It should be remembered, however, that these are the results of one year only, and that this was a poor year for honey and wax production.

WINTERING OUTSIDE IN PACKING CASES VS. WINTERING IN A CELLAR

For a number of years colonies have been wintered outside in cases packed with planer shavings and in a dug-out cellar. Every year, without an exception, the colonies wintered outside here have been in better condition in the spring, and the losses have been lower than the colonies wintered in the cellar. This year all the colonies came through the winter in good condition, but as the following table shows, those wintered outside were stronger in the spring and produced more honey in the year than the colonies wintered in the cellar.

AVERAGE RESULTS FROM COLONIES WINTERED OUTSIDE IN PACKING CASES COMPARED TO COLONIES WINTERED IN CELLAR

Kind of hive	How wintered	Strength in fall 1923 No. of frames—		Strength in spring 1924 No. of frames—		Honey produced season of 1924
		Brood	Bees	Brood	Bees	
						pounds
Jumbo	Outside	5·5	6·75	2·75	6·25	106·25
Jumbo	Inside	6·25	7·5	2·25	5·75	71·75
Standard	Outside	7·5	7·5	2·75	5·75	66·25
Standard	Inside	5·75	7·5	3·25	6·25	54·25

The colonies included in the table were ones used during the summer of 1924 for honey production only, those used for increase being omitted, thus making it simpler to compare the results from the two methods of treatment.

GENERAL NOTES

That the Station is each year becoming more of a vital factor in the agricultural life of the district was demonstrated during the year by the large number of farmers who visited the Station, the demand for members of the staff to talk at meetings and assist in various agricultural activities, and the numerous letters of inquiry received and answered.

A new undertaking that met with marked success was a two-weeks' course in irrigation farming held at the Station from January 29 to February 8. This course was suggested by the Honourable George Hoadley, Minister of Agriculture for Alberta, and was held under the joint auspices of his Department and this Station. The University of Alberta, the Dominion Department of the Interior, the Canadian Pacific Railway, Department of Natural Resources, and others co-operated in providing lecturers.

The average daily attendance was about eighty. Most of those who attended stayed throughout the course, and all showed a keen interest in the work, taking careful notes and asking numerous questions. A strong demand was made for this activity to be continued another year.

Other events of importance were the annual visit of the Raymond Woman's Institute, which this year spent the day studying floriculture; the excursion of the farmers from the Lethbridge Northern Irrigation District, who were specially interested in the irrigation practice and horticulture; and the visit of the U.F.A. and U.F.W.A. organizations of Raymond, Magrath, and Stirling.

OTTAWA: Printed by F. A. ACLAND, Printer to the King's Most Excellent Majesty, 1925.