DOMINION OF CANADA
DEPARTMENT OF AGRICULTURE
DOMINION EXPERIMENTAL FARMS

EXPERIMENTAL STATION
LACOMBE, ALBERTA

REPORT OF THE SUPERINTENDENT

F. H. REED, B.S.A.,

FOR THE YEAR 1923

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SEASONAL NOTES

The past season has been outstanding in that one of the heaviest crops in the history of the Station was harvested. While the precipitation received during the season approximated the average of the past sixteen years, the resultant yields were phenomenal. This might be accounted for by the fact that the previous four years was a very dry series, and the possibility that the precipitation during those years was insufficient to permit the plants to avail themselves of all the plant food liberated in the soil during that period. The season of 1923 was ideal with respect to sunshine, temperature and moisture, which permitted the plants to make full use of any available plant food in the soil.

The year opened with January quite the mildest on record. February opened with mild weather, but the temperature dropped to -45° accompanied by high winds which were very hard on all live stock wintering in the open. The month closed with a higher temperature. March had very changeable weather with light snowfalls and frequent high winds.

April on the whole was a little warmer than usual. Work on the land was general on April 16, and at the end of the month 80 per cent of the wheat was seeded.

May was about the average in every way. Sixteen degrees of frost on May 23 cut many grain fields back to the ground, but recovery was rapid. There was plenty of moisture for germination, and all crops made a vigorous start.

June was the warmest, with two exceptions, in the past sixteen years and quite the wettest since June 1915. The 4.3 inches precipitation which fell on 18 days, together with the warm weather, forced a very strong growth.

July was an ideal month for the development of all crops, the weather being warm and showery.

August had excellent weather for the development of all crops. There was sufficient moisture for good growing and plenty of heat and sunshine for ripening. One degree of frost on August 1 did no damage. There was a tendency for farmers to cut their grain on the green side, and at the end of the month 75 per cent of the wheat and barley and 25 per cent of the oats were cut.

September was one of the warmest and driest Septembers on record, and was ideal in this respect for bringing the very heavy crops to maturity. A 2 inch fall of snow on September 21 caused serious lodging in all uncut grain and greenfeed. It also held up threshing for several days.

October was also one of the warmest and driest Octobers on record, the mean temperature being 8.3° above the average. This made ideal conditions for threshing, and although every available machine in the district was run to full capacity, there was still a considerable percentage of the crop in the stook at the end of the month.

Stook threshing was completed in November, but there was still considerable stack threshing to be done. The mean temperatures for November and December were 6.41° and 5.15° respectively above the average. In addition to this the only precipitation received was in the form of light snow flurries. In short, the climatic conditions were so favourable that a phenomenally heavy crop, which in a normal season could not have been handled, was all threshed and marketed without hindrances of any sort.

Owing to pressure of work in caring for the bumper crop, very little fall ploughing was done. The heavy stubble left on the ground made excellent fall feed for the cattle and horses, which went into the winter in excellent condition.

The dates of farm operations will give a general idea of the season.

DATES OF FARM OPERATIONS

First working on land, (harrowing)	April 16
Seeding wheat	April 21
Seeding oats	April 21
Seeding barley	May 30
Seeding spring rye	April 25
Seeding peas	May 25
Seeding corn	May 26
Seeding mangolds	May 21
Seeding sunflowers	May 18
Spring ploughing	April 16
Summer fallow ploughing	June 25
Cultivating summer fallow	July 17
Cutting alfalfa, first crop	July 10
Cutting alfalfa, second crop	Aug. 25
Ploughing sod	Sept. 25
Cutting oats	Aug. 22
Cutting barley	Sept. 12
Cutting wheat	Aug. 28
Cutting spring rye	Aug. 30
Cutting peas	Sept. 10
Cutting green feed	Aug. 15
Threshing	Oct. 19
Cutting corn	Sept. 12
Cutting sunflowers	Sept. 14
Silo filling—Greenfeed	Aug. 16
Corn	Sept. 13
Sunflowers	Sept. 15
Harvesting mangolds	Oct. 8
Fall ploughing	Oct. 15
Freeze-up	Oct. 25

METEOROLOGY

Climatic factors are recognized to be the determining influence in the agriculture of central Alberta. Meteorological observations have been made and data compiled for 16 years, 1908 to 1923 inclusive. A complete resume of the data obtained was presented in the 1921 annual report, and will give those interested a knowledge of the climatic conditions which prevail in central Alberta. In this report the current year's records are presented along with a brief summary and comparison with the data compiled during previous years.

MONTHLY METEOROLOGICAL RECORDS FOR THE YEAR 1923

Month	Mean temperatures	Maximum temperatures	Minimum temperatures	Precipitation	Number of days on which precipitation occurred	Bright sunshine	Wind	Evaporation
	Degrees F	Degrees F	DegreesF	Inches		Hours	Miles	Inches
January	22·85	43·5	−29·5	0·20	3	70·2	.....	.....
February	14·78	64·2	−45·0	0·50	3	105·7	.....	.....
March	24·34	55·2	−10·5	0·66	8	132·8	.....	.....
April	38·37	83·0	3·0	0·50	4	240·9	*3,327	1·93
May	48·83	80·0	16·0	2·04	12	243·1	6,184	2·61
June	58·42	87·5	35·0	4·30	18	241·9	6,092	3·21
July	62·09	85·5	39·0	3·81	17	275·3	5,046	4·49
August	58·73	88·5	31·0	3·57	9	265·9	4,110	3·04
September	51·36	90·0	22·0	0·84	6	239·0	5,285	2·79
October	47·7	79·5	− 4·0	0·26	4	222·0	5,691	1·12
November	32·83	68·5	3·0	0·05	2	132·1	4,051	.....
December	18·8	53·0	−32·0	0·175	3	102·0	5,692	.....
Totals	.....	.....	.....	16·905	.....	2,152·0	45,478	19·19

* Wind records were started April 13.

COMPARISON OF 1923 METEOROLOGICAL DATA WITH THE YEARS 1908 TO 1923, INCLUSIVE

Year	Mean temperature	Maximum temperature	Minimum temperature	Precipitation	Sunshine
	Degrees F.	Degrees F.	Degrees F.	Inches	Hours
1908	36·01	86·4	−31·5	19·041	2,200·5
1909	30·94	86·5	−56·1	14·370	2,405·4
1910	33·85	89·7	−38·0	13·3	2,327·1
1911	33·15	85·0	−47·5	21·43	2,141·4
1912	37·32	89·6	−46·0	21·84	2,002 8
1913	35·68	84·8	−35·6	13·755	2,452
1914	37·85	87·6	−41·6	18·295	2,058
1915	36·27	88·6	−25·0	17·321	1,925·
1916	35·64	82·9	−52·0	22·91	1,941·
1917	34·12	85·8	−49·8	15·313	2,110·
1918	36·25	89·8	−44·1	20·905	2,148·
1919	36·25	92·6	−40·6	16·993	2,041·3
1920	35·30	91·9	−50·3	12·415	2,123·2
1921	36·09	94·6	−37·2	15·215	2,139·4
1922	36·56	92·8	−41·1	12·445	2,157·1
1923	39·93	90·0	−45·0	16·905	2,270·9
Average	35·70	88·66	−42·6	17·028	2,152·9

WIND.—Data on wind velocity are presented for the first time in this report. These wind data are recorded by an anemometer situated on a 30 foot steel tower so that the movement of the wind would not be influenced to any appreciable extent by adjoining buildings or trees. Wind velocity is an important factor in crop production. Winds of high velocity can cause great damage to crops by covering young plants, cutting them off with moving sand particles, on by causing the crop to lodge when mature or nearly so.

High winds which result in soil drifting and injury to growing crops as a result of excessive evaporation from the soil and transpiration from the growing plants have never caused serious damage in this district. Any soil drifting has occurred where high land has been left in bare fallow during the summer or in the spring before such land has been covered by the crop.

The prevailing direction of the wind during April, May, June, July, August and September was northwest, while south was the prevailing direction in October, November and December. This south wind during the latter months was largely responsible for the very open fall of 1923. The highest mileage per hour was 35 miles per hour registered on September 28, while the highest gale was registered on November 19 when the wind travelled 4.5 miles in 5 minutes.

May appears to be the windiest month of the year, while the harvest months appear to have less than the average. The low mileage during August was responsible for the small amount of lodging when the exceptionally heavy crop of grain is considered.

TEMPERATURE.—The data on mean, maximum and minimum temperatures, by months, are given in the preceding tables.

It will be noticed that the mean temperature for the year was 4.23° above the average. In all cases the mean temperature of each month was above the average; October, November and December showing the greatest difference, being 7.21°, 6.41° and 5.15° respectively above the average.

The maximum temperature of the year, 90.0°, was registered during September 14, and gives further evidence of the very mild weather which prevailed during the autumn.

The minimum temperature of −45·0° was registered on February 14. This is, with one exception, the lowest temperature ever recorded during February at this Station.

The growing season of 1923 was particularly free from frost, no killing frosts being registered between May 24 and September 11. This resulted in

1923 being one of the most favourable years for the development of corn, roots and similar crops in the history of the Station.

EVAPORATION.—Data on evaporation are presented for the first time in this report. The evaporimeter is situated in a location where it is not protected from the rays of the sun, and where the atmospheric currents will not be seriously influenced by adjoining shrubbery and buildings.

The loss of moisture by evaporation in this region is considerable. The principal factors which influence evaporation are humidity, wind, temperature and precipitation. Evaporation is naturally most rapid under conditions of low humidity, strong wind, high temperature and low rainfall.

As compared with the precipitation, the evaporation has been high, being 2.285 inches above the precipitation for the year, and 4.725 inches above that received during the seven months during which evaporation was recorded. At no time was evaporation sufficiently rapid to cause excessive wilting of any of the growing crops.

ANIMAL HUSBANDRY

HORSES

There are twenty head of horses at the Lacombe Experimental Station, including drivers, work horses and Shire and Clydesdale breeding stock. The drivers are pure-bred Hackneys of which two are mares and one a gelding. There are five pure-bred Shires, including two stallions, two brood mares, and one filly foal. The Clydesdales number eight, six of them mares of breeding age, and, of the other two, one is a yearling filly and the other a filly foal. The four remaining horses are grades or cross-breds of good Clydesdale type.

CLASSIFICATION OF HORSES AT THE EXPERIMENTAL STATION, LACOMBE

—	Classification	Age	Weight
		years	lbs.
Hackneys—			
Serenade (imp.) 810 (21024)	Pure-bred Hackney mare	15	1,170
Bay Dora 1018	" " "	11	1,230
Rock	" " gelding.	8	1,150
Shires—			
Marden Jupiter (imp.) [1610] (34960)	Pure-bred Shire stallion	7	2,450
Hawton Carlton (imp.) [1609] (38846)	" " "	2	1,970
Essendon Jet (imp.) [1531] (102996)	" " mare	8	2,275
Coxall Day Dawn (imp.) [1532] (102419)	" " "	6	2,250
Foal of 1923	" " filly foal	8 mos.	950
Clydesdales—			
Lily McTaggart (imp.) 14972 (18960)	Pure-bred Clydesdale mare.	17	1,800
L. E. S. Consuelas' Diadem 33722	" " "	11	1,515
L. E. S. Lady Jane 33723	" " "	11	1,560
Jean of Killallan 40898	" " "	6	1,765
Bankview Dandelion 40665	" " "	6	1,625
L.E. S. Lady Jane 2nd 48133	" " "	3	1,600
L. E. S. Hugo Belle 49925	Clydesdale yearling filly	1	1,240
L. E. S. Jeannie Dale 49924	" filly foal	9 mos.	975
Grades or Cross-Breeds—			
Fanny	Grade Clydesdale mare	11	1,655
Dolly	" " "	8	1,350
Belle	" " "	6	1,485
King	Cross-bred gelding Belgian-Clydesdale Cross.	3	1,685

This Station is fortunate in that the donation of Shire horses and mares from the Shire Horse Society of Great Britain to the Canadian Government was placed here. This donation consisted of two stallions and three mares. One of the mares, Coxall Day Dawn, foaled at Ottawa on the way out, and as a result six pure-bred Shires reached Lacombe in May last. This gift was made by the Shire Horse Society of Great Britain, through a desire to demonstrate to the farmers of Canada the value of the Shire for grading-up purposes, and for imparting weight and substance to its offspring. These horses were placed at this Station where they are available for demonstration, for exhibition, and breeding purposes.

Of the two Shire stallions one, Marden Jupiter [1610] is seven years old, and the other, Hawton Carlton [1609] is a two-year-old. Marden Jupiter is perhaps the heaviest draft stallion in Canada, as he now weighs 2,450 pounds and is not excessively fat. Marden Jupiter is a noted prize winner in the Old Country himself, and he is sired by Champions Goalkeeper, considered to be the greatest Shire stallion of the breed to-day. His dam is Marden Joan by Lockinge Forest King, the most successful sire in the history of the breed. He is a big, beautiful drafter, brown in colour with a rich dapple showing through. He has a star in his forehead and the nigh hind foot is white. He is a well-ribbed, deep-bodied, strong-loined horse, with good feet, and legs well set under him. He is a horse of quality and not too much feather, which should add to his popularity in Canada. The most impressive features about this horse are the boldness and dash which he displays when moving. He has a free, bold stride, remarkably straight and true.

Hawton Carlton [1609] will not be three years old until May, 1924, but already he weighs close to a ton. He is light brown in colour with a blaze on his forehead and a white face. The near fore coronet and near hind leg are white, and the off fore leg is white half way up. These markings add to his attractiveness. This is a strapping big colt, and though at present at a raw age, promises to develop into quite as outstanding a horse as Marden Jupiter. He has more feather than Jupiter, but is better in the feet and pasterns. He has a good quality of strong, hard bone, and is exceptionally well developed in the muscling of the quarters. This is also a well-bred horse, sire by Quenby Teamster by Tandridge Coming King, a winner of many prizes at the largest Old Country fairs. His dam is Hawton Flash by Halstead Royal Duke also by Lockinge Forest King.

Of the three mares that were donated, Essendon Jet [1531], is the oldest, coming nine years of age in 1924. This mare is black with a stripe on her face and white near fore and hind legs. She now weighs 2,275 pounds and is a beautifully turned, compact, short-coupled, deep-ribbed mare with wonderful muscling over the loin and croup. For her size and massiveness this mare is strikingly active and a perfect mover. She is an ideal draft brood mare. This mare has won many prizes and medals at Old Country Fairs. She is sired by Coleshill Forester, another horse by Lockinge Forest King, and she is out of Ware Gallant Lass by Lowesby Gallant by Sopwell Duke.

Coxall Day Dawn [1532], the second mare, is six years old and weighs 2,250 pounds. She is brown with a white face and four white legs. She is sired by Shopnoller Drayman by King Cole VII, and her dam is Coxall Daylight by Exton Conqueror. Coxall Day Dawn is also a winner of many prizes. Of the two mares she is the more striking in style, having a flash and ranginess about her which are very attractive. This mare is not so massive, but is of a longer and taller build than Essendon Jet. She has not as much quality or as good a set of feet and legs under her as the black mare, but, because of her style and openness, would be favoured as a brood mare by some judges. On April 23, while at Ottawa, this mare droped a filly foal by Bowland Dray King, one of the good breeding horses in England. In spite of the long freight haul

from Ottawa to Lacombe the mare and the new foal stood the trip well, and unloaded at Lacombe in good condition on May 16. At the end of the year the foal weighed 950 pounds, and is altogether a very typy filly with a lot of outcome.

The third mare, making up this donation was a three-year-old from the King's stud at Sandringham, Norfolk. This mare was sired by Horning Mimic by Mimms Champion by Childwick Champion, and her dam was Moulton Victor's Last by Moulton Victor King by Lockinge Forest King. She was bred from notable prize-winning stock, and was herself the most promising mare of all. She was a deep-ribbed, massive mare in every way with exceptionally good feet and legs. On August 10 this mare was found in the pasture in the last stages of suffocation, caused by severe bloating and colic. A trocar was used but with no effect, and she died a few minutes afterwards. Her loss is felt very keenly.

In the five Shires now at this Station is the best foundation on the continent for a Shire stud. Though the horses arrived late in the breeding season a total of twenty-nine mares were bred last year. Nine of these were from the Experimental Station, and included the two imported Shire mares, six pure-bred Clydesdale mares, and one grade Clydesdale mare. Six of these appear to be in foal, three to each stallion. It is hoped that the public will make much more use of these stallions this coming season, as their quality is outstanding and they are a real boon to the district.

In the past year the fees were moderate, $10 to breed a mare and $10 when the mare proved in foal. This is a moderate service fee, and both pure-bred mares and grade mares of good type are accepted. Pasture is supplied for mares shipped in from a distance, and a reasonable charge of $2 a month is charged for the keep of the mares until bred.

One good Clydesdale foal was raised during the year. This foal, L.E.S. Jeannie Dale 49924, is out of Jean of Kilallan and by Kilallandale, a young horse owned by Norman A. Weir of Ohaton. This is a particularly good filly. She is growthy, better coupled than her mother, well turned in every way, and with a beautiful muscling of fore-arm and thighs. The strongest feature about this filly is her quality of feet and legs. She is a filly that is fit to show in any company. At nine months of age she weighed 975 pounds.

BEEF CATTLE

On December 31, 1923 there are seventy-nine head of beef cattle. Seventy-five of these are pure-bred Aberdeen Angus and the remaining four are grade or cross-bred Aberdeen Angus. The beef herd is classified as follows:—

—	Males	Females	Totals
Pure-bred Aberdeen Angus—			
Senior herd sires	1	.....	1
Junior herd sires	1	.....	1
Females, three years or over	.....	33	33
Two-year olds	2	6	8
Yearlings	11	7	18
Calves	5	5	10
Steers	4	.....	4
Total of pure-breds	24	51	75
Grade or cross-bred Aberdeen Angus—			
Yearling steers	2	.....	2
Steer calves	1	.....	1
Cross-bred calves	.....	1	1
Total of grades or cross-breds	3	1	4
Grand totals	27	52	79

During the year two pure-bred Aberdeen Angus bulls were sold at the Lacombe bull sale. Three steers were sold for beef, and also the bull, Glencarnock Prideman 3rd No. 26134, who had not proved himself a sure breeder. In April the Grade Angus herd was disposed of with the exception of the two yearling steers and two calves. In all nine head were sold, including six mature cows and three heifers. These were exceptionally well fitted and sold for a high price, the heifers selling at five cents and the cows at four and a half cents at Lacombe. This was a record price for female butcher cattle at that time.

In August a young bull calf, Prideman Glencarnock 4th—31949—, was received from J. D. McGregor, Brandon, Manitoba, to replace the bull, Glencarnock Prideman 3rd—26134. This calf was born October 28, 1922 and is a son of the famous Blackcap Revolution—27530—, the greatest show bull of the past year, and which sold for the long price of $15,000 at the Chicago sale in December 1923, after having won the Grand Championship of the International Fat Stock Show. His dam is Pride of Larkin Farm 46th—23612, a well-bred Pride of Aberdeen cow. From the standpoint of breeding the new herd bull has everything that could be desired. He has a very fashionable pedigree, and his sire and dam are both outstanding individuals. The bull is now a yearling of very fair type and gives promise of developing into a good individual. It is hoped that this bull will breed well to the daughters of Eliminator of Gwenmawr 3rd—17474—, who has been used in the herd for some years.

A show herd of Aberdeen Angus was exhibited at Calgary, Edmonton and Red Deer, this being the first time that Aberdeen Angus were shown for some years.

The total winnings at the three fairs were:—

Championships 1, reserve championships 4, first prizes 9, second prizes 7, third prizes 10, fourth prizes 5, fifth prizes 8, sixth prizes 3.

At these three fairs there was the keenest competition in Aberdeen Angus breeding stock that there has ever been. At Calgary five full herds competed, two of them from the United States, both well-known and high class herds. At Edmonton six herds competed, with three herds from the United States, and at Red Deer there were four herds. It is planned to show an Aberdeen Angus herd again this next summer at these fairs.

As there are 154 head of cattle at the Station including the beef and dairy herds, the stabling accommodation is not nearly sufficient to house all the cattle in winter. All the dairy cows, the calves, young bulls and the yearlings are housed, so also the Aberdeen Angus cows nursing calves and the calves are kept in stable. The dry Angus cows and heifers and dry two-year-old Holstein heifers are wintered out in the bush. During the summer and fall months all cattle available are on pasture. In the past open fall the cattle on pasture were run on stubble, with a light feed of oat greenfeed late in the fall, until after the New Year. Because of these conditions and of the difficulty in conducting experimental work with the breeding herd, it has been very difficult to carry on experimental feeding with the beef herd. Experimental feeding has necessarily been limited to the feeding of the grade Angus females sold for beef in April. These were fed as a commercial proposition.

COMMERCIAL FEEDING OF DRY COWS AND HEIFERS IN THE WINTER OF 1923

Object. — To determine the profit that can be obtained from feeding dry cows and heifers.

Plan. — Eight head of Aberdeen Angus grades were fed for beef during the winter of 1923. Among these were five dry cows and three heifers that had never been bred. These were all good beef-type animals in fair flesh when put in to feed January 15. They were put in at the top market price at that time; namely,

2.75 cents for cows and 3.25 cents for heifers. They were tied up in stalls in one of the sheds at the Fair Grounds, adjacent to the Experimental Station, and fed for 76 days. They were fed three times daily and watered once daily and had no exercise other than when going to water at the end of the shed. They were fed about equal amounts of oat greenfeed and prairie hay. They were started on a meal ration of oatchop, bran and oilcake meal in the proportions of eight pounds of oatchop to two pounds of bran and one pound of oilcake meal fed at the rate of eight pounds per head per day. This was gradually increased until fourteen pounds per head per day were fed at the end of the seventy-six days. After the first month the oatchop was gradually replaced by barley chop and for the last few weeks barley chop had completely replaced the oatchop. These cattle were sold April 2, and because of their high finish the cows sold for 4.5 cents and the heifers for 5.0 cents per pound. The spread in price from the time they were put in to feed to the time they were sold was 1.75 cents, for both the dry cows and heifers.

COMMERCIAL FEEDING OF DRY COWS AND HEIFERS IN THE WINTER OF 1923

—		Dry cows	Heifers
Number of animals fed		5	3
Number of days fed		76	76
Initial weight January 15, 1923	lbs.	5,915	2,830
Initial average weight January 15, 1923	"	1,183	943·3
Value when put in to feed. Cows at 2·75 cents and heifers at 3·25 cents a pound	$	162·66	91.97
Value per head	$	32.53	30.65
Final weight April 1, 1923	lbs.	6,480	3,200
Final average weight April 1, 1923	"	1,296	1,066·6
Total gain in 76 days	"	565	370
Average gain per head	"	113	123·3
Average daily gain per head	"	1·48	1·62
Value when sold. Cows at 4½ cents and heifers at 5 cents a pound	$	291.60	160.00
Value per head when sold	$	58.32	53.33
Increase in value per head through feeding and rise in market price	$	25.79	22.68
Feed required—			
Quantity of oat greenfeed at $10 a ton	lbs.	4,725	
" prairie hay at $18 a ton	"	4,395	
" oatchop at 50c. a bushel	"	1,475	
" barley at 60c. a bushel	"	1,350	
" bran at $20 a ton	"	650	
" oilcake meal at $50 a ton	"	325	
Total feed cost	$	116.35	
Cost per head including cows and heifers	$	14.54	
Cost per pound of gain, cows and heifers	cts.	12.44	
Total cost including cost of cows' and heifers' feed	$	370.98	
Value of cows and heifers when sold	$	451.60	
Total profit	$	80.62	
Profit per head	$	10.07	

In this feeding test the feed was weighed in to the cattle as a group, no separate record kept for the dry cows or heifers. In seventy-six days the cows gained an average of 113 pounds, and the heifers 123.3 pounds or an average daily gain of 1.46 pounds per head for the cows and 1.62 pounds per head for the heifers. Because of their heavier weight the cows increased in value more than the heifers. The increase in weight from feeding and the spread in price of 1.75 cents gave an increase in value of $25.79 per head to the cows and $22.68 per head to the heifers.

For the cows and heifers combined the total feed cost is $116.35, making a cost for each of $14.54. The cost per pound of gain is 12.44 cents. The total profit over the cost of feed and the cattle when put in to feed is $80.62, or an average of $10.07 per head. No allowance is made for labour or interest on the money tied up in this work, but without taking the interest into consideration the returns for the labour and time required to look after these eight head of cattle amounts to $1.06 per day.

DAIRY CATTLE

At the end of 1923 there are 54 pure-bred Holsteins and 21 grade Holsteins in the dairy herd. The pure-bred males include 2 herd sires, 1 yearling bull, and 5 bull calves, and of the females there are 23 cows and heifers milking or that have calved, 2 three-year-olds not yet calved, 4 two-year-olds, 9 yearlings and 8 calves, making a total of 8 bulls and 46 females. The grade Holsteins include 12 cows and heifers milking or that have calved, 1 three-year-old not yet calved, 4 two-year-olds, 2 yearlings and 2 calves.

The herd was strengthened this year by the addition of a junior herd sire sent out from the Central Experimental Farm at Ottawa. This bull, Midnight King Jewel—51945—, born February 21, 1922, is particularly rich in breeding, having a first-class line of females and bulls back of him. He is a grandson on his sire's side of King Segis Alcartra Spofford—20352—one of the greatest sires of high-producing females ever used in Ontario. His sire is Roycroft King Johanna, whose first two daughters in milk have 7-day butter records of 20·40 and 17·17 pounds. His dam has a 365-day record of 20,467 pounds of milk and 967·50 pounds of butter at five years of age. She also has a 7-day record of 24·02 pounds of butter. This is the lowest 7-day record in three generations of females back of this bull. As an individual he is big, growthy, with a breedy head, a straight strong top and a well-sprung, deep, dairy rib. He is a bull of quality, and has every indication of being a sire of high producers. Some years ago a half-brother of this bull, Roycroft King Spofford, was used in the herd and left five heifers, all outstanding producers. This new bull will be used on all of these heifers to try out line breeding for milk and butter production.

During the year five yearling bulls were sold to head dairy herds. These were sold for an average of $117, not a high price but a fair price taking into consideration the stringent financial position of the Alberta farmer in a year preceded by crop failures. It is planned to sell off most of the grade herd within the next year. There are already 46 pure-bred females, and as the heifers in this herd come in it will be necessary to dispose of the grades to enable the work with the pure-breds to be carried on.

The breeding work with dairy cattle at this Station has been the building up of a high class herd of Holsteins through the use of good bulls. Results of this work to date are subsequently published in this report. Other work conducted includes the compilation of lactation records for all individuals in the herd with the object of getting data on the feeds required for milking cows, and the cost of milk production with both pure-bred and grade cows. Record of Merit and Record of Performance work is featured. All cows and heifers possible are entered for Record of Merit and Record of Performance tests when they freshen. Whenever possible feeding experiments are carried on with various feeds and combinations of feeds.

CANADIAN RECORD OF PERFORMANCE RECORDS HELD BY FEMALES IN THE HERD AT THE PRESENT TIME

Name and Number of Cow or Heifer	Age at commencement of test	Days milking	Pounds of milk	Pounds of butterfat	Pounds of 80 p.c. butter	Average test
Nina Gem Lutske, 10674	6	365	15,453	462	557·5	3·00
Lawncrest Rosa Echo, 15021	5	365	14,932	402	502·5	2·69
May Echo Lady, 39918	6	365	21,885	679	848·7	3·10
L.E.S. Nina Gem Lutske, 34364	7	365	18,922	670	837·5	3·54
L.E.S. Daisy Johanna, 31601	6	365	14,569	460	575·0	3·16
L.E.S. Korndyke Rosa Echo, 35780	5	365	19,244	621	776·2	3·23
L.E.S. Royalton Korndyke Star, 42578	6	335	18,653	599	748·7	3·20
L.E.S. Evergreen Rosa, 56204	3	365	18,261	559	698·7	3·06
" "	5	305	14,830	479	598·7	3·23
L.E.S. Evergreen Johanna, 56199	3	365	15,530	492	615·0	3·17
" "	5	349	16,014	558	697·5	3·48
L.E.S. Aaggie Mechthilde Echo, 56200	4	345	15,563	556	695·0	3·57
L.E.S. May Echo Mechthilde, 70080	2	365	12,992	409	511·2	3·15
" "	3	274	12,658	388	485·0	3·07
L.E.S. Ianthe Aaggie De Kol, 70079	2	365	14,095	517	646·2	3·67
L.E.S. Johanna Alcartra, 75007	2	365	17,718	624	780·0	3·52
L.E.S. Evergreen Gretchen, 75005	2	365	13,628	449	561·2	3·29
L.E.S. May Echo Gretchen, 75006	2	365	16,068	530	662·5	3·30
L.E.S. Royalton Aaggie, 91369	2	365	14,049	493	616·2	3·51
L.E.S. Nina Alcartra, 91370	2	365	18,185	562	702·5	3·09
L.E.S. Princess Helbon, 91371	2	365	17,839	620	775·0	3·48

There are eighteen cows and heifers with Canadian Record of Performance records at present in the herd. Twelve of these have records of 15,000 pounds or over with the highest by May Echo Lady 39938 with 21,885 pounds of milk. Six only have records below 15,000 pounds and four of these are two-year-olds. The lowest mature yearly record is 14,569 pounds, and the lowest two-year-old record is 12,922 pounds. During the past year three outstanding two-year-old records were made as follows:—

Heifer	Days	Milk	Butter
L.E.S. Johanna Alcartra	365	17,718	780·0
L.E.S. Princess Helbon	365	17,839	775·0
L.E.S. Nina Alcartra	365	18,185	702·5

These are the three highest milk records for two-year-olds in the three Prairie Provinces of Alberta, Saskatchewan and Manitoba. L.E.S. Johanna Alcartra has the highest butter record and L.E.S. Princess Helbon has the second highest butter record in these three provinces. L.E.S. Nina Alcartra's record of 702·5 pounds of butter stands sixth in the three Prairie Provinces.

RECORD OF MERIT RECORDS HELD BY FEMALES IN THE HERD AT THE PRESENT TIME

Name and Number of Cow or Heifer	Age at Commencement of Test			Number of days	Pounds of milk	Pounds of butter-fat	Pounds of 80 p.c. butter
	Years	Months	Days				
May Echo Lady, 39918	8	1	4	7	483·7	20·06	25·08
				14	946·0	36·50	45·63
L.E.S. Nina Gem Lutske, 34364	9	0	5	7	514·5	19·68	24·60
				14	1,073·0	38·85	48·56
				30	2,375·2	81·98	102·48
L.E.S. Korndyke Rosa 34367	8	9	1	7	445·8	17·40	21·76
L.E.S. Daisy Johanna, 31601	7	10	27	7	405·9	17·91	22·39
L.E.S. Korndyke Rosa Echo, 35780	7	3	20	7	500·3	16·53	20·67
				14	999·2	33·14	41·43
				30	2,147·1	70·50	88·13
L.E.S. Evergreen Rosa, 56204	5	6	1	7	487·1	21·09	26·37
				14	1,008·9	40·79	50·99
				30	2,230·0	84·32	105·40
L.E.S. Evergreen Johanna, 56199	5	1	16	7	509·7	22·17	27·72
				14	1,033·1	43·78	54·73
				30	2,291·1	90·31	112·89
L.E.S. May Echo Mechthilde, 70080	3	10	27	7	477·4	17·40	21·75
				14	983·5	33·61	42·02
L.E.S. Johanna Alcartra, 75007	3	8	10	7	418·3	22·04	27·56
				14	859·2	40·60	50·75
L.E.S. Evergreen Gretchen, 75005	3	5	0	7	299·2	14·26	17·83
				14	585·4	25·96	32·45
L.E.S. May Echo Gretchen, 75006	2	6	16	7	440·0	13·16	16·46
L.E.S. Nina Alcartra, 91370	2	6	19	7	387·5	12·83	16·04

The highest mature seven-day Record of Merit is held by L.E.S. Evergreen Johanna with 27·22 pounds of butter in seven days. This is the second highest seven-day record in Alberta, and also second highest in the Prairie Provinces. No four-year-records have yet been made but, as a senior three-year-old, L.E.S. Johanna Alcartra leads both for Alberta and the three Prairie Provinces, with 27·56 pounds of butter in seven days. This record is also third highest for any age in these provinces. For junior three-year-olds L.E.S. Evergreen Gretchen stands second in the Prairie Provinces with 17·83 pounds of butter in seven days. Besides these records specially mentioned there are a number of other very creditable records.

Short records are not featured at this Station. In all record work the 305-day record is the objective as there is a calving limit of 400 days, and if a cow is to be most profitable she should calve once a year. The 305-day record makes this necessary, and is therefore the most reliable record. All cows and heifers on Record of Performance are bred to calve within 400 days, but where they do not hold to a service early enough to have them drop a calf within the time limit for the 305-day division they are carried on for the 365-day record. They are not forced for the short record, as this has a tendency to interfere with, and spoil to some extent, the yearly record.

STATEMENT OF RECORDS MADE BY COWS AND THEIR DAUGHTERS SHOWING THE INFLUENCE OF THE SIRE

Records of Daughters						Records of Dams					
Sires and Daughters	Age	Days milking	Milk	Fat	Test	Dams	Age	Days milking	Milk	Fat	Test
Daughters of Royalton Korndyke Count—											
L.E.S. Nina Gem Lutske, 34364.	7	365	18,922	670	3·54	Nina Gem Lutske, 10674...	6	365	15,453	462	3·00
L.E.S. Korndyke Rosa Echo 35780.	5	365	19,244	621	3·23	Lawncrest Rosa Echo, 15021.	5	365	14,932	402	2·69
L.E.S. Korndyke Rosa, 34367.	7	298	14,570	489	3·36	" "	5	365	14,932	402	2·69
L.E.S. Daisy Johanna, 31601.	6	365	14,569	460	3·16	Daisy Johanna Ormsby, 18324.	4	365	13,118	486	3·70
L.E.S. Royalton Korndyke Star, 42578.	6	365	18,653	599	3·20	Lenore Dell Burke Star, 10962.	3	365	15,764	430	2·72
Averages for Daughters..	6·2	351	17,191	567	3·29	Averages for dams.....	4·6	365	14,839	436	2·96
Daughters of Sir Evergreen Ormsby—											
L.E.S. Evergreen Rosa, 56204.	3	365	18,261	559	3·06	L.E.S. Korndyke Rosa, 34367.	7	298	14,570	489	3·36
L.E.S. Evergreen Johanna, 56199.	5	349	16,014	558	3·48	L.E.S. Daisy Johanna, 31601.	6	365	14,569	460	3·16
Averages of daughters...	4	357	17,137	558·5	3·27	Averages of dams.....	6·5	331	14,570	474	3·26
Daughters of Roycroft King Spofford—											
L.E.S. Johanna Alcartra, 75007.	2	365	17,718	624	3·52	L.E.S. Evergreen Johanna, 56199.	5	349	16,014	558	3·48
L.E.S. Nina Alcartra, 91370	2	365	18,185	562	3·09	Nina Gem Lutske, 10674..	6	365	15,453	462	3·00
L.E.S. May Echo Gretchen, 75006.	2	365	16,068	530	3·30	L.E.S. May Echo Lee, 56206.	3	365	16,787	494	2·94
L.E.S. Evergreen Gretchen, 75005.	1½	365	13,628	449	3·29	L.E.S. Evergreen Rosa, 56204.	3	365	18,261	559	3·06
Averages for daughters..	2	365	16,399	541	3·30	Averages for dams.....	4	361	16,628	518	3·12
Daughters of Prince Aaggie Mechthilde—											
L.E.S. Aaggie Mechthilde Echo, 56200.	4	345	15,563	556	3·57	Lawncrest Rosa Echo, 15021.	5	365	14,932	402	2·69
L.E.S. May Echo Mechthilde, 70080.	2	365	12,992	409	3·15	May Echo Lady, 39918....	6	365	21,885	679	3·10
L.E.S. Ianthe Aaggie De Kol, 70079.	2	365	14,095	517	3·67	Rhoda De Kol Beets, 17440	4	365	13,361	423	3·16
L.E.S. Royalton Aaggie, 91369.	2	365	14,049	493	3·51	L.E.S. Royalton Korndyke Star, 42578.	6	365	18,653	599	3·20
L.E.S. Princess Hebron, 91371.	2	365	17,839	620	3·48	Princess Margaret Hsbron, 17051 (not official).	6	275	8,920	303	3·40
Averagss for daughters..	2·4	361	14,907	519	3·47	Averages for dams.....	5·4	347	15,550	481	3·11
Averages for all daughters..	3·6	358	16,273	544	3·35	Averages for all dams.....	5	354	15,475	475	3·03

OAT GREENFEED VS. ALFALFA FOR MILK PRODUCTION

Object.—To compare oat greenfeed and alfalfa hay as to their suitability for the economic production of milk.

Plan.—Eight high-producing milch cows were used in this experiment. The feeding period was of nine weeks duration and divided into three periods of three weeks each. For the first three weeks alfalfa was fed in addition to the meal mixture and ensilage. Oat greenfeed was fed for the second three weeks and alfalfa again for the final three weeks. In taking the data, the last week of each period only was used. This would eliminate any effect caused by a change of feed. To counteract the normal decline in milk flow alfalfa was fed in the first and third periods, and the average of these results is taken and compared with the results obtained from feeding the oat greenfeed. To obtain the percentage of butterfat a test was taken in the middle of the final week of each period. The same amounts of feed by weight were fed throughout the entire nine weeks. Feeds were charged at the following prices, which are at cost of pro-

duction for home-grown feeds and at cost laid down at the Station for brought-in feeds:—

Alfalfa, $23.35 a ton.
Oat Greenfeed, $10 a ton.
Ensilage, $3.50 a ton.
Meal Mixture, 1.43 cents a pound.

The meal ration fed to these cows consisted of the following mixtures:—

Oats, 240 pounds at 50 cents a bushel.
Bran, 120 pounds at $16.90 a ton.
Oilcake meal, 100 pounds at $48 a ton.
Barley, 60 pounds at 60 cents a bushel.
Shorts, 50 pounds at $18.90 a ton.
Bone meal, 5 pounds at $45 a ton.
Salt, 6 pounds at $1.10 a hundred.
Total, 581 pounds; cost $8.34.
Cost per pound, 1.43 cents.

The alfalfa used in this experiment was extra choice No. 1 second cutting from the Lethbridge area. It was leafy and well cured, perhaps just a little too dry in the bale.

The oat greenfeed was grown in 1922. It was Banner oats seeded late in a dry year and cut with a mower. There was a high percentage of second growth. Because of the fine straw and the fine cut of second growth oats it made a good quality of feed with practically no waste.

OAT GREENFEED VS. ALFALFA FOR MILK PRODUCTION

—		First Period Alfalfa	Third Period Aflalfa	Average of First and Third Periods—Alfalfa	Second Period—Oat Greenfeed
Number of cows on test		8	8	8	8
Total milk produced in final week of each period	Lbs.	2,721·7	2,577·3	2,649·5	2,572·0
Average per cow per day	"	48·6	46·0	47·3	45·9
Average percentage butterfat in milk	%	3·58	3·26	3·42	3·33
Total pounds of butterfat for one week	Lbs.	97·43	84·01	90·61	85·64
Average butterfat per cow per day	"	1·74	1·50	1·61	1·53
Value of butterfat at 30 cents per pound	$	29·22	25·20	27·18	25·69
Amounts of Feed Required					
Alfalfa at $23.35 a ton	Lbs.	735	735	735	.....
Oat greenfeed at $10 a ton	"	.....	.....	.....	735
Ensilage at $3.50 a ton	"	1,680	1,680	1,680	1,680
Meal mixture at 1·43 cents a pound	"	952	952	952	952
Total cost of feed	$	25·13	25·13	25·13	20·22
Profit over cost of feed not including skim milk	$	4·09	0·07	2·05	5·47
Cost to produce 100 pounds of milk	$	0·92	0·97	0·94	0·78
Cost to produce 1 pound of butterfat	$	0·25	0·29	0·27	0·23

The results of this experiment go to show that cows will produce more milk and butter fat when fed alfalfa than when fed oat greenfeed. On alfalfa the cows gave an average of 47.3 pounds of milk daily, while on oat greenfeed the average was 45.9 pounds of milk daily. In a week on alfalfa the cows gave 4.97 pounds of butterfat more than in a week on oat greenfeed. The difference in cost of production is, however, in favour of greenfeed. A week's feeding including alfalfa cost $25.13, as compared with $20.22 for a week's feeding including oat greenfeed. When fed alfalfa the eight cows showed a profit of $2.05 in a week, and $5.47 when fed oat greenfeed. When fed alfalfa it cost 94 cents to produce 100 pounds of milk and 27 cents to produce a pound

of butterfat, but when fed oat greenfeed it cost only 78 cents a hundred for milk and 23 cents for a pound of butterfat. Thus, while in this experiment the cows produced considerably more of both milk and butterfat when fed alfalfa, the cost of production was decidedly in favour of greenfeed. Both feeds were charged at the high prices of 1923, $23.35 a ton for alfalfa and $10 a ton for oat greenfeed.

In this experiment the cows used were on Record of Performance and were fed a daily average of 17 pounds of meal mixture. This has cut down the profits and prevented any great differences being shown with regard to the merits of alfalfa and greenfeed for milk and fat production. Were the grain ration less the differences in favour of alfalfa would probably be much greater.

One other point which this feed comparison brings out is the difference in favour of home-grown feed for profitable milk and butter production. The alfalfa was shipped in from the south and the cost would be prohibitive for extensive feeding in a commercial way. The oat greenfeed grown on the Farm and fed at cost of production is much more economical and quite satisfactory when used as a general roughage.

LACTATION RECORDS COMPLETED IN 1923

In the following table is a compilation of all lactation records completed in the calendar year of 1923 with amounts of feed required by the individual cows during their lactation period. Because of breeding troubles a few of the records are for considerably more than one year in duration, and consequently the cost of milk production is raised and the daily average of the herd reduced. These troubles, however, are met with in most herds, and to get an accurate statement on the cost of milk and butter production it is necessary to include all lactation records. The feed totals are for the actual milking period, and do not include the dry periods before calving, usually of about two months' time. Pasture has also been omitted, but as the pasture consisted of oats or a mixture of rye and oats seeded annually, which at the most lasted from 3½ to 4 months valued at $2 a month, this cost added to the total lactation period is insignificant.

Some of the records are spread over two seasons, and it has been difficult to set accurate values on the various feeds which have differed quite widely over this period of time. An attempt has been made to set an average price for the past two years on the basis of cost on feed brought in and laid down at the Station. With oat greenfeed, ensilage and roots, all home-grown feeds, the values represent cost of production. The meal mixture for the cows on Record of Performance was made up as follows:—

240 pounds of oat chop at 50 cents a bushel.
120 pounds of bran at $20 a ton.
100 pounds of oilcake meal at $50 a ton.
5 pounds edible bone meal at $45 a ton.
6 pounds salt at $1.10 a hundred.

This was varied at times with the addition of 60 pounds of barley at 60 cents a bushel and 50 pounds of shorts at $22 a ton. This mixture cost approximately 1½ cents a pound. Alfalfa was fed extensively to R.O.P. cows and is put in at $25 a ton. Prairie hay cost $18 a ton, oat greenfeed $10 a ton, ensilage $4 a ton, and roots, consisting of swede turnips and mangolds, $3 a ton.

The majority of the pure-bred Holsteins were forced for Record of Performance, and as a result the costs are correspondingly higher. The grade Holsteins were well fed at all times, but not any more than they should be under good farming conditions. Their records and costs would be more applicable to average farming conditions.

The pure-bred herd of fourteen head, averaging 4.8 years of age and 413 days to a lactation period, have given an average of 15,737 pounds of milk testing 3.4 per cent. Their butter records average 659.1 pounds of butter each. At $1.60 a hundred the milk is worth $251.79 and the butter $197.73 at 30 cents a pound. The feed cost $160.95, making a profit when sold as milk of $90.84 per cow and sold as butter of $36.78. With the pure-breds, milk cost $1.02 per hundred and butter 24.4 cents a pound.

The grade herd of eight head averaging 3.7 years of age and 365 days to a lactation period have given an average of 11,066 pounds of milk testing 3.57 per cent. Their butter records average 510.3 pounds. At $1.60 per hundred their milk is worth $177.06, and at 30 cents the butter is worth $153.11. The feed cost for the grades is $114.21, and they therefore show a profit of $62.85 on the milk and $38.90 on butter. With the grades, milk cost $1.027 per hundred and butter 22.3 cents. The milk has cost practically the same with the pure-breds and grades, but as the grades have a higher butterfat test the cost of butter is lower from the grade herd by 2.1 cents per pound.

The whole herd of twenty-two head have given an average of 14,039 pounds of milk. The daily average per head is 35.4 pounds, which is considered a high average for this number of dairy cows, including as it does all the cows, both pure-breds and grades, completing records in the year. It has cost $143.95 each to feed these cows for 396 milking days. Milk has cost $1.022 per hundred and butter 23.7 cents a pound.

The pure-breds have given more milk and butter than the grades, but the milk has cost practically the same because the pure-breds were fed a more expensive ration. Because the grade cows have a higher butterfat test, they have made butter cheaper than the pure-breds. The average rations for the pure-breds and grades are as follows:—

Pure-Breds—			
Meal	6,181 pounds		
Dry roughages	4,035 pounds	Alfalfa	2,555 lbs.
		Prairie hay	805 "
		Oat greenfeed	675 "
Succulent roughages	14,018 pounds	Ensilage	11,383 lbs.
		Roots	2,635 "
Grades—			
Meal	4,197 pounds	Oat chop	2,188 lbs.
		Barley chop	215 "
		Bran	1,242 "
		Oilcake meal	552 "
Dry roughages	3,279 pounds	Alfalfa	588 lbs.
		Prairie hay	1,205 "
		Oat greenfeed	1,486 "
Succulent roughages	13,801 pounds	Ensilage	12,246 "
		Roots	1,555 "

Name and Number of Cow or Heifer	Age when freshened	Date of dropping calf	Number of days in lactation period	Total amount of milk in lactation period	Daily average yield of milk	Average per cent of fat in milk	Pounds of 80 per cent butter	Value of milk at $1.60 a hundred	Value of butter at 30 cents a pound	Pound of test cows meal mixture at 1½ cents a pound	Pounds of oat-chop at $1.50 a hundred	Pounds of barley-chop at $1.25 a hundred
								$ cts.	$ cts.			
Pure-bred Holsteins—												
Nina Gem Lutske—10674	13	Feb. 5, 1922	360	8,405	23·3	3·4	377·5	134 48	113 25	535	1,050	560
L.E.S. Nina Gem Lutske—34364	7	Nov. 1, 1921	485	20,047	41·3	3·4	850·6	320 75	255 18	8,420	.....	.....
L.E.S. Daisy Johanna—31601	8	Sept. 25, 1922	333	10,490	31·5	3·5	446·0	167 84	133 80	1,560	1,380	.....
L.E.S. Korndyke Rosa Echo—35780	7	Aug. 5, 1922	375	17,469	46·5	3·4	728·1	279 50	218 43	3,000	1,730	.....
L.E.S. Royalton Korndyke Star—42578	6	Jan. 1, 1922	423½	19,992	47·2	3·2	787·5	319 87½	236 25	7,475	.....	.....
L.E.S. Evergreen Rosa—56204	5	Dec. 5, 1922	320	14,953	46·7	3·3	622·5	239 24	186 75	5,450	.....	.....
L.E.S. Evergreen Johanna—56199	5	Aug. 17, 1922	362¼	16,112	44·5	3·5	692·2	257 79¼	207 66	5,920	.....	.....
L.E.S. May Echo Mechthilde—70080	3	Dec. 17, 1922	348	13,933	40·0	3·3	544·0	222 92	163 20	5,060	.....	.....
L.E.S. Ianthe Aaggie De Kol—70079	2	" 28, 1921	424	15,368	36·2	3·6	682·9	245 88	204 87	7,890	.....	.....
L.E.S. Aaggie Mechthilde Echo—56200	4	" 1, 1921	656	22,423	34·1	3·5	951·2	358 76	285 36	6,670	1,510	.....
L.E.S. Johanna Alcartra—75007	2	Feb. 19, 1922	422	18,932	44·8	3·3	770·0	302 91	231 00	7,880	.....	.....
L.E.S. Royalton Aaggie—91369	2	May 17, 1922	489	17,144	35·0	3·6	745·1	274 30	223 53	6,735	.....	.....
L.E.S. May Echo Gretchen—75006	2	Aug. 8, 1922	388	16,402	42·2	3·3	665·4	262 43	199 62	4,830	.....	.....
L.E.S. Korndyke Helbon—91372	2	" 7, 1922	407	8,656	21·2	3·4	365·3	138 49	109 59	400	1,940	.....
Totals for Pure-breds	68	.....	5,792	220,326	534·5	47·7	9,228·3	3,525 16	2,768 49	71,825	7,610	560
Averages for Pure-Breds	4·8	.....	413	15,737	38·1	3·40	659·1	251 79	197 73	5,130	543	40
Grade Holsteins—												
Grade No. 41	7	Sept. 26, 1921	625	15,676	25·0	3·8	761·2	250 81	228 36	.....	2,550	1,510
Grade No. 136	5	May 19, 1922	332	10,099	30·4	3·1	390·4	161 58	117 12	.....	2,460	70
Grade No. 128	5	June 14, 1922	210	7,522	35·8	3·5	334·7	120 35	100 41	.....	940	140
Grade No. 124	3	Jan. 11, 1922	670	21,689	32·3	4·0	1,086·0	347 02	325 80	.....	4,330	.....
Grade No. 121	3	Dec. 1, 1921	427	11,514	26·9	3·6	536·3	184 22	160 89	.....	2,430	.....
Grade No. 105	3	Mar. 3, 1923	303	10,043	33·1	3·5	441·5	160 68	132 45	.....	2,080	.....
Grade No. 140	2	Aug. 6, 1922	215	6,238	29·0	3·7	286·7	99 80	86 01	.....	1,679	.....
Grade No. 190	2	Oct. 17, 1922	145	5,752	39·6	3·4	246·2	92 03	73 86	.....	1,050	.....
Totals for Grades	30	.....	2,927	88,533	252·1	28·6	4,083·0	1,416 49	1,224 90	.....	17,510	1,720
Averages for Grades	3·7	.....	365	11,066	30·2	3·57	510·3	177 06	153 11	.....	2,188	215
Totals for Herd	98	.....	8,719	308,859	786·6	76·3	13,311·3	4,941 65	3,993 39	71,825	25,120	2,280
Averages for Herd	4·4	.....	396	14,039	35·4	3·48	605·0	224 62	181 51	3,264	1,141	103

DAIRY HERD PRODUCTION—*Continued*

Name and Number of Cow or Heifer	Pounds of bran at $20 a ton	Pounds of of oilcake meal at $50 a ton	Pounds of alfalfa at $25 a ton	Pounds of Prairie hay at $18 a ton	Pounds of greenfeed at $10 a ton	Pounds of ensilage at $4 a ton	Pounds of roots at $3 a ton	Total cost of feed during lactation period	Cost to produce 100 pounds of milk	Cost to produce a pound of butter	Profit from milk at at $1.60 a hundred	Profit from butter at 30 cents a pound
								$ cts.	$ cts.	c.	$ cts.	$ cts.
Pure-Bred Holsteins—												
Nina Gem Lutske—10674	930	385	.....	1,000	1,470	9,930	1,420	88 03	1 04	23·3	46 45	25 22
L.E.S. Nina Gem Lutske—34364	.....	.....	4,000	1,070	.....	15,610	1,700	219 70	1 09	25·8	101 45	35 48
L.E.S. Daisy Johanna—31601	995	380	775	950	1,050	9,000	2,100	108 18	1 03	24·2	59 66	25 62
L.E.S. Korndyke Rosa Echo—35780	1,150	420	1,280	840	1,160	11,070	2,390	148 03	0 84	20·4	131 47	70 40
L.E.S. Royalton Korndyke Star—42578	.....	.....	3,520	450	550	12,675	2,510	192 03	0 96	24·3	127 84	44 22
L.E.S. Evergreen Rosa—56204	.....	.....	2,760	530	200	7,090	3,180	140 97	0 93	22·6	98 27	45 78
L.E.S. Evergreen Johanna—56199	.....	.....	2,930	650	540	9,520	4,050	198 08	0 98	22·9	98 71	48 58
L.E.S. May Echo Mechthilde—70080	.....	.....	2,820	630	440	5,610	1,600	132 64	0·95	24·3	90 28	30 56
L.E.S. Ianthe Aaggie De Kol—70079	.....	.....	3,110	850	530	13,000	2,770	197 67	1 28	28·9	48 21	7 20
L.E.S. Aaggie Mechthilde Echo—56200	800	250	4,230	1,010	720	18,480	2,240	242 83	1 08	25·5	115 93	42 53
L.E.S. Johanna Alcartra—75007	.....	.....	3,240	750	510	13,510	4,560	201 86	1 06	26·2	101 05	29 14
L.E.S. Royalton Aaggie—91369	.....	.....	3,320	710	450	12,310	3,850	181 55	1 05	24·3	92 75	41 89
L.E.S. May Echo Gretchen—75006	.....	.....	3,070	730	410	9,470	3,350	143 40	0 87	21·5	119 03	56 22
L.E.S. Korndyke Helbon—91372	1,020	240	720	1,110	1,430	12,090	1,180	97 39	1 12	26·6	41 10	12 20
Totals for Pure-breds	4,895	1,675	35,775	11,280	9,460	159,365	36,900	2,253 36	14 28	340·8	1,271 80	515 04
Averages for Pure-breds	349	119	2,555	805	675	11,383	2,635	160 95	1 02	24·4	90 84	36 78
Grade Holsteins —												
Grade No. 41	1,960	320	1,230	2,260	2,740	22,470	3,130	183 76	1 17	24·1	67 05	44 60
Grade No. 136	1,130	600	470	1,040	1,340	11,620	1,480	111 46	1 10	28·5	50 12	5 66
Grade No. 128	940	320	310	760	920	7,400	.....	63 36	0 84	18·9	56 99	37 05
Grade No. 124	2,240	1,260	980	2,230	2,550	20,530	1,440	207 14	0 95	19·0	139 88	118 66
Grade No. 121	1,260	740	690	1,410	1,720	15,550	890	129 89	1 12	24·2	54 33	31 00
Grade No. 105	850	380	460	890	1,160	7,480	1,890	86 65	0 86	19·6	74 03	5 80
Grade No. 140	750	460	290	530	740	7,260	1,700	73 21	1 17	25·5	26 59	12 80
Grade No. 190	800	340	280	520	720	5,660	1,910	58 21	1 01	23·6	33 82	15 65
Totals for Grades	9,940	4,420	4,710	9,640	11,890	97,970	12,440	913 68	8 22	183·4	502 81	311 22
Averages for Grades	1,242	552	588	1,205	1,486	12,246	1,555	114 21	1·027	22·3	62·85	38·90
Totals for Herd	14,835	6,095	40,485	20,920	21,350	257,335	49,340	3,167 04	22 50	524·2	1,774 61	826 26
Averages for Herd	674	277	1,840	951	970	11,697	2,242	143 95	1·022	23·7	80·66	37·55

Cheddar cheese has been made at this Station for some years. This is put in small family-size cheeses weighing about ten pounds each. A good trade has been built up for this cheese, with the local merchants and merchants from nearby towns. Many farmers in the district also come to the Station for cheese. As most of the cheese sold in Alberta has to be shipped in from Ontario, there is a strong demand for this home-grown cheese, and the price during the past year has been very good, varying from 21½ to 27½ cents per pound. Butterfat has sold at prices varying from 27 to 42 cents.

In the table following is the Dairy Report giving the number of pounds of milk made into cheese for each month, its value as cheese and its value had it been separated and sold as butterfat. The value of the skim-milk or whey is not taken into consideration, but the cheese shows a much greater profit than butterfat. The average difference per hundred of milk made into chesse is $1.13 more than milk sold as butterfat. This would indicate that there are possibilities in cheese-making for this province.

Month	Amount milk for cheese	Cheese made	Milk for one pound cheese	Price of cheese per pound	Value of milk per cwt.	Per cent of fat in milk	Number of pounds butterfat	Price of butter fat per pound	Value of milk per cwt.	Profit per cwt. of milk for cheese over butter	Average profit for year per cwt. of milk of cheese over butter
	lbs.	lbs.	lbs.	cts.	$ cts.	%	lbs.	cts.	$ cts.	$ cts.	$ cts.
January	1,164	113¾	10·2	21½	2 10	3·7	43·06	36	1 33	0 77	.....
February	7,333	714	10·2	23	2 16	3·6	263·98	38	1 49	0 67	.....
March	6,745	642½	10·5	26	2 45	3·5	236·07	42	1 47	0 98	.....
April	5,974	557¼	10·7	26	2 42	3·4	203·11	37	1 24	1 18	.....
May	7,820	716	10·9	23	2 10	3·1	242·42	30	0 92	1 18	.....
June	9,306	875¼	10·6	22	2 05	3·5	325·71	28	0 98	1 07	.....
July	7,508	716¼	10·5	22	2 09	3·4	255·27	27	0 92	1 17	.....
August	4,521	422	10·7	22	2 03	3·3	149 19	28	0 88	1 15	.....
September	8,210	768½	10·6	23½	2 19	3·3	270·93	29	0 95	1 24	.....
October	9,654	940¾	10·2	27	2 63	3·6	347·54	32	1 16	1 47	.....
November	8,253	777	10·6	27½	2 56	3·4	280·60	32	1 08	1 48	.....
December	7,418	715	10·3	26	2 50	3·5	259·63	35½	1 24	1 26	1 13

SHEEP

The main project with sheep at this Station has been a grading-up experiment started in 1917. Some 400 range ewes of Merino breeding were bought and mated to pure-bred rams of the following six breeds: Leicester, Cheviot, Corriedale, Oxford, Hampshire, and Shropshire. The cross-bred ewes have been mated to pure-bred rams until at the present time the breeding ewes are mostly second and third-cross ewes. Blood is beginning to tell as the ewes are now very fair representatives of their breeds. Uniformity and type are now clearly demonstrated throughout the breeds. The flock as it stands at present numbers 757 head including 11 rams, 334 breeding ewes, 243 lambs, 44 cull yearlings and 125 cull ewes mostly five years old. The breeding ewes are divided as follows:—

Leicesters	65
Cheviots	51
Corriedales	50
Oxfords	49
Hampshires	50
Shropshires	69
Total	334

Eventually these ewes will be cut to a basis of 50 ewes of each breed. In the past, some breeds have increased more rapidly, and others have been culled more severely which accounts for the numbers as they stand at present. These ewes were put in for breeding commencing November 5, 1923.

The past year has been a good year for the sheep breeder. Lambs and mutton sheep have been in keen demand all year. The lowest quotation for good lambs has been nine cents with the highest at thirteen cents. The market for lambs has been steadier than for any other class of live stock, and the wool market has been better than in the two previous years. At this Station the flock has made very satisfactory progress. All breeds are taking on a uniformity and breed type which is unmistakable. Generally speaking, 1923 has not been as good a year for range sheep as in 1922 and 1921. While on summer range there was much more rainfall, and this was hard on the sheep and particularly on the lambs. There were heavy frosts early in September, and in the first week of September there was a snowfall of three inches which remained on the ground for several days, and the sheep were forced to feed in the low bottoms where the grass was rank. The ewes came in off range in November averaging two pounds lighter than in 1922, and six pounds lighter than in 1921. The lambs averaged three pounds lighter than in 1922, and one pound lighter than in 1921.

COMPARISON OF BREEDS BY WEIGHT TAKEN WHEN THE EWES CAME IN OFF SUMMER RANGE EARLY IN NOVEMBER

Ewes

Breed	1921	1922	1923	Averages for all years
Hampshires	102·6	117·5	114·0	111·3
Oxfords	93·9	113·6	108·3	105·2
Corriedales	94·4	107·5	110·8	104·2
Leicesters	96·7	107·1	102·6	102·1
Cheviots	96·8	104·9	95·8	99·1
Shropshires	85·2	102·1	98·2	95·1
Average for all breeds	94·9	108·7	104·9	102·8

COMPARISON OF BREEDS BY WEIGHT TAKEN WHEN THE LAMBS CAME IN OFF SUMMER RANGE EARLY IN NOVEMBER

Lambs

Breed	1920	1921	1922	1923	Averages for all years
Hampshires	66·2	65·0	67·0	63·3	65·3
Oxfords	60·5	62·8	67·0	64·6	63·7
Leicesters	60·6	62·0	62·0	56·0	60·1
Cheviots	66·2	59·2	58·4	53·6	59·3
Corriedales	57·6	56·4	56·8	57·9	57·1
Shropshires	56·3	52·1	57·5	54·4	55·0
Average for all breeds	61·2	59·5	61·4	58·3	60·1

COMPARISON OF BREEDS BY WEIGHT TAKEN WHEN THE YEARLING WETHERS CAME IN OFF SUMMER RANGE EARLY IN NOVEMBER

Wethers

Breed	1921	1922	Average for all years
Hampshires	95·2	115·5	105·3
Oxfords	93·1	115·4	104·2
Leicesters	92·5	114·7	103·6
Corriedales	94·9	101·8	98·3
Cheviots	94·2	100·0	97·1
Shropshires	83·3	93·5	88·4
Average for all breeds	92·2	106·8	99·5

NOTE.—As it has been amply demonstrated that it pays to market as lambs rather than yearlings, no wethers other than a few culls were kept over in 1923. The practice in future will be to market as lambs.

Lambing Statement, 1923

Breed	Ewes	Total ewes bred	Total ewes lambed	Per cent of ewes bred which lambed	Dry ewes	Ewes with twin lambs	Number of living ewe lambs	Number of living ram lambs	Number of ewe lambs born dead	Number of ram lambs born dead	Ewe lambs died after birth	Ram lambs died after birth	Total number of all lambs	Weight of ewe lambs	Weight of ram lambs	Average weight of ewe lambs	Average weight of ram lambs	Average weight of all lambs	Per cent of living lambs to ewes lambed	Per cent of living lambs to total ewes bred
Leicesters.....	First Cross...	41	31	75·6	10	6	19	15	.....	2	.....	1	37	141·5	118·5	7·4	7·9	7·6	109·6	82·9
	Second Cross.	27	14	51·8	13	0	9	5	.....	.....	.....	.....	14	65·5	35·0	7·2	7·0	7·1	100·0	51·8
	Total.....	68	45	66·1	23	6	28	20	.....	2	.....	1	51	207·0	153·5	7·3	7·6	7·5	106·6	70·5
Cheviots.....	First Cross...	28	28	100·0	0	2	13	16	.....	1	.....	.....	30	97·0	130·0	7·4	8·1	7·8	103·5	103·5
	Second Cross.	26	23	88·4	3	0	11	12	.....	.....	.....	.....	23	90·0	81·5	8·1	6·8	7·4	100·0	88·4
	Total.....	54	51	94·4	3	2	24	28	.....	1	.....	.....	53	187·0	211·5	7·7	7·5	7·6	101·9	96·3
Corriedales....	First Cross...	28	24	85·7	4	5	8	18	1	.....	.....	2	29	67·0	153·5	8·3	8·5	8·4	108·3	92·8
	Second Cross.	13	7	53·8	6	0	2	4	.....	.....	.....	1	7	12·5	22·0	6·2	5·5	5·7	85·7	46·1
	Total.....	41	31	75·6	10	5	10	22	1	.....	.....	3	36	79·5	175·5	7·9	7·9	7·9	103·2	78·0
Oxfords.....	First Cross...	46	45	97·9	1	2	27	18	.....	.....	.....	2	47	233·0	167·0	8·6	9·2	8·8	100·0	97·9
	Second Cross.	16	16	100·0	0	0	7	9	.....	.....	.....	.....	16	62·0	77·0	8·8	8·5	8·6	100·0	100·0
	Total.....	62	61	98·3	1	2	34	27	.....	.....	.....	2	63	295·0	244·0	8·6	9·0	8·8	100·0	98·3
Hampshires...	First Cross...	26	26	100·0	0	5	15	13	.....	3	.....	.....	31	130·0	109·5	8·6	8·4	8·5	107·6	107·6
	Second Cross.	17	17	100·0	0	0	12	5	.....	.....	.....	.....	17	111·5	42·0	9·3	8·4	9·0	100·0	100·0
	Total.....	43	43	100·0	0	5	27	18	.....	3	.....	.....	48	241·5	151·5	8·9	8·4	8·7	104·6	104·6
Shropshires....	First Cross...	45	40	88·8	5	2	15	25	.....	1	1	.....	42	115·5	204·5	7·7	8·1	8·0	100·0	88·8
	Second Cross.	31	25	80·6	6	0	19	5	.....	.....	.....	1	25	143·0	40·5	7·5	8·1	7·6	96·0	77·4
	Total.....	76	65	85·5	11	2	34	30	.....	1	1	1	67	258·5	245·0	7·6	8·1	7·8	98·4	84·2
	Grand total...	344	296	86·0	48	22	157	145	1	7	1	7	318	1,268·5	1,181·0	8·07	8·15	8·11	102·0	87·7

SUMMARY OF LAMBING STATEMENTS FOR 1921, 22–23

Breed	Number of Ewes which Lambed			Total Numbers of Living Lambs			Percentage of Living Lambs to Ewes which Lambed			Percentage for three years of Lambs to Ewes which Lambed
	1921	1922	1923	1921	1922	1923	1921	1922	1923	1921–22–23
Leicesters	47	49	45	51	57	48	108·5	116·3	106·6	110·6
Cheviots	36	47	51	32	53	52	88·8	112·7	101·9	102·2
Corriedales	21	33	31	21	36	32	100·0	109·0	103·2	104·7
Oxfords	38	48	61	39	53	61	102·6	110·4	100·0	104·0
Hampshires	36	45	43	33	55	45	94·2	122·2	104·6	107·2
Shropshires	77	99	65	53	103	64	68·8	104·0	98·4	91·2
Totals	255	321	296	229	357	302	89·8	111·2	102·2	101·8

SUMMARY OF LAMB LOSSES FOR 1922 AND 1923, INCLUDING LOSSES FROM LAMBING UNTIL WEANED IN NOVEMBER

Breed	Total Lambs Lambed		Number of Lambs Living when the Sheep came in off Summer Range in November		Percentage of Lambs lost from Lambing until coming in off Summer Range in November		
	1922	1923	1922	1923	1922	1923	Average 1922-1923
Leicesters	48	57	45	37	6·2	35·0	21·9
Cheviots	52	53	50	48	3·8	9·4	6·6
Corriedales	32	36	19	22	40·6	38·8	39·7
Oxfords	61	53	40	48	34·4	9·4	22·8
Hampshires	45	55	42	33	6·6	40·0	25·0
Shropshires	64	65	54	55	15·6	15·3	15·5
Totals	302	319	250	243	17·2	23·8	20·6

Breed	Number of fleeces	Three-eighths staple bright	Three-eighths staple semi-bright	Three-eighths clothing bright	Three-eighths clothing semi-bright	One-quarter staple bright	One-quarter staple semi-bright	One-quarter clothing bright	One-quarter clothing semi-bright	Low one-quarter staple bright	Low one-quarter staple semi-bright	Coarse semi-bright	Medium seedy semi-bright	Coarse seedy semi-bright	Soft cotts	Total weights of fleeces	Average weights of fleeces
Leicesters—																	
Rams	2						179·0				250·0	22·0				22·0	11·0
Ewes	78					6·0	9·0			16·0	117·0		24·0	7·0	6·0	488·0	6·27
Lambs	26															126·0	4·84
Percentage in each grade	106					0·94	29·55			2·51	57·70	3·45	3·77	1·10	0·94	636·0	6·0
Cheviots—																	
Rams	3						21·0				5·0					26·0	8·6
Ewes	54		78·0				184·0		9·0		5·0		61·0			337·0	6·24
Lambs	35	11·0		8·0		109·0			13·0	5·0			2·0			148·0	4·22
Percentage in each grade	92	2·15	15·26	1·56		21·33	40·11		4·30	0·97	1·95		12·32			511·0	5·55
Corriedales—																	
Rams	1						14·75									14·75	14·75
Ewes	39	83·0	20·0		15·0	124·0	30·0						16·0			288·0	7·38
Lambs	28		62·0		4·0		74·0						8·0			148·0	5·28
Percentage in each grade	68	18·41	18·19		4·21	27·50	26·34						5·32			450·75	6·62
Oxfords—																	
Rams	2										33·0					33·0	16·5
Ewes	52	43·0	6·0			90·0	143·0		15·0				11·0			308·0	5·92
Lambs	14		18·0			45·0	23·0									86·0	6·14
Percentage in each grade	68	10·07	5·62			31·61	38·87		3·51		7·72		2·57			427·0	6·27
Hampshires—																	
Rams	2						22·75									22·75	11·37
Ewes	53	120·0	113·0		16·0		54·0						20·0			323·0	6·09
Lambs	20		60·0				36·0						6·0			102·0	5·10
Percentage in each grade	75	26·80	38·63		3·57		25·18						5·80			447·75	5·96
Shropshire—																	
Rams	3						43·0									43·0	14·3
Ewes	85	197·0	114·0	14·0	8·0	17·0	76·0		34·0				29·0			489·0	5·75
Lambs	32	140·0		6·0					5·0				7·0			158·0	4·93
Percentage in each grade	120	48·84	16·52	2·89	1·15	2·46	17·24		5·65				5·07			690·0	5·74
Arbitrary value in points		70	65	60	55	50	45	40	35	30	25	20	15	10	5		

WOOL FROM VARIOUS BREEDS

By placing an arbitrary value on each of the grades of wool in the above grading table, commencing with 70 points for ¾ staple bright, 65 points for ¾ staple semi-bright, and so on down to 5 points for soft cotts, it is possible to determine which breed has given the best quality of wool. The percentage of wool in each grade is multiplied by its arbitrary value. The following table gives the standing in order of merit, with the total of points scored by each breed in 1923:—

1—Shropshires	5,902
2—Hampshires	5,803
3—Corriedales	5,343
4—Oxfords	4,754
5—Cheviots	4,521
6—Leicesters	3,136

SUMMARY OF WOOL GRADING STATEMENTS FOR 1921-22-23

Standing of Breeds on the Scoring of the Wool by Grade

Rank	1921	1922	1923	Standing for average of three years
1	Oxfords	Shropshires	Shropshires	Shropshires.
2	Corriedales	Corriedales	Hampshires	Corriedales.
3	Shropshires	Oxfords	Corriedales	Oxfords.
4	Hampshires	Hampshires	Oxfords	Hampshires.
5	Cheviots	Cheviots	Cheviots	Cheviots.
6	Leicesters	Leicesters	Leicesters	Leicesters.

COMPARISON OF BREEDS IN RESPECT OF WEIGHTS OF FLEECES OF RAMS, EWES AND YEARLING LAMBS FOR 1921, 1922 AND 1923

Breed	1921			1922			1923			Totals and averages for three years		
	Number of fleeces	Total weight	Average weight	Number of fleeces	Total weight	Average weight	Number of fleeces	Total weight	Average weight	Number of fleeces	Total weight	Average weight
Leicester—												
Rams				3	32	10·6	2	22	11·0	5	54	10·8
Ewes	36	280	7·7	55	381	6·9	78	488	6·2	169	1,149	6·8
Lambs	36	213	5·9	29	173	5·9	26	126	4·8	91	512	5·6
Cheviots—												
Rams				3	24	8·0	3	26	8·6	6	50	8·3
Ewes	35	255	7·2	60	399	6·6	54	337	6·2	149	991	6·6
Lambs	36	193	5·3	25	120	4·8	35	148	4·2	96	461	4·8
Corriedales—												
Rams				1	11	11·0	1	14·7	14·7	2	25·7	12·8
Ewes	44	318	7·2	44	327	7·4	39	288	7·3	127	933	7·3
Lambs	15	86	5·7	17	105	6·1	28	148	5·2	60	339	5·6
Oxfords—												
Rams				2	20	10·0	2	33	16·5	4	53	13·2
Ewes	46	319	6·9	56	361	6·4	52	308	5·9	154	988	6·3
Lambs	46	265	5·7	45	261	5·8	14	86	6·1	105	612	5·8
Hampshires—												
Rams				2	19	9·5	2	22·7	11·3	4	41·7	10·4
Ewes	22	156	7·0	43	275	6·4	53	323	6·0	118	754	6·3
Lambs	20	105	5·2	26	139	5·3	20	102	5·1	66	346	5·2
Shropshires—												
Rams				2	22	11·0	3	43	14·3	5	65	13·0
Ewes	79	502	6·3	108	647	5·9	85	489	5·7	272	1,638	6·0
Lambs	78	426	5·4	47	242	5·1	32	158	4·9	157	826	5·2
Totals	493	3,118	6·32	568	3,558	6·26	529	3,162·4	5·97	1,590	9,838·4	6·19

SHEEP EXHIBITS

At the Edmonton Spring Live Stock Show, 1923, groups of five wethers and lambs of each breed were exhibited. These were judged as fat wethers and lambs alive, then were slaughtered and placed in order as wether and lamb carcasses. In this way a competent outside judgment was obtained for the comparison of wethers and lambs of the different breeds, both when shown alive and as carcasses, which after all is the ultimate test. The five best wethers and lambs of each breed were selected and fitted for some time before the fair. They were shown in fair flesh, and not excessively fat, just the condition best liked by the packer. A representative group of wethers of each of the six breeds was shown, and so also for the lambs, with the exception of Corriedales, of which breed there were not sufficient representative wether lambs. Weights at Lacombe were taken, and the weights taken again prior to killing. The dressed weights were also available, enabling a comparison of the dressing percentages of the breeds. In the following table are found the results of the comparisons brought out:—

STATEMENT OF AWARDS AND SLAUGHTER TEST ON WETHERS AND LAMBS SHOWN AT THE EDMONTON SPRNG STOCK SHOW, 1923

Yearling Wethers

Breed	No.	Weight at Lacombe	Weight at packing plant	Shrink in six days	Percent shrink in six days	Dressed weights	Dressing percentages	Placing shown on hoof	Placing as carcasses
Cheviot	5	595	530	65	10·9	298	56·2	1	1
Shropshire	5	610	530	80	13·1	290	54·7	4	2
Corriedale	5	655	610	45	6·8	292	47·8	5	3
Oxford	5	750	670	80	10·6	355	52·9	2	4
Hampshire	5	700	670	30	4·2	320	47·7	3	5
Leicester	5	705	640	65	9·2	316	47·1	6	6

Lambs

Shropshire	5	510	480	30	5·8	212	44·1	4	1
Oxford	5	540	510	30	5·5	235	46·0	2	2
Cheviot	5	420	380	40	9·5	186	48·9	1	3
Hampshire	5	500	460	40	8·0	202	43·9	3	4
Leicester	5	510	500	10	1·9	222	44·4	5	5

SUMMARY OF BREED COMPARISONS

The breed comparison work has not been conducted over sufficient years to warrant final conclusions, but certain features are apparent now. Over a period of years the Hampshire ewes have been heaviest when they came in off the range in November. The Oxfords, Corriedales and Leicesters follow in order with the Shropshires in last place, being beaten by the Cheviots in all but this last year. Of the yearling wethers the Hampshires are again in first place, followed closely by the Oxfords and Leicesters with the Corriedales and Cheviots next in order, and the Shropshire last. The Cheviot wethers have been considerably heavier than the Shropshire. In lambs the Hampshires also lead with Oxfords second and Leicesters third. The Cheviots come up to fourth place and the Corriedales drop to fifth place, while the Shropshires again are in the last place. For a small breed it is remarkable how the Cheviot lambs have stood up. They are very hardy little fellows, great rustlers and invariably do well on the range. The Corriedales are slower to develop, making their greatest gains the second year.

The lambing results for the past three years show the Leicester to be the most prolific, having given the highest percentage of lambs to total ewes which lambed. The Hampshire ranks next with the Corriedales, Oxfords, Cheviots, and Shropshires in this order. The Shropshires are in last place by 11 per cent, which is quite an appreciable difference. In the percentage of lambs lost from lambing until they came in off range, the Cheviots are leading by a big percentage. Their losses are 8.9 per cent lower than the Shropshires which are next with an average loss of 15.5 per cent over a period of three years. Leicesters rank third and Oxfords fourth. The Hampshires and Corriedales show the greatest percentages of losses, with the Corriedales as high as 39.7 per cent. The Cheviot lambs are extremely hardy, being very active when born, and usually there are few lambing troubles. The Hampshire and Corriedale lambs are much more tender, especially the Corriedale lambs. When born they are very indifferent, the majority of them taking a few days to get on their feet properly. This tenderness is observed to stay with them until they are well developed or about a year old.

In weights of fleeces the Corriedale ewes lead, the Leicesters coming second by an average of half a pound. Cheviot ewes rank third, followed by the Oxfords and Hampshires which are equal in weight, and the Shropshires are in the last place, being one third of a pound lighter. In lambs the Oxfords lead, with the Corriedales and Leicesters equal in second place. The Shropshires and Hampshires are equal in weight, leading the Cheviot lambs by an average of 0.4 pounds per fleece. In quality over a period of three years the Shropshires have given the best grade, followed very closely by the Corriedales. The Oxfords' fleeces have stood up well in third place and the Hampshires' a good fourth. The Leicesters and Cheviots have the coarsest wool, the Leicesters, each year grading much the lowest.

Under range conditions the Hampshire, Oxford and Corriedale ewes have the most size. The Hampshire and Oxford lambs are considerably the heaviest, and the Shropshires and Corriedales have given the best grade of wool. Taking into consideration the heavier fleece of the Corriedale, it ranks easily first. The Leicester and Hampshire are the most prolific breeds, and the Cheviots have the lowest percentage of losses after lambing.

THE MARKETING OF LAMBS

For the farmer with a large number of lambs, or with numbers large enough to justify shipping in carload lots, the question of shipping, price f.o.b. shipping point or price off cars destination, and their possible difference, is sometimse disconcerting. In the spring of 1923, 80 wether lambs were sold. Tenders were called for prices, and the highest local price offered was 11.30 cents. The highest outside price was 13.00 cents off cars at Edmonton. The Edmonton price was accepted, and the following is a statement comparing the two offers, and setting forth the cost of marketing as found on this shipment of 80 wether lambs:—

SELLING F.O.B. SHIPPING POINT, LACOMBE, VERSUS OFF CARS, EDMONTON
Lacombe Price, 11·30 cents. Edmonton Price, 13·00 cents

Weight of 80 lambs over scales at Lacombe	lbs.	7,340
Value at 11·30c	$	829.42
Value per head	$	10.36
Weight off cars, Edmonton	lbs.	6,750
Shrink in 80 lambs	"	590
Shrink per head	"	7·37
Percentage shrink	%	8·03
Total value off cars, Edmonton	$	877.50
Value per head	$	10.96
Shipping Charges—		
Freight	$	26.40
Switching charges	$	2.50
Cleaning car	$	0.75
Exchange	$	1.05
Total	$	30.70
Net returns off cars, Edmonton	$	846.80
Net returns per head	$	10.58
Difference in favour of 13 cents off cars, Edmonton	$	17.38
Difference per head	cts.	21·7
Difference in price per pound	"	·23
Price at Lacombe which would equal 13c. off cars, Edmonton	"	11·53
Cost of Shipping—		
590 lbs. of shrink at 11·53	$	68.02
Shipping charges by freight	$	30.70
Total cost to ship	$	98.72
Cost per 100 lbs. to ship	$	1.34
Cost per pound to ship	cts.	1·34
Cost divided—		
Shrink, 68·9 per cent.		
Freight charges, 31·1 per cent.		

MARKETING THE WOOL CROP, 1922

For some years the wool crop at the Lacombe Station has been sold through the Canadian Co-operative Wool Growers' Limited. The wool is handled through the local branch of the Central Alberta Wool Growers and shipped in bulk to the main warehouse at Weston, Ont., where it is graded and sold according to grade. In the spring of 1922 local buyers were offering 10 cent a pound for wool. This price was later raised to 12 cents to try to induce the wool growers to accept the cash price rather than ship co-operatively. The following is a statement showing the benefits derived through shipping co-operatively as compared with the price that would have been received from the local buyers.

CO-OPERATIVE MARKETING OF THE WOOL CROP VERSUS SELLING TO LOCAL BUYERS

Total weight of wool shipped from Lacombe	lbs.	3,773
" " reached Weston, Ont.	"	3,682
Shrink in shipping	"	91
Percentage shrink	%	2·41
Total selling price through Co-operative Wool Growers	$	900.58
Selling price per pound (Weston weight)	cts.	24·4
Total net returns	$	706.84
Net returns per pound (Weston weight)	cts.	19·1
Net returns per pound (Lacombe weight)	cts.	18·7
Cost per pound marketing through Co-operative Wool Growers Ltd.	cts.	5·3
Loss per pound due to shrink	cts.	0·4
Total loss per pound from shrink and marketing cost	cts.	5·7
Had the wool been sold to local buyers at 12c., net returns would be 3,773 lbs. at 12c	$	452.76
Loss from selling locally	$	254.08
Net price per pound including shrink	cts.	18·7
Local price	"	12·0
Difference per pound in favour of Co-operative shipment	cts.	6·3

WETHER LAMBS VS. YEARLING WETHERS FOR PROFITS

LAMBS

Date lambed—April and May, 1922.
Carried on free summer range until November 3, 1922.
Fed in corrals from November 3, 1922 until May 4, 1923 or for 182 days.

Cost of feeding until ready for market May 4—	
3 pounds of hay each per day at $18 per ton	$ 4 91
70 pounds of oats each at 50c. a bushel	1 02
Total cost of feed	5 93
On May 4, lambs averaged 91·7 pounds and sold for a net price of 11·53 cents per pound.	
Net returns per head	10 58
Profit per head not including labour	4 65

WETHERS

Date lambed—April and May, 1921.
Carried on free range until November 1, 1921.
Wintered in open corrals until May 25, 1922, for a total of 206 days.

Cost of feeding over first winter—	
3 lbs. of hay per day at $18 per ton	$ 5 56
Less value of wool averaging 5·5 pounds per head at 18·5c. per pound	1 01
Total cost to winter less value of wool	4 55

Carried on free range from May 25 until November 3, 1922.
Fed in corrals from November 3, 1922 until April 3, 1923—151 days.

Cost of feeding for second winter—	
3·5 pounds of hay each at $18 a ton	$4 75
80 pounds of oats each at 50c. a bushel	1 17
Total cost to feed in winter of 1922-23	5 92
Total cost to raise until marketed April 3, 1923	10 47
On April 3 yearling wethers averaged 122·6 pounds and sold for a net price of 9 cents per pound.	
Net returns per head	11 03
Profit per head not including labour	0 56
Profits per head in favour of lambs	4 09

WETHER LAMBS VS YEARLING WETHERS

The statement gives a detail of the actual cost of feeding yearling wethers and wether lambs where the yearlings were carried over until April 3 and the lambs a month longer until May 4. Ordinarily neither would be carried until such a late date but would be fed in the fall and marketed earlier in the winter; but, as both were carried until late in the spring, it afforded a fairly good comparison. The yearlings are handicapped by an extra winter of feeding, which is practically a dead loss because when marketed, though they were 30.9 pounds heavier than the lambs, their added weight hardly offset the greater price received for the lambs; namely, a difference of 2.53 cents per pound net. The market demands lambs weighing from 80 to 90 pounds, and these pay a heavy premium as compared with yearling wethers. Lambs have shown a profit of $4.65 cents per head, while wethers gave a profit of only $0.56 per head because they had to face the cost of an extra winter of feeding, and a cut of 2.53 cents per pound because they were not what the market wanted; namely, lambs weighing from 80 to 90 pounds.

The yearling wethers and lambs were fed on purchased feeds for which the top market prices were paid in years when feed was very expensive. Both yearling wethers and lambs showed a profit in face of the high costs of feeds. The farmer with his own feed, grown at cost of production, would stand to make a much greater profit.

CUT OAT GREENFEED VS. LOWLAND HAY FOR FATTENING EWES

Plan. — Forty-two cull ewes were housed in a shed in two pens 20 feet x 16 feet with twenty-one ewes in each pen. The first lot was fed a ration of lowland hay and grain. The second lot was fed cut oat greenfeed and grain. The lowland hay was a good sample of locally grown prairie hay which would be classified as good lowland hay. The cut oat greenfeed was of very excellent quality. It was fine, well matured, and had a high percentage of green second growth which made very tasty sheep feed. Both lots were fed the same grain ration of whole oats commencing with a half a pound per head per day, increasing to one and a quarter pounds at the end of the sixty-day feeding period.

		Lot 1 Lowland hay and oats	Lot 2 Cut oat greenfeed and oats
Number of sheep in each lot		21	21
Number of days fed		60	60
Total weight commencing test Jan. 15	lbs.	1,930	2,025
Average weight commencing test Jan. 15	"	91·9	96·4
Total value at market price of 3c	$	57·90	60.75
Average value per head	$	2.75	2.89
Total weight at end of 60 days, March 16	lbs.	2,160	2,160
Average weight at end of 60 days, March 16	"	102·8	102·8
Total gain for 60 days	"	230	135
Average gain for 60 days	"	10·95	6·42
Average daily gain for 60 days	"	0·182	0·107
Total value at end of 60 days at 5·50c	$	118.80	118.80
Average value per head	$	5.65	5.65
Increased value through feeding and rise in markets	$	60.90	58.05
Cost of Feed and Labour			
Labour at 25c. a day for 42 head of sheep	$	7.50	7.50
4,500 pounds of cut oat greenfeed at $12 a ton	$	.....	27.00
2,990 pounds of lowland hay at $16 a ton	$	23.92	.....
1,280 pounds of oats at 48c. a bushel	$	18.07	18.07
Total cost of feed and labour	$	49.49	52.57
Total profit	$	11.41	5.48
Profit per head	$	0.54	0.26
Feed per head per day—			
Lowland hay	lbs.	2.37	.....
Cut oat Greenfield	"	.....	3·57
Oats	"	1·01	1·01

The above results would indicate that lowland hay is a better roughage than cut oat greenfeed for old ewes. It was observed that there was much more waste from the oat greenfeed because it was not fed from suitable racks. This no doubt accounted for the large amount required and added to the cost of feed for the group of ewes fed cut oat greenfeed. The old ewes appeared to take less kindly to the greenfeed than younger sheep fed at the same time in a roughage experiment. It was observed that when not fed in suitable racks cut feed is a disagreeable feed for sheep because it got into the wool to such an extent that it was uncomfortable, and made the wool dirty as well.

A COMPARISON OF SINGLE ROUGHAGES FOR FATTENING YEARLING WETHERS

Object. — To determine which of the available roughages in Central Alberta are the best for feeding yearling wethers.

Plan. — Ninety yearling wethers were divided into nine lots of ten wethers each. The lots were made as nearly uniform as possible with respect to breeding and weights. They were housed in a double-boarded shed in pens 20 feet x 8 feet with hurdles dividing the pens. They were fed in low, open mangers and watered in buckets. All pens except No. 9 were fed the same grain ration of

whole oats starting with half a pound each per day and increased every two weeks until each received one and a half pounds. The following is a list of the pen numbers and the roughage fed: —

1 — Alfalfa.
2 — Upland hay
3 — Slough hay.
4 — Cut oat greenfeed.
5 — Cut oat straw.
6 — Timothy.
7 — Lowland hay.
8 — Whole oat greenfeed.
9 — Cut oat greenfeed (no grain).

As feeds differ to such an extent in central Alberta the following notes on the class of feed are offered: —

1. The alfalfa was extra No. 1 second cutting from the Lethbridge district.

2. The upland hay was a first class quality of prairie wool from Saskatchewan.

3. The slough hay was locally grown, cut in the summer of 1922, and while it was a coarse, soft feed it was remarkably clean from brush, moss and rushes.

4. The cut oat greenfeed was of excellent quality and grown in 1922. It was fine, well matured, well cured, and had a high percentage of second growth in it.

5. The cut oat straw was fine, well matured, and with a high percentage of chaff.

6. The timothy hay was 1922 first cutting of timothy off stubble. The timothy was well cured and fine in the straw, but had a high percentage of stubble and weeds in it.

7. The lowland hay was a good sample of locally grown 1922 cut wild hay reasonably clean and from a meadow which had been cut the previous year.

8. Same as for lot 4 but fed whole.

9. Same as for lot 5.

		1 Alfalfa, whole oats	2 Upland hay, whole oats	3 Slough hay, whole oats	4 Cut oat greenfeed, whole oats	5 Cut oat straw, whole oats	6 Timothy hay, whole oats	7 Lowland hay, whole oats	8 Whole oat greenfeed, whole oats	9 Cut oat greenfeed, no grain	Totals
Number of wethers in each lot		10	10	10	10	10	10	10	10	10	90
Number of days fed		60	60	60	60	60	60	60	60	60	60
Weight at commencement of test	lbs.	1,155	1,005	1,030	1,035	1,015	1,100	1,020	1,115	1,055	9,530
Average weight at commencement of test	"	115·5	100·5	103·0	103·5	101·5	110·0	102·0	111·5	105·5	105·8
Value at market price of 7 cents, January 15, 1923	$	80·85	70·35	72·10	72·45	71·05	77·00	71·40	78·05	73·85	667·10
Average value per head	"	8·08	7·03	7·21	7·24	7·10	7·70	7·14	7·80	7·38	7·41
Weight March 16 after 60 days	lbs.	1,265	1,210	1,150	1,250	1,110	1,215	1,080	1,260	1,050	10,590
Average weight March 16 after 60 days	"	126·5	121·0	115·0	125·0	111·0	121·5	108·0	126·0	105·0	117·7
Total gain in 60 days	"	110	205	120	215	95	115	60	145	−5	1,060
Average gain in 60 days	"	11·0	20·5	12·0	21·5	9·5	11·5	6·0	14·5	−0·5	11·7
Average daily gain	"	0·18	0·34	0·20	0·35	0·15	0·19	0·10	0·24	−0·08	0·19
Value at market price of 9 cents March 16, 1923 (*Lot No. 9 valued at 8 cents*)	$	113·85	108·90	103·50	112·50	99·90	109·35	97·20	113·40	84·00	942·60
Average value per head	$	11·38	10·89	10·35	11·25	9·99	10·93	9·72	11·34	8·40	10·47
Increased value through feeding and rise in markets	"	33·00	38·55	31·40	40·05	28·85	32·35	25·80	35·35	10·15	275·50
Increased value per head	"	3·30	3·85	3·14	4·00	2·88	3·23	2·58	3·53	1·01	3·06
Cost of Feed and Labour											
Labour—											
50 cents a day divided between 9 pens	$	3·33	3·33	3·33	3·33	3·33	3·33	3·33	3·33	3·33	30·00
Feed—											
2,350 pounds of alfalfa at $22	$	25·85	.....	.....	.....	.....	.....	.....	.....	.....	25·85
1,800 pounds of upland hay at $19.50	$	.....	17·55	.....	.....	.....	.....	.....	.....	.....	17·55
2,000 pounds of slough hay at $16	$	.....	.....	16·00	.....	.....	.....	.....	.....	.....	16·00
3,000 pounds of cut oat greenfeed at $12	$	.....	.....	.....	18·00	.....	.....	.....	.....	.....	18·00
2,675 pounds of cut oat straw at $4	$	.....	.....	.....	.....	5·35	.....	.....	.....	.....	5·35
2,930 pounds of timothy at $18	$	.....	.....	.....	.....	.....	26·37	.....	.....	.....	26·37
1,685 pounds of lowland hay at $18	$	.....	.....	.....	.....	.....	.....	15·16	.....	.....	15·16
2,850 pounds of whole oat greenfeed at $12	$	.....	.....	.....	.....	.....	.....	.....	17·10	.....	17·10
3,270 pounds of cut oat greenfeed at $12	$	.....	.....	.....	.....	.....	.....	.....	.....	19·62	19·62
585 pounds of whole oats at 48c. a bushel	$	8·25	8·25	8·25	8·25	8·25	8·25	8·25	8·25	.....	66·00
Total cost of feed and labour	$	37·43	29·13	27·58	29·58	16·93	37·95	26·74	28·68	22·95	257·00
Profit on each lot	$	−4·43	9·42	3·82	10·47	11·92	−5·60	−0·94	6·67	−12·80	18·50
Profit on each wether	$	−0·44	0·94	0·38	1·04	1·19	−0·56	−0·09	0·66	−1·28	0·20

The above results should not be regarded as conclusive by any means. These results are from one winter's work and before final conclusions can be drawn these roughages should be compared over a number of years because in all feeding work there are so many factors influencing the results. In the above experiment some feeds were wasted more than others, the cut feeds being wasted most, with alfalfa and timothy next in order. Some feeds were not representative as with the timothy which contained a high percentage of weeds and stubble. Two conclusions which are evident from an analysis of these results are: firstly, that home-grown feeds made good gains and made the most money; secondly, that a grain supplement is necessary for fattening wethers. This is brought out very forcibly when lots 4 and 9 are compared. Cut oat greenfeed with grain gave a profit of $1.19 per head and without grain a loss of $1.28 per head. Cut oat straw, cut oat greenfeed, upland hay, and whole oat greenfeed are the roughages making the most profit. Timothy hay and alfalfa because of the waste and high price have not given a good profit.

A third conclusion to the effect that there is money in feeding sheep can be drawn. These 90 wethers made a profit of $18.50 over and above feed cost and labour. Had all been fed a good home-grown ration, the profit would have been much greater as in the lots fed cut oat straw and cut oat greenfeed each wether made a profit of more than a dollar a head.

COMPARISON OF DIFFERENT GRAIN RATIONS FOR LAMB FEEDING

Object.—To determine which of the following grains is most suitable for fattening lambs; whole oats, whole barley, equal parts of whole oats and barley, oil-cake meal or screenings.

Plan.—Six groups of 13 lambs each were penned in a double-boarded shed in pens 14 feet by 10 feet separated from each other by hurdles. The groups were uniform with respect to breeding, and as closely as possible for weight. Pen No. 1 was fed whole oats, No. 2 whole barley, No. 3 equal parts of whole oats and barley, No. 4 oilcake meal and Nos. 5 and 6 standard recleaned elevator screenings fed whole. To prevent the lambs from picking out the wheat from the screenings a little bran was mixed in the screenings for lot No. 5 and a little oat chop for No. 6. Where screenings are fed whole this is a necessary precaution to prevent sheep from picking out the wheat which, if eaten in too great quantities, is liable to cause death because it swells badly after it is eaten. The bran and oat chop were not fed in sufficient quantity to affect the results. The grain and meal were fed in shallow troughs which were turned over after the grain was cleaned up. The roughages consisting of alfalfa, oat greenfeed and lowland hay were fed on the ground. To prevent waste the lambs were fed what they would clean up four times a day. Oat greenfeed was fed in the morning, lowland hay before noon, alfalfa afternoon and lowland hay again in the evening. Salt was before them at all times, and water was supplied in buckets.

COMPARISON OF DIFFERENT GRAIN RATIONS FOR LAMB FEEDING

Whole Oats vs. Whole Barley vs. Equal Parts Whole Oats and Barley vs. Oilcake vs. Screenings Mixed with Bran vs. Screenings mixed with Oatchop

—		1 Whole oats	2 Whole barley	3 Barley and oats	4 Oilcake meal	5 Screenings and bran	6 Screenings and oatchop	Totals
Number of lambs in each lot	No.	13	13	13	13	13	12	77
Number of days fed		60	60	60	60	60	60	60
Weight commencing test January 15	Lbs.	885	870	880	925	830	835	5,225
Average weight commencing test, January 15	"	68·0	66·9	67·6	71·1	63·8	69·5	67·8
Value at market price of 8 cents, January 15	$	70·80	69·60	70·40	74·00	66·40	66·80	418·00
Average value at market price of 8 cents, January 15	"	5·44	5·35	5·41	5·69	5·10	5·56	5·42
Weight at end of 60 days, March 16	Lbs.	1,140	1,100	1,100	1,105	1,000	1,010	6,455
Average weight at end of 60 days, March 16	"	87·6	84·6	84·6	85·0	76·9	84·1	83·8
Total gain in 60 days	"	255	230	220	180	170	175	1,230
Average gain per head in 60 days	"	19·6	17·6	16·9	13·8	13·0	14·5	15·9
Average daily gain per head in 60 days	"	·32	·29	·28	·23	·21	·24	·26
Value at market price of 10·5 cents, March 16	$	119·70	115·50	115·50	116·02	105·00	106·05	677·77
Increased value through feeding and rise in markets	"	48·90	45·90	45·10	42·02	38·60	39·25	259·77
Increase in value per head	"	3·76	3·53	3·46	3·23	2·92	3·27	3·37
Cost of Feed and Labour:—								
Labour—								
30 cents a day divided between 6 pens	$	3·00	3·00	3·00	3·00	3·00	3·00	18·00
Feed—								
Roughages divided equally among all pens								
4,365 pounds of alfalfa at $22 a ton	"	8·09	8·09	8·09	8·09	8·09	7·56	48·01
4,535 pounds oat greenfeed at $12 a ton	"	4·58	4·58	4·58	4·58	4·58	4·31	27·21
6,375 pounds lowland hay at $18 a ton	"	9·68	9·68	9·68	9·68	9·68	8·97	57·37
630 pounds oats at 48 cents a bushel	"	8·89						8·89
630 pounds barley at 60 cents a bushel	"		7·87					7·87
630 pounds equal parts oats and barley	"			8·38				8·38
365 pounds oilcake meal at $50 a ton	"				9·12			9·12
475 pounds screenings mixed with bran at $20 a ton	"					4·75		4·75
440 pounds screenings mixed with oat chop at $20 a ton	"						4·40	4·40
Total cost of feed and labour	"	34·24	33·22	33·73	31·47	30·10	28·24	194·00
Profit per pen	"	14·66	12·68	11·37	7·55	8·50	11·01	65·77
Profit per lamb		1·12	·97	·87	·58	·65	·91	·85

In this experiment the weights of the roughages were not kept for each pen. The total weight only was kept, and in the results tabulated it is assumed that each pen received and ate the same amounts. It was an easy matter, however, for some pens to have been given slightly more or less, and some pens receiving less palatable grain rations did eat more hay. This is bound to have had some slight effect in the results of the grain comparison.

Oats and barley and the mixture of oats and barley were started at the rate of one third of a pound each per day and increased a quarter of a pound each fortnight until they were receiving one and a half pounds each per day. Oilcake meal and screenings were started at the rate of one third of a pound per head daily and increased as quickly as the lambs would take it. At the end of the sixty days oilcake was being eaten at the rate of a pound per head daily, and the screenings slightly over a pound. The lambs did not take readily to either the oilcake meal or screenings. Had the cracked oilcake been available it would have been much more suitable, as sheep like something to chew and prefer whole grain to meal.

The results of this experiment would indicate that there is money in feeding lambs. Whole oats for fattening lambs has quite a margin over any other grain ration used both from the standpoint of gains made and profits. Whole barley ranks second for both profit and gains, with the barley and oat mixture third in gains made but ranking below lot No. 6 fed screenings for profit. Oilcake meal

is clearly not suitable for lambs as a sole meal ration. Whole oats and barley or the mixture of oats and barley have given very close and uniform results, and of the grains fed, are the most suitable for lambs. Home-grown grains lead both for total gains and economy of gains.

SWINE

This has been the most profitable year with swine in the history of this Station. Prices for pork have not been quite as high as in the past few years, but at all times there has been a keen demand at a price which enabled the hog raiser to sell his grain through hogs at double or treble the market value of barley and oats. There has been a wide demand for breeding stock, both boars and sows. There has been much less demand for Duroc-Jerseys and Berkshires than for Yorkshires. This latter breed has made rapid strides in popularity in this province. Yorkshires are in demand because they are the hogs which the packer wants, and also because their superiority over other breeds for economy of production is slowly forcing itself upon the public. There has been a greater call for Yorkshire breeding stock than could be filled. A total of 79 pure-bred Yorkshire sows and boars have been sold for breeding purposes, as compared with 21 Berkshires and 12 Duroc-Jerseys. This makes a total of 112 hogs sold for breeding purposes during the year. Of these, 36 were boars and 76 were sows.

From the standpoint of climatic conditions the year has been ideal, practically throughout. Excessive heat and cold have been rare, and there has been little prolonged cold, wet weather at any time. Pastures have been abundant, and the autumn months have been unusually open and favourable for fall farrowed pigs. Throughout the year the brood sows have given strong, healthy litters of which a high percentage have been raised. This percentage is higher for this year than for any previous year. Sixty litters have been farrowed during the year, including spring and fall litters. Yorkshire sows have raised an average of 7.45 pigs per litter as compared with 6.71 pigs for the Berkshires, and 4.85 pigs for the Duroc-Jerseys. A total of 631 pigs were farrowed, and of these 387 or 61.33 per cent were raised to weaning.

Fifteen Yorkshire, ten Berkshire, fourteen Duroc-Jersey and one Yorkshire-Duroc-Jersey cross-bred sow were carried over the winter of 1922-23 and gave litters in the spring. Twenty of these gave fall litters as well, making a total of sixty litters for the calendar year. The main feature of experimental work for the past two years has been breed comparisons, using the Yorkshires, Berkshires and Duroc-Jerseys and various crosses from these breeds. The results, as in previous years, prove that the Duroc-Jersey has no advantage in the economy of pork production over the Yorkshire. Further, the Duroc-Jersey is not the type of hog demanded for the British bacon trade, to which market the Canadian hog grower must cater if there is to be a continued export market for hogs. For these reasons it has been decided to discontinue breeding Duroc-Jerseys at this Station. This change would have been made some years ago, but that the Duroc-Jerseys were held until complete experimental comparisons could be made. Central Alberta is an ideal hog raiser's country, and keeping this in mind it is planned to start a Tamworth herd during the next year. Many farmers claim that the Tamworth is more suitable than the Yorkshire for this climate because of the colour. When a sufficient number of Tamworths have been raised for experimental purposes, breed comparisons with pure-bred hogs and their different crosses will be conducted with Yorkshires, Tamworths and Berkshires. At present the breeding sows that will be carried over the winter of 1923-24 will consist of 25 pure-bred Yorkshire sows and 11 pure-bred Berkshire sows. Boars of both breeds will be carried for the purpose of breeding the brood sows at this Station and for the use of farmers in the neighbourhood.

BOARS

Four Yorkshire boars have been used on the brood sows this fall, including an imported Yorkshire from Scotland, a boar bred by the Dominion Experimental Farm, Brandon, Manitoba, one bred by the Manitoba Agricultural College, Winnipeg, Manitoba, and a young boar bred at this Station. This last boar, King Peter L.E.S.—94774—, was used on a few sows only and then transferred to the Brandon Farm. He was an outstanding young boar with good length, breediness, quality and bone. For his length he had a beautifully rounded, strong top. He had depth but with it he was remarkably straight and trim beneath. He was a thrifty hog at all stages of his development, and at six months he looked an ideal bacon hog.

The imported Yorkshire, Dolphington Major —88836— is a great asset to the herd. He was bred by A. N. Dudgeon, Dalmeny, Aberdeenshire, Scotland, and is a well-bred Dalmeny Yorkshire, belonging to the most famous strain of Large English Yorkshires. At fifteen months of age this boar, in fair flesh, weighed close to four hundred pounds. He is a boar with a great deal of scale, somewhat larger and heavier than the popular Canadian type of Yorkshire. He, however, has great length and depth with a remarkable trimness of underline for a boar of his size. His rib is deep and flat, and his bone rugged and of excellent quality. The most striking feature about this boar is his masculinity as shown in his head and crest. He is a great worker and is settling the bulk of the sows this year.

The boar from the Brandon Farm, Brandon Hoadley —87476—, is a growthy Yorkshire of extreme length, and should be a valuable boar for using on the thicker sows in the herd. He is the type of boar to which the sows of the thicker breeds should be bred in order to lengthen out their progeny.

College Y 455 —94160—, the young boar from the Manitoba Agricultural College, is developing into a remarkably fine young boar with masculinity and breed character very much in evidence. He has length and strength and trimness coupled with the good back and rib desired in the sire of select bacon hogs. A few sows are being bred to this boar this year. He will bring new blood into the herd and should leave very fine pigs.

Two Berkshire boars are being used for service this year. One was bred at this Station and used last year. He left long, typy Berkshires, very smooth but lacking in growth and early maturity. A new boar, Blythwood Western Baron —65060—, was brought out from Ontario this year. He was bred by C. M. Blyth, of Guelph, and represents an exceptionally long type of Berkshire. While he has extreme length, he has lost little of the Berkshire type. This boar was bought for the purpose of increasing the length of the Berkshires. As a breed, Berkshires have to be lengthened if they are to make select bacon hogs, and the breeding aim at this Station is to increase the length without sacrificing too much breed type.

FARROWING STATEMENT, 1923—PROLIFICNESS OF DIFFERENT BREEDS OF SWINE

——	Spring Litters			Fall Litters			Total of Spring and Fall Litters			Grand Totals
	Yorks.	Berks.	Duroc-J	Yorks.	Berks.	Duroc-J	Yorks.	Berks.	Duroc-J	
Number of litters farrowed in 1923	15	10	14	9	4	6	24	14	20	58
Total number of pigs farrowed	171	106	124	100	50	63	271	156	187	614
Average number of young pigs per litter	11·4	10·6	8·8	11·1	12·5	10·5	11·2	11·1	9·3	10·5
Number of young pigs dead at birth	29	22	14	10	7	10	39	29	24	92
Average number of young pigs dead at birth per litter	1·9	2·2	1·0	1·1	1·7	1·6	1·6	2·0	1·2	1·5
Number of young pigs died before weaning	40	22	46	13	11	20	53	33	66	152
Average number of young pigs per litter died before weaning	2·6	2·2	3·2	1·4	2·7	3·3	2·2	2·3	3·3	2·6
Total number of young pigs raised to weaning	102	62	64	77	32	33	179	94	97	370
Average number of young pigs raised to weaning per litter	6·8	6·2	4·5	8·5	8·0	5·5	7·4	6·7	4·8	6·3
Percentage of total pigs farrowed that were raised	59·6	58·4	51·6	77·0	64·0	52·3	66·0	60·2	51·8	60·2
Percentage of live pigs farrowed that were raised	71·8	73·8	58·1	85·5	74·4	62·2	77·1	74·0	59·50	70·8

NOTE.—In addition to the above, one cross-bred sow farrowed two litters totalling 17 pigs, all of which were raised. This makes a total of 60 litters farrowed in the year, giving a total of 631 pigs, and of these 387 or 61·33 per cent were raised to weaning.

PROLIFICNESS OF DIFFERENT BREEDS

The Yorkshires have again demonstrated that they are more prolific than the Berkshires and Duroc-Jerseys. The average Yorkshire litter farrowed in 1923 was 11·2 as compared with 11·1 for Berkshires and 9·3 for Duroc-Jerseys. There were a greater number of gilts with their first litters among the Yorkshires which has helped to lower the breed average because the gilts farrowed smaller litters than the older sows. In the average number of pigs raised per sow, Yorkshires again lead with an average of 7·4 per sow; the Berkshires with an average of 6·7 and the Duroc-Jerseys 4·8 per sow. This goes to show that the Yorkshire is more prolific and the sows are better mothers than the sows of the other two breeds. In previous years the Duroc-Jerseys have been more prolific than the Berkshires, but this year the Berkshires lead the Duroc-Jerseys in pigs farrowed per litter and pigs raised per sow.

Another point which this table brings out, and which will be of interest to the farmer hog raiser, is that the autumn is a more suitable time for farrowing pigs than the spring time. The litters this year were well spread over the seasons, commencing January 11 and ending with the last fall litter farrowed September 28. The first of the fall litters dated from June 25. The litters for the year can be taken as representative of spring and fall litters, as these were early and late pigs in both instances. The fall litters were stronger and evener. In the spring 57·8 per cent of the total pigs farrowed were raised to weaning, while in the fall 67·8 per cent were raised to weaning. Generally speaking, it is advisable to have the fall pigs farrowed not later than September 15. Hogs farrowed before this date usually are well enough developed to stand the cold weather when it comes.

PROLIFICNESS OF DIFFERENT BREEDS OF SWINE—SUMMARY OF YEARS 1920, 1921, 1922, 1923

——	York-shire	Berk-shire	Duroc-Jersey
Total number of litters	76·0	82·0	67·0
Total number of pigs farrowed	834·0	679·0	611·0
Average number of pigs per litter	10·9	8·2	9·1
Total number of pigs raised to weaning	448·0	377·0	304·0
Average number of pigs weaned per sow	5·39	4·59	4·53

The above table is a summary of four years of breeding work comparing the prolificness of the three breeds. In size of litters farrowed the Yorkshire ranks first, the Duroc-Jersey second and the Berkshire third. In average number of pigs weaned per sow the Yorkshire ranks first, the Berkshire second and the Duroc-Jersey third. The Yorkshires are the most prolific and make the best mothers. The Berkshires have given smaller litters than the Duroc-Jerseys, but they have been better mothers and raised more pigs per sow.

YORKSHIRES VS. BERKSHIRES VS. DUROC-JERSEYS VS. BERKSHIRE-DUROC-JERSEY CROSS-BREDS VS. YORKSHIRE-DUROC-JERSEY CROSS-BREDS FOR WINTER FEEDING

Object.—To compare the above pure-bred hogs and crosses under winter feeding conditions.

Plan.—On November 16, 1922, six of the best hogs of the following breeds and crosses were selected and put in the feed lot; Yorkshires, Berkshires, Duroc-Jerseys, Berkshire-Duroc-Jersey cross-breds, and Yorkshire-Duroc-Jersey cross-breds. These were selected for age and uniformity as closely as possible. The Duroc-Jerseys were approximately a month older than the others, but they were very thrifty, well-grown hogs averaging 51·1 pounds at 85 days of age. These five lots of hogs were housed in small cabins 8 feet by 6 feet with runs 50 feet by 10 feet to the south. The cabins had a dropped canvas over the doors to keep out draughts.

The hogs were fed dry feed in troughs at the south end of the runs. Water was supplied twice daily, and tankage was stirred into the water which was warmed slightly to take the chill off it. The tankage was fed to the extent of 8 per cent of the meal ration for the first eight weeks only. It was discontinued after that time. For the first six weeks equal parts of shorts and oat chop were fed. This was changed to equal parts of shorts, oat chop and barley chop for the next seven weeks, and then equal parts of oat chop and barley chop were fed. During the last six weeks straight barley chop was fed except to the Yorkshire-Duroc-Jersey cross-breds, which had barley for ten days only. The hogs were fed three times daily for the first six weeks, and after that time twice daily. They were given just what they would clean up at each meal.

In considering all the feeding experiments for 1923 it should be borne in mind that owing to unusual conditions all feeds in Alberta were extremely high in price. With shorts at $20 a ton, barley at 60 cents a bushel and oats 50 cents a bushel, the costs per pound to produce pork were unusually high. Even with the high feed costs very satisfactory net profits were shown in almost all cases. With ordinary prices for grain, profits would have been much larger. As the amounts of grain fed are shown in all cases, it is a simple matter to calculate costs of production and profits at any existing price for grains and hogs.

YORKSHIRE VS. BERKSHIRE VS. DUROC-JERSEYS VS. BERKSHIRE-DUROC-JERSEY, CROSSBREDS VS. YORKSHIRE-DUROC-JERSEY CROSSBREDS FOR WINTER FEEDING

——	Yorkshires	Berkshires	Duroc-Jerseys	Berkshire-Duroc Jersey Crossbreds	Yorkshire-Duroc-Jersey Crossbreds	Totals
Number of hogs started on test November 16.	6	6	6	6	6	30
Age of hogs when started on test..... dys.	59	57	88	58	53	63
Total weight..... lbs.	191	162	307	160	215	1,035
Average weight..... "	31·8	27·0	51·1	26·6	35·8	34·5
Detail of hogs coming off test.....	1 pig injured and removed May 3 weighing 168 lbs.; 5 pigs on May 17, weighed 1,0i0 lb.	1 died Dec. 23, weighed 41 lbs.; 1 died Jan. 5, weighed 48 lbs.; 4 pigs on May 17, weighed 740 lbs.	1 crippled and removed April 18, weighed 142 lbs.; 5 pigs on May 17, weighed 1,016 lbs.	May 17, 1 pig weighed 128 lbs.; May 17, 1 pig weighed 157 lbs., May 17, 4 pigs weighed 751 lbs.	1 died Jan. 10 weighed 52 lbs.; 1 died Jan. 30 weighed 57 lbs.; 3 pigs on Apr. 18 weighed 584 lbs.; 1 pig on April 18, weighed 128 lbs.	
Total weight coming off test..... lbs.	1,178	829	1,158	1,036	821	5,022
Average weight coming off test..... "	196·3	138·1	193·0	172·6	136·8	167·3
Average weight of best hogs when marketed. lbs.	May 17 4 average 214·7 lbs.	May 17 4 average, 185 lbs.	May 17 5 average, 203·2 lbs.	May 17 4 average, 187·7 lbs.	April 18 3 average, 194·6 lbs.	
Age of best hogs when marketed..... dys.	241	239	270	240	206	242
Total gains made..... lbs.	987	667	851	876	606	3,987
Total one hog days on tests..... dys.	1,078	815	1,063	1,092	742	4,790
Average daily gains per head..... lbs.	0·91	0·81	0·80	0·80	0·81	0·83
Returns from selling market hogs at 9c., lights at 8c. $	104.34	66.60	102.80	90.39	62.80	426·93
Cost of hogs when started on test at $2 each, Duroc-Jerseys at $2.50..... $	12.00	12.00	15.00	12.00	12.00	63.00
Feed required—						
Tankage at $50 a ton..... lbs.	61	44	61	46	61	273
Shorts at $20 a ton..... "	543	374	543	436	484	2,380
Oats at 50c. a bushel..... "	981	666	981	812	776	4,216
Barley at 60c. a bushel..... "	2,684	1,709	2,594	2,303	1,122	10,412
Total meal consumed..... "	4,269	2,793	4,179	3,597	2,443	17,281
Total feed cost..... $	54·92	35.99	53.79	46.23	31.79	222.72
Total cost of hogs and feed..... $	66.92	47.99	68.79	58.23	43.79	285.72
Profit on group of six hogs..... $	37.42	18.61	34.01	32.16	19.01	141.21
Cost per pound of marketable pork... cts.	5.68	6·48	5·9½	5·62	6·15	5·92
Meal to produce a pound of gain..... lbs.	4.32	4·18	4·91	4·10	4·03	4·33

Certain definite observations were brought out with regard to these breeds and crosses under winter feeding conditions. The most striking observation made was the suitability of the Yorkshire hog for winter feeding. When fed as much as they would take they always were thrifty and in good condition. Not a single Yorkshire went off its feed or became sick or crippled in any shape or form.

The Berkshires in the lot adjoining went to the other extreme. They, too, were fed all they would clean up and troubles began at once. They went off their feet, got a stunted, bloated appearance with big bellies and humps in their backs. Their hair became harsh and curly. They had to be fed very sparingly throughout the winter. Two of them went off their feed and never recovered, one dying December 23 and the other, January 5. The Berkshires were a difficult pen to feed because just a little too much feed had such a disastrous effect on them.

The Duroc-Jerseys had all the advantages in this experiment. They were practically a month older when started on test, and they were exceptionally strong, thrifty pigs to start with. They stood the feeding well. None of them were sick throughout the winter, and they at all times appeared thrifty. They, however, made very slow gains and matured fully a month later, and required more meal per pound of gain than the other breeds or crosses.

The Yorkshire-Duroc-Jersey cross-bred hogs were the most economical feeders of all. They ate only 4.03 pounds of meal for every pound of growth, and they matured a full month earlier than any others. Previous experimental work with this cross had given similar results in that a summer litter was turned off at 5 months and 10 days, which was very early. Two of the pigs died, one on January 10 and one on January 30, being unable to stand the feed or conditions. Later, one developed bronchitis and on April 18 weighed only 128 pounds when the remaining three averaged 194.6 pounds.

The Yorkshires were the most profitable hogs of all. They stood up well under heavy winter feeding, and made the largest daily gains, averaging 0.915 pounds throughout the test. They matured considerably earlier than the Berkshires and fully a month earlier than the Duroc-Jerseys, and also made more economical gains than the Duroc-Jerseys, but not as economical as the Berkshires.

In the above table no grading has been given. Three Yorkshires graded select bacon, and none of the other breeds or crosses had a single bacon hog, though one Duroc-Jersey was an exceptionally long, smooth hog.

SWINE BREED COMPARISON EXPERIMENT FOR THE SPRING OF 1923

Object.—To compare the three breeds of hogs, Yorkshires, Berkshires and Duroc-Jerseys for economy of pork production of the desired market type.

Plan.—Weaned pigs of the three breeds were selected from March, April and May litters. Six pigs of each breed from March-farrowed litters were selected and started on a breed comparison test as soon as they were weaned. The same was done with April- and May-farrowed litters. In each case the pigs were selected very carefully for uniformity in size, age and thrift. Breed type was kept in mind, and no pigs that were off type or defective to any visible extent were selected. The best pigs only of each breed were used in this comparison. These hogs were all hand-fed similar meal mixtures. In the March litter-breed-test the Yorkshires reached 160 pounds in weight earlier than the other two breeds, and were put on barley meal to finish them off. It was fully two weeks later before the Berkshires and Duroc-Jerseys were put on barley. For the April and May litters all lots were also fed the same throughout, and the meal changes were made at the same time. Generally

speaking, the method of feeding with some slight variations was as follows: shorts for one week; two parts of shorts and one part of oat chop for two weeks; equal parts of shorts, oat chop and barley chop for six weeks; equal parts of oat chop and barley chop for six weeks; barley until the hogs attained the market weight. Buttermilk at the rate of two pounds per hog per day was fed for from four to six weeks. Water was supplied at each meal. The grain ration was fed dry in troughs and the water immediately after the hogs had eaten. The hogs were fed three times daily for the first six weeks and twice daily afterwards. All the hogs were on pasture. Each lot of six hogs had one fifth of an acre of oat and rye pasture in which a small cabin 8 feet by 6 feet was placed to provide shelter.

COMPARISON OF YORKSHIRES, BERKSHIRES AND DUROC-JERSEYS FROM MARCH-FARROWED LITTERS

——		Yorkshire	Berkshire	Duroc-Jerseys	Totals
Number of hogs in each lot		6	6	6	18
Age	Days	55	52	51	53
Weight, May 8	Lb.	166	133	147	446
Average weight	"	27·6	22·1	24·5	24·7
Value at $2.50 per hog	$	15·00	15·00	15·00	45·00
Number of days on test	Days	135	163	163	153
Age when finished	"	190	215	214	206
Total weight when finished	Lb.	1,152	1,161	1,156	3,469
Average weight per hog when finished	"	192·0	193·5	192·6	192·7
Total gain	"	986	1,028	1,009	3,023
Average gain per hog	"	164·3	171·3	168·1	167·9
Average daily gain per hog	"	1·21	1·05	1·03	1·09
Value sold as pork at $9.50	$	109·44	110·29	109·82	329·55
Feed Required					
Oats at 50 cents per bushel	Lb.	478	880	880	2,238
Barley at 60 cents per bushel	"	1,772	2,189	2,189	6,150
Shorts at $20 a ton	"	326	326	326	978
Buttermilk at 20 cents a hundred	"	2,100	2,100	2,100	6,300
Total feed cost	$	36·63	47·76	47·76	132·15
Total cost of feed and hogs	"	51·63	62·76	61·76	177·15
Profit on each lot	"	57·81	47·53	47·06	152·40
Profit per hog	"	9·63	7·92	7·84	8·46
Cost per pound of gain	c.	3·71	4·64	4·73	4·37
Meal per pound of gain	Lb.	2·61	3·30	3·36	3·09
Buttermilk per pound of gain	"	2·14	2·04	2·08	2·08

The results from the March-farrowed hogs are very strongly in favour of the Yorkshires over the other two breeds. The three lots were marketed at approximately the same weight, and the Yorkshires were turned off when 190 days old, the Berkshires at 215 days and the Duroc-Jerseys at 214 days. The average weight of the Yorkshires was 192.0 pounds, the Berkshires 193.5 and the Duroc-Jerseys 192.6. Twenty-four days earlier on the market is a big advantage in favour of the Yorkshires over the other two breeds. With an average daily gain of 1.21 pounds the Yorkshires lead the Berkshires by 0.16 of a pound and the Duroc-Jerseys by 0.18 of a pound, almost one-fifth of a pound each per day. Not only were the Yorkshires on the market first, but in economy of gains as well they were first, with a cost of 3.71 cents per pound of gain requiring 2.61 pounds of meal and 2.14 pounds of buttermilk for every pound of meal and 2.14 pounds of buttermilk for every pound of gain. The Berkshire next in order cost 4.64 cents per pound of gain, requiring 3.30 pounds of meal and 2.04 pounds of buttermilk for every pound of gain. In this test the Duroc-Jerseys cost 4.73 cents per pound of gain and required 3.36 pounds of meal and 2.08 pounds of buttermilk for every pound of gain.

All the hogs in this breed comparison were sows. The Yorkshires were on the market twenty-four days earlier; they made the greatest daily gains and the cheapest gains, and made a pound of gain on less meal than either of the other breeds. In addition to the above advantages the Yorkshire made much better carcasses. Four of the six Yorkshires graded select bacon, while no Berkshires or Duroc-Jerseys graded select. In the table no credit is given the Yorkshires for the four selects, and, were this added, the Yorkshires would still further lead over the Berkshires in profits per hog.

COMPARISON OF YORKSHIRES, BERKSHIRES AND DUROC-JERSEYS FROM APRIL-FARROWED LITTERS

——		Yorkshires	Berkshires	Duroc-Jerseys	Totals
Number of hogs in each lot		6	6	6	18
Age	Days	52	43	52	49
Weight, June 8	Lb.	158	118	144	420
Average weight, June 8	"	26·3	19·6	24·0	23·3
Value at $2.50 per hog	$	15·00	15·00	15·00	45·00
Number of days on test	Days	174	174	174	174
Age when finished	"	226	217	226	223
Total weight when finished	Lb.	1,225	1,085	1,191	3,501
Average weight per hog	"	204·1	180·8	198·5	194·5
Total gain	"	1,067	967	1,047	3,081
Average gain per hog	"	177·8	161·1	174·5	171·1
Average daily gain per hog	"	1·02	·92	1·00	0·98
Value sold as pork at 6·75 cents	$	82·68	73·23	80·39	236·30
Feed Required					
Oats at 50 cents a bushel	Lb.	1,019	1,019	1,019	3,057
Barley at 60 cents a bushel	"	2,385	2,385	2,385	7,155
Shorts at $20 a ton	"	351	351	351	1,053
Buttermilk at 20 cents a hundred	"	2,100	2,100	2,100	6,300
Total feed cost	$	52·50	52·50	52·50	157·50
Total cost of feed and hogs	"	67·50	67·50	67·50	202·50
Profit on each group	"	15·18	5·73	12·89	33·80
Profit per hog	"	2·53	0·95	2·14	1·86
Cost per pound of gain	"	4·92	5·42	5·01	5·11
Meal per pound of gain	Lb.	3·51	3·88	3·58	3·65
Buttermilk per pound of gain	"	1·96	2·17	2·00	2·04

The results from the April-farrowed hogs are somewhat similar to the March-farrowed hogs with the exception that the Duroc-Jerseys take second place whereas the March-farrowed Duroc-Jerseys followed the Berkshires in point of gains made and economy of gains as well as profits. The April-farrowed hogs made slower gains throughout for all breeds. The Yorkshires were turned off at the age of 226 days, at which time they averaged 204.1 pounds in weight. At the same age the Duroc-Jerseys weighed an average of 198.5 pounds and at 217 days the Berkshires averaged 180.8 pounds. The Yorkshires made a daily gain of 1.02 pounds, the Duroc-Jerseys 1 pound and the Berkshires 0.92 of a pound. All were fed the same amount of feed and were on test for 174 days. The Berkshires were nine days younger to start with, which undoubtedly was a slight disadvantage. The Yorkshires made a profit of $5.73. The Yorkshires again were the most economical, costing 4.92 cents for a pound of gain as compared with 5.01 cents for the Duroc-Jerseys and 5.42 cents for the Berkshires. The Yorkshires required less meal and buttermilk for a pound of gain, consuming 3.51 pounds of meal and 1.96 pounds of buttermilk. The Duroc-Jerseys required 3.58 pounds of meal and 2.00 pounds of buttermilk for each pound of gain, and the Berkshires 3.88 pounds of meal and 2.17 pounds of buttermilk for every pound of gain.

There were three barrows and three sows in each lot. From the standpoint of total gains made, average daily gains, profits and economy of gains, the

Yorkshires are first, the Duroc-Jerseys second and the Berkshires third. Three of the Yorkshires graded select bacon, for which no credit has been given in the table. The pasture in the lot where the Yorkshires were fed gave out early in August, or after a few weeks of pasturing. The Yorkshires were, therefore, handicapped because there was no pasture for them after seven weeks. Had they been on pasture as were the other two breeds, and had they been credited with the three select hogs, the difference in their favour would have been considerably enchanced. There was also one unthrifty Yorkshire hog which pulled the average of the lot down. The poor pasture on which the April-farrowed hogs were run is mainly responsible for the slower and more costly gains made.

COMPARISON OF YORKSHIRES, BERKSHIRES AND DUROC-JERSEYS FROM MAY-FARROWED LITTERS

——		Yorkshires	Berkshires	Duroc-Jerseys	Totals
Number of hogs in each lot		6	6	6	6
Age	Days	55	51	48	51
Weight, July 6	Lb.	133	149	132	414
Average weight	"	22·1	24·8	22·0	23·0
Value at $2.50 per hog	$	15·00	15·00	15·00	45·00
Number of days on test	Days	151	158	158	155
Age when finished	"	206	209	206	207
Total weight when finished	Lb.	1,166	1,066	1,045	3,277
Average weight per hog when finished	"	194·3	177·6	174·1	182·0
Total gain	"	1,033	917	913	2,863
Average gain per hog	"	172·1	152·8	152·1	159·0
Average daily gain per hog	"	1·14	0·96	0·96	1·02
Value sold as pork at 6·25 cents	$	72·87	66·62	65·31	204·80
Feed Required					
Oats at 50 cents a bushel	Lb.	756	756	756	2,268
Barley at 60 cents a bushel	"	1,470	1,686	1,680	4,836
Shorts at $20 a ton	"	435	435	435	1,305
Buttermilk at 21 cents a hundred	"	2,800	2,800	2,800	8,400
Total feed cost	$	39·43	42·12	42·06	123·61
Total cost of feed and hogs	"	54·43	57·12	57·06	168·61
Profit on each group	"	18·44	9·50	8·25	36·19
Profit per hog	"	3·07	1·58	1·37	2·01
Cost per pound of gain	c.	3·81	4·59	4·60	4·31
Meal per pound of gain	Lb.	2·57	3·13	3·14	2·93
Buttermilk per pound of gain	"	2·71	3·05	3·06	2·93

The results from the May-farrowed hogs are similar to the results from the March-farrowed hogs in that the Yorkshires lead with the Berkshires again in second place and the Duroc-Jerseys dropping back to third place. At 206 days of age, the Yorkshires averaged 194.3 pounds in weight; at 209 days the Berkshires averaged 177.6 pounds and the Duroc-Jerseys at the same age as the Yorkshires, 206 days, averaged 174.1 pounds in weight. This is 20.2 pounds lighter than the Yorkshires at the same age. The Berkshires, three days older than the Yorkshires, were an average of 16.7 pounds lighter. These are very great differences for hogs at this age. The Yorkshires made an average daily gain of 1.14 pounds as compared with 0.96 of a pound for the other two breeds. From the standpoint of profits the Yorkshires have a margin of $1.49 over the Berkshires, having made a profit of $3.07 per hog. The Berkshires made a profit of $1.58 each and the Duroc-Jerseys $1.37 each. In economy of gains and meal per pound of gain the white hogs have a comfortable margin of advantage, taking 2.57 pounds of meal and 2.71 pounds of buttermilk for each pound of gain in weight. The other breeds are practically even in this respect, requiring 3.13 and 3.14 pounds of meal and 3.05 and 3.06 pounds of buttermilk for every pound of gain for Berkshires and Duroc-Jerseys respectively.

There were four barrows and two gilts of each breed. From the standpoint of early maturity, gains made, economy of gains and meal per pound of gain, the Yorkshires are again leading by a safe margin. The Berkshires come back to second place, and the Duroc-Jerseys go back to third place. The Yorkshires selected for this test were all from the same litter, and were not considered to be nearly as good pigs as those of the other two breeds. They were the only hogs of the age required at the time, and were selected for that reason. None of them graded select bacon, as they were too short and thick. No Berkshires or Durco-Jerseys graded select bacon.

COMPARISON OF YORKSHIRES, BERKSHIRES AND DUROC-JERSEYS—SUMMARY OF MARCH, APRIL AND MAY-FARROWED LITTERS

		Yorkshires	Berkshires	Duroc-Jerseys	Totals
Number of hogs of each breed		18	18	18	54
Average age when put on test	Days	54	49	50	51
Weight when put on test	Lb.	457	400	423	1,280
Average weight when put on test	"	25·3	22·2	23·5	23·7
Value at $2.50 per hog	$	45·00	45·00	45·00	135·00
Number of days on test	Days	153	165	165	161
Age when finished	"	207	214	215	212
Total weight when finished	Lb.	3,543	3,312	3,392	10,247
Average weight when finished	"	196·8	184·0	188·4	189·7
Total gain	"	3,086	2,912	2,969	8,907
Average gain per hog	"	171·4	161·7	164·9	166·0
Average daily gain per hog	"	1·12	0·98	1·00	1·03
Value when sold as pork	$	264·99	250·14	255·52	770·65
Feed Required					
Oats at 50 cents a bushel	Lb.	2,253	2,655	2,655	7,563
Barley at 60 cents a bushel	"	5,627	6,260	6,254	7,563
Shorts at $20 a ton	"	1,112	1,112	1,112	3,336
Buttermilk at 20 cents a hundred	"	7,000	7,000	7,000	2,100
Total feed cost	$	128·56	142·38	142·32	413·26
Total cost of feed and hogs	"	173·56	187·38	187·32	548·26
Profit on each group	"	91·43	62·76	68·20	222·39
Profit per hog	"	5·08	3·38	3·78	4·11
Cost per pound of gain	c.	4·16	4·88	4·79	4·68
Meal per pound of gain	Lb.	2·91	3·44	3·37	3·23
Buttermilk per pound of gain	"	2·26	2·40	2·35	2·34

The summary of breed comparisons includes three lots of six hogs each from litters farrowed in March, April, and May, making a total of eighteen hogs of each breed. All were carefully selected and fed in the same way. The results, therefore, should be fairly conclusive. The Yorkshires weighed an average of 196·8 pounds when 207 days old, the Duroc-Jerseys 188·4 pounds when 214 days old, and the Berkshires 184 pounds when 215 days old. In average daily gains each, the Yorkshires lead with a daily gain of 1·12. The Duroc-Jerseys follow with a daily gain of 1 pound, and the Berkshires came next in order with 0·98 of a pound. The feed required for a pound of gain was 2·91 pounds of meal and 2·26 pounds of buttermilk for the Yorkshires, 3·37 pounds of meal and 2·35 pounds of buttermilk for the Duroc-Jerseys, and 3·44 pounds of meal and 2·40 pounds of buttermilk for the Berkshires. This makes a cost per pound of gain of 4·16 cents for the Yorkshires, 4·79 cents for the Duroc-Jerseys, and 4·88 cents for the Berkshires. The Yorkshires made a profit of $5.08 each, the Duroc-Jerseys $3.78, and the Berkshires $3.38 each.

The Yorkshires, therefore, have proved themselves to be the earliest to mature, and have required less feed per pound of gain. They were consistently the most economical hogs fed for each of the three months, and were also the most profitable hogs fed each month. Moreover, seven of the Yorkshires graded select bacon, and neither the Duroc-Jerseys nor Berkshires produced a select bacon hog.

The Berkshires placed next to the Yorkshires for March and May-farrowed hogs, but on the totals for the three months are beaten out by the Duroc-Jerseys by a very small margin.

COMPARISON OF EARLY, MEDIUM AND LATE SPRING-FARROWED PIGS

——		March-farrowed	April-farrowed	May-farrowed	Totals
Number of pigs in each lot		18	18	18	54
Age	Days	53	49	51	51
Weight when put on test	Lb.	446	420	414	1,280
Average weight when put on test	"	24·7	23·3	23·0	23·7
Value at $2.50 each	$	45·00	45·00	45·00	135·00
Number of days on test	Days	153	174	155	161
Age when finished	"	206	223	207	212
Total weight when finished	Lb.	3,469	3,501	3,277	10,247
Average weight per hog	"	192·7	194·5	182·0	189·7
Total gain	"	3,023	3,081	2,863	8,967
Average gain per hog	"	167·9	171·1	159·0	166·0
Average daily gain per hog	"	1·09	·98	1·02	1·03
Value sold as pork at 9·50 cents for March litters, 6·75 cents for April and 6·25 cents for May-farrowed litters	$	329·55	236·30	204·80	770·65
Feed Required					
Oats at 50 cents a bushel	Lb.	2,238	3,057	2,268	7,563
Barley at 60 cents a bushel	"	6,150	7,155	4,836	18,141
Shorts at $20 a ton	"	978	1,053	1,305	3,336
Buttermilk at 20 cents a hundred	"	6,300	6,300	8,400	21,000
Total feed cost	$	132·15	157·50	123·61	413·26
Total cost of feed and hogs	$	177·15	202·50	168·61	548·26
Profit on each lot	$	152·40	33·80	36·19	222·39
Profit per hog	$	8·46	1·86	2·01	4·11
Cost per pound of gain	c.	4·37	5·11	4·31	4·68
Meal per pound of gain	Lb.	3·09	3·65	2·93	3·23
Buttermilk per pound of gain	"	2·08	2·04	2·93	2·34

In this experiment the April-farrowed litters were at a disadvantage because of their pasture, which lasted only for a short time, and therefore they grew more slowly and less economically, requiring almost a pound more meal for each pound of gain. The May-farrowed hogs had the best pasture and the best climatic conditions, but made slower though more economical gains than the March-farrowed pigs. They gained 1·02 pounds each daily, and took 2·93 pounds of meal and 2·93 pounds of buttermilk for a pound of gain. The March-farrowed litters gained 1·09 pounds each daily and took 3·09 pounds of meal and 2·08 pounds of buttermilk for a pound of gain. Generally speaking, however, there are no very outstanding differences either in respect of gains made or economy of gains; but there is a great difference in the profits. The March-farrowed hogs sold on the 1st of October at 9·50 cents a pound and realized a profit of $8.46 for each hog. The April-farrowed hogs sold on a falling market about the middle of November at 6·75 cents a pound and realized a profit of $1.86 for each hog. The May-farrowed hogs sold at 6.25 cents a pound the first week in December and gave a profit of $2.01 for each hog. The argument in favour of the early-farrowed pigs is not one of cost of production, but of market price. The peak of the market for hogs was reached between September 20 and October 1 during the past year. Prices were high during the summer months, and until the 1st of October. After that time the bulk of the farmers' hogs came on the market and consequently prices dropped. The hogs then that made the most money were those which came on the market before the price dropped, and this is the big advantage in favour of March-farrowed pigs. Another feature in favour of March pigs which does not enter into this experiment is that it gives an opportunity to breed

the sows early enough for fall litters to be farrowed early in September at latest. A great many farmers farrow their hogs early enough, but do not have the grain to finish them off until after their crop is harvested. The hogs are carried through the summer very cheaply but lose the advantage of the top market price. It would be to their advantage to carry over enough grain to finish their hogs and get them on the market earlier.

COMPARISON OF EARLY, MEDIUM AND LATE FALL-FARROWED HOGS

		Lot 1 Early	Lot 2 Medium	Lot 3 Late	Totals
Number of hogs put on test November 17		25	25	25	75
Average age when put on test	days	87	57	48	64
Total weight when put on test	lbs.	1,371	625	460	2,456
Average weight when put on test	"	54·8	25·0	18·4	32·7
Losses due to deaths		1, Dec. 3	1, Dec. 26.. 2, Jan. 7 1, Jan. 11	1, Dec. 17 1, Dec. 27 1, Jan. 17	8
Total weight coming off test	lbs.	4,081	3,760	3,730	11,571
Average weights coming off test	"	170·0	179·0	169·5	172·7
Total number of days on test	days	2,781	3,649	3,972	10,402
Average age when marketed	"	220	222	231	224
Total gains not including hogs that died	lbs.	2,710	3,135	3,512	9,357
Average daily gains per hog	"	0·97	0·85	0·88	0·89
Value of hogs put on test, lot 1 at $2.60 each, lot 2 at $2.15 each and lot 3 at $2 each	$	65.00	53.75	50.00	168.75
Value sold as pork, lot 1 at 8.85 cents, lot 2 at 9·10 cents and lot 3 at 9·20 cents	$	361.16	342.16	343.16	1,046·48
Feed Required					
Tankage at $50 a ton	lb.	370	250	172	782
Shorts at $20 a ton	"	2,755	2,308	1,819	6,882
Oats at 50c. a bushel	"	2,935	4,938	3,794	11,667
Barley at 60c. a bushel	"	5,480	7,703	6,820	20,003
Total feed fed	"	11,530	15,199	12,605	39,334
Total feed cost	$	148.21	198.22	163.53	509.96
Total cost of feed and hogs	$	213.21	251.97	213.53	678.71
Profit on each lot	$	147.95	90.19	129.63	367.77
Profit per hog	$	5.91	3.60	5.18	4.90
Cost per pound of pork	cts.	5·22	6·70	5·72	5·86
Meal to produce a pound of gain, not including hogs that died	lb.	4.25	4.84	3.58	4.20
Feed cost per 100 pounds	$	1.19	1.34	1.29	1.29
Value per 100 pounds sold as pork	$	3.13	2.25	2.72	2.66

COMPARISON OF EARLY, MEDIUM AND LATE FALL-FARROWED HOGS

Object.—To compare early fall-farrowed with medium and late fall-farrowed hogs as to suitability for feeding and for economy of pork production.

Plan.—Three groups of twenty-five hogs each were selected for a feeding experiment. The first group was farrowed about August 20, the second group September 20 and the third group October 1. The first group consisted of a mixed lot of hogs, of which 8 were pure-bred Yorkshires, 6 pure-bred Duroc-Jerseys, 5 pure-bred Berkshires and 6 cross-bred hogs, the latter being the second cross from a Yorkshire boar and Duroc-Jersey sow. The second group consisted of 19 Yorkshire-Duroc-Jersey cross-breds and 6 Berkshire-Duroc-Jersey cross-breds, while the third group were all pure-bred Yorkshires. Unfortunately, these lots were not made up from hogs with similar breeding, as breed differences enter into and affect the results to a certain extent. These were fed the same grain ration at the same age, and all were self-fed. They were watered twice daily, and the water had the chill taken off. They were housed in a large straw shelter, each group having a pen 16 feet by 14 feet. The doors were covered with a dropped canvas, and straw for bedding was plentifully supplied.

With regard to the method of caring for the hogs as outlined in this experiment, it may be pointed out that very fair results were obtained. Better conditions would have been provided, had the hogs been fed in smaller lots. In as large a group as twenty-five, the hogs piled up in very cold weather, with the result that the hogs underneath became too hot and steamed. The steam collected as frost on the straw roof, and in mild weather melted and dropped on the hogs, making them wet and uncomfortable. This had a decidedly detrimental effect on their thriftiness. Generally speaking, a group of ten to twelve hogs is large enough for comfort, and the straw roof should be about five feet from the ground, as this height gives the best conditions of warmth and ventilation. Where the ceiling is about this height and the hogs are in small groups, there is no collection of frost.

The early-farrowed hogs made the most profit by a comfortable margin of 73 cents per hog over the third group. These were mostly pure-bred with the exception of six cross-breds in the first lot. The second lot made up of cross-bred hogs made the least profit. It would seem from the results of other experimental work along with the results of this feed trial that the third group of pure-bred Yorkshires had the advantage in breeding. Yorkshires are particularly well adapted for winter feeding, and this may account in some measure for the third group showing to better advantages than the second group. They had the disadvantage in that they were younger and smaller, and would naturally be expected to feel the cold more than older, heavier hogs. In the early lot only one pig died, while there were four pigs in the second cross-bred lot and three in the third pure-bred lot which died. This would indicate that it is harder to feed late-farrowed fall pigs than early-farrowed hogs, and there is, therefore, an advantage in having the fall litters early. In years when the autumn is not as open as in 1922 this would be still more advantageous. The first lot sold at the lowest price because the market was still rising when they were turned off at the end of March. In this experiment the early fall pigs made the most profit and sold on a lower market.

From the standpoint of economy of gains, the third group consisting of pure-bred Yorkshires lead. Again this lot had the advantage of breeding and, further, the hogs were much lighter and younger when put on test, and would therefore make greater gains per pound of meal than the older hogs. This does not hold with the first two lots, however, as the early-farrowed hogs won out largely because there were fewer losses.

The hogs in this experiment were fed shorts costing $20 a ton, oats, at 50 cents a bushel and barley at 60 cents a bushel. The seventy-five hogs gave a profit of $4.90 per head over and above the loss of the eight which died. If hogs fed grain at the above prices make a profit of almost $5 each, the average farm-fed hog, fed grains at cost of production, would make a much greater profit. For this group of seventy-five hogs the meal ration cost $1.29 per hundred pounds, which when sold as pork was worth $2.66 a hundred. It more than doubled its value when sold as pork, and the meal ration was put in at top market prices rather than at cost of production.

Spring-Farrowed Vs. Fall-Farrowed Hogs

A comparison of the two previous tables, giving comparisons with totals of early, medium and late-farrowed pigs from both spring and fall litters, brings out certain features. Seventy-five fall-farrowed hogs made a profit of $4.90 each, and the early fall litters made the most money. Fifty-four spring-farrowed hogs made a profit of $4.11 each, and the early litters made by far the most money. From this it would appear that under present market conditions the early spring and early fall pigs are the most profitable.

From the feeding end the fall pigs cost more in that they required more feed to produce a pound of pork than the spring pigs. This is only natural in winter, particularly in cold weather when so much of the feed goes to supply body heat. Fall pigs cost 5.86 cents to grow a pound of pork, and spring pigs cost 4.68 cents. Fall pigs ate 4.20 pounds of meal for every pound of pork produced, and spring pigs ate 3.23 pounds of meal for every pound of gain. The fall pigs were turned off at 224 days of age weighing an average of 172.7 pounds each, while the spring pigs were turned off at 212 days weighing 189.7 pounds each. They were 12 days younger and weighed 17 pounds more. Fall pigs cost more to raise, and were slower to mature, but because they came on the market when the price was higher, they gave the greater profits. This work would indicate that the time to market plays an important part in profitable hog raising. The bulk of the hogs come on the market in the fall, and consequently the price is then down.

If dry and reasonably warm quarters for farrowing can be provided, it will pay to have the spring litters farrowed early. Some extra care and labour will be necessary, but this will be over before seeding commences. The early litters sold either as market or breeding hogs will secure higher prices than late litters, and the sows may be again bred for early fall litters, which is a necessity for success with fall pigs.

From the farrowing statement table it is seen the fall litters were larger, and that there were fewer pigs dead at birth. A larger proportion of the fall pigs were raised. The autumn, therefore, is the better time to farrow pigs. The weather is ideal if farrowed early enough. The sows have better conditions during the gestation period, and the litters consequently are usually larger, more even and stronger. It is seldom that hairless litters are farrowed in the summer or fall months.

SELF-FEEDER VS HAND FEEDING FOR BACON PRODUCTION

Object.—To ascertain if the self-feeder can be advantageously used in feeding bacon hogs.

Plan.—This experiment was carried out in duplicate. In the first test two lots of pure-bred Yorkshires weighing about ninety pounds each were selected. Twelve hogs were selected, including six barrows and six sows. These were then picked as carefully as possible with the object of keeping the lots uniform. Two hogs similar in size and conformation were picked out and one was put in each lot. There were three barrows and three sows in each lot. By this method two very uniform lots of hogs were secured. One lot was put on a self-feeder and another on hand feeding, as much as the hogs would eat and clean up. Both lots were on good rye and oat pasture. For thirty-five days they were fed equal parts of barley and oat chop, and after that barley only. Each lot received 20 pounds of buttermilk a day for 38 days.

In the second test, hogs weighing about fifty pounds were selected. There were six hogs in each lot including one Yorkshire, one Berkshire, one Duroc-Jersey, one Yorkshire-Berkshire cross-bred and two Yorkshire-Duroc-Jersey cross-breds. One lot was put on a self-feeder and the other lot an hand feeding. Both lots had good rye and oat pasture. These two lots were fed the same meal mixture throughout. They were fed equal parts of shorts and oat chop for four weeks, barley and oat chop in equal parts for three more weeks, and then barley alone for the remaining three and a half weeks on test. Buttermilk at the rate of twenty pounds a day to each lot was supplied for ten weeks.

SELF-FEEDER VS. HAND-FEEDING FOR BACON PRODUCTION
Experiment Number 1

		Self-Fed	Hand-Fed
Number of hogs in each lot		6	6
Number of days fed	days	65	64
Weight when started on test	lb.	544	540
Average weight when started on test	"	90·6	90·0
Weight when taken off test	"	1,275	1,197
Average weight when taken off test	"	212·5	199·5
Total gain in 65 days	"	731	657
Average gain per hog in 65 days	"	121·8	109·5
Average daily gain per hog	"	1·87	1·71
Feed Required			
Oats at 50c. a bushel	lb.	471	354
Barley at 60c. a bushel	"	1,995	1,566
Buttermilk at 20c. a hundred	"	1,500	1,500
Total feed cost	$	34.85	27.77
Cost per pound of gain	cts.	4.76	4·22
Meal per pound of gain	lb.	3·37	2·92
Buttermilk per pound of gain	"	2.05	2.28
Value of meal per pound when sold as grain	cts.	1.29	1.29
Value of meal per pound when marketed as pork at 8·40 per lb	"	2.49	2.87

This does not includs the value of the buttermilk.

The self-fed hogs made a greater daily gain than the hand-fed hogs, gaining 1.87 pounds a day while the hand-fed hogs gained 1.71 pounds per day. The self-fed gains were more costly, as it cost 4.76 cents for a pound of gain for the self-fed hogs and 4.22 cents for a pound of gain for the hand-fed hogs. On the self-feeder it required 3.37 pounds of meal for a pound of gain, and on hand feeding 2.92 pounds of meal for a pound of gain. A pound of gain on the self-feeder cost 0.54 of a cent or roughly half a cent more than on hand feeding. The self-fed hogs made greater gains but more costly gains. The self-fed hogs developed a much fatter carcass and a shorter side of bacon. They were chunkier, smoother hogs. The hand-fed hogs were fat enough for killing purposes, and had a more even thickness of fat, averaging one-fourth of an inch less in depth along the back. They developed more bone and muscle in proportion to the fat, which condition is desired in the select bacon hog. None of the self-fed hogs graded select bacon, but three hand-fed hogs made the select grade.

SELF-FEEDER VS. HAND-FEEDING FOR BACON PRODUCTION
Experiment Number 2

		Self-Fed	Hand-Fed
Number of pigs in each lot		6	6
Number of days fed	days	93	93
Weight when started on test	lbs.	306	314
Average weight when started on test	"	51	52·3
Weight when taken off test	"	1,042	978
Average weight when taken off test	"	173·6	163·0
Total gain	"	736	664
Average gain per hog	"	122·6	110·6
Average daily gain per hog	"	1·31	1·19
Feed Required			
Oats at 50c. a bushel	lb.	787	454
Barley at 60c. a bushel	"	1,473	1,120
Shorts at $20 a ton	"	450	248
Buttermilk at 20c. a hundred	"	1,840	1,840
Total feed cost	$	38.14	26.83
Cost per pound of gain	"	5.18	4.04
Meal per pound of gain	lb.	3.68	2.74
Buttermilk per pound of gain	"	2.50	2.77
Value of meal per pound when sold as grain	cts.	1.27	1·27
Value of meal per pound when sold as pork at 8·75 cents a pound	"	2·37	3·13

This does not include the value of the buttermilk.

In this experiment the hogs were younger when put on test, and consequently more visible difference was noted. The self-fed hogs made an average daily gain of 1.31 pounds each as compared with 1.19 pounds each for the hand-fed hogs. The gains cost 5.18 cents a pound for self-fed hogs and 4.04 cents a pound for hand-fed hogs, a difference of 1.14 cents a pound. This experiment confirms the findings from the first experiment that the self-feeder will give the greater, but considerably more expensive, gains. In each lot there was one Yorkshire, one Berkshire, one Duroc-Jersey, one Yorkshire-Berkshire cross-bred, and two Yorkshire-Duroc-Jersey cross-breds. The Yorkshire in the hand-fed lot was an unthrifty hog, and did not make the weight for a select bacon hog. The Yorkshire on the self-feeder was an exceptionally good hog, but was a trifle too well finished for the select bacon grade. The only hog which did grade select bacon was the Yorkshire-Berkshire cross-bred hand-fed hog.

Both these experiments point out that the self-feeder will give greater gains but more costly gains than hand-feeding. The self-feeder develops a short, thick heavily fleshed hog which goes on the market earlier, but is too short and thick to grade select bacon. Both these experiments brought out that the best use is not made of pasture when the hogs are self-fed. In both instances the hand-fed hogs ate much more pasture than the self-fed.

Feeding on Pasture Versus Feeding Inside with Minerals Versus Feeding Inside without Minerals for Bacon Production

Object.—To compare pasture-fed hogs with hogs fed indoors both with and without minerals for economy of gains and for the production of market hogs of the correct bacon type.

Plan.—Three lots of five hogs in each lot weighing about 35 pounds each were selected. Four in each lot were pure-bred Yorkshires and the fifth was a Yorkshire-Duroc-Jersey cross-bred. They were selected for uniformity in size, type and breeding. One lot was put on a pasture lot one-fifth of an acre in size with a good start of rye and oat pasture. There was a small cabin in the pasture for shade and protection. The other two lots were put in pens in the piggery with a small outside run ten feet by twelve feet. One lot was fed minerals mixed in the meal ration. The minerals consisted of tankage and edible bone meal each fed at the rate of five per cent of the total meal ration. In addition the pen had access to slaked coal and salt throughout the test. The third lot received the meal ration without the minerals; otherwise, all lots were fed the same. For four weeks they were fed equal parts oat chop, for three weeks equal parts of barley and oat chop, and for the remaining seven weeks on test they were fed barley chop only.

In addition each lot received 18 pounds of buttermilk a day for the first month and 20 pounds a day for two months longer, making altogether a total of 1,800 pounds of buttermilk for each lot of five hogs. Water was supplied after each meal. The meal was fed dry in a trough.

FEEDING ON PASTURE VERSUS FEEDING INSIDE WITH MINERALS VERSUS FEEDING INSIDE WITHOUT MINERALS FOR BACON PRODUCTION

—		Pasture	Inside with minerals	Inside without minerals	Totals
Number of hogs		5	5	5	15
Number of days on test	days	122	122	122	122
Total weight when put on test	lb.	187	175	174	536
Average weight when put on test	"	37·4	35·0	34·8	35·7
Total weight when taken off test	"	1,005	985	930	2,920
Average weight when taken off test	"	201	197·0	186·0	195·3
Total gain in 122 days	"	818	810	756	2,384
Average gain per hog	"	163·6	162·0	151·2	158·9
Average daily gain per hog	"	1·34	1·33	1·23	130
Feed Required					
Oats at 50c. a bushel	lb.	357	320	357	1,034
Barley at 60c. a bushel	"	1,781	1,606	1,781	5,168
Shorts at $20 a ton	"	203	183	203	589
Tankage at $50 a ton	"	.....	116	.....	116
Bone meal at $50 a ton	"	.....	116	.....	116
Buttermilk at 20c. a hundred	"	1,800	1,800	1,800	5,400
Total meal fed	"	2,341	2,341	2,341	7,023
Total feed cost	$	33.14	35.50	33.14	101.78
Cost per pound of gain	cts.	4·05	4·38	4·38	4·27
Meal per pound of gain	lbs.	2·86	2·89	3·09	2·94
Buttermilk per pound of gain	"	2·20	2·22	2·38	2·26
Cost of meal per pound	cts.	1·41	1·51	1·41	1·45
Value of meal per pound when sold as pork at 9c.	"	3·14	3·11	2·90	3·05

NOTE.—This does not include the value of buttermilk in the ration.

The pasture-fed hogs made the greatest gains and the cheapest gains. While they gained very little more than the hogs fed indoors with minerals, their gains were 0.33 of a cent a pound cheaper. The mineral fed lot gained 54 pounds more than the lot indoors fed without minerals. The mineral ration was more costly, and as a result the cost per pound of gain was the same for both lots fed inside.

In the finish of the different lots of hogs, the pasture-fed hogs were quite different from the pen-fed hogs. They were bigger, rangier hogs with a great deal more stretch and bone. They did not appear as smooth or to have the finish of the other two lots. They, however, were finished hogs and the four Yorkshires graded select bacon. The Yorkshire-Duroc-Jersey cross-bred in each lot did not make the grade as all were too short and thick. The two lots fed in the pen were smoother hogs with a little better finish. Of the two lots the mineral-fed hogs had more bone and fibre and stretch. They were a growthier lot. The four Yorkshires graded select bacon. The hogs in the lot fed no minerals were a nice group of hogs. They were very smooth and appeared to be the best finished hogs of all, though they were 11 pounds lighter than the mineral-fed hogs. They were finer in the bone and hair, and lacked growthiness and stretch of the other lots. Three of these hogs graded select bacon.

For growing bacon hogs in summer this experiment has demonstrated the value of pasture both for economy of gain and for the development of the correct type of hog. Where pasture is not available it is advisable to feed minerals to develop growth of frame and bone. Minerals in this experiment have helped very materially in obtaining the bacon type desired. While the cost has been the same with the lots fed minerals and without minerals, it would pay to feed minerals because of the greater growth, and better market grade. In feeding for an early market, the mineral ration would have an enhanced value.

In this experiment a small quantity of buttermilk was fed. This would have the tendency to offset the difference brought out by these different methods of feeding. It is reasonable to suppose that were no buttermilk fed the differences would be more noticeable. The hogs fed on pasture would have carried a better finish, and would have made cheaper gains had they been penned up for at least two weeks before they were turned off.

FIELD HUSBANDRY

The season of 1923 was most favourable for crop production. One of the largest crops in the history of the district was harvested. Although the precipitation received was not above the average, the amount received came at seasons when best use could be made of it. Wheat yielding 70 bushels and oats yielding 140 bushels per acre under field conditions were not uncommon. Owing to the disappointing results which were obtained during the recent dry years from working the land in the usual way, a much larger percentage of the crop than usual was stubbled in. Even land handled in this way gave returns of 30 bushels of wheat and 100 bushels of oats.

CROP ROTATIONS

Rotation experiments were inaugurated in 1914 when five different rotations were started, one of which was shortly discontinued. The other four have been carried to the present time. Since the beginning of this work, many new problems in crop production not covered by these rotations have arisen. The work was reorganized and nine new rotations started in 1923. For this purpose 250 acres of land divided into 52 blocks is used.

The accuracy of the cost of production figures compiled in connection with these experiments has been questioned at different times. It must be borne in mind that the areas used are large enough to permit of ordinary farm machinery being used. The blocks are all oblong in shape, long and narrow, so that the teams do not have to turn more than would be necessary in actual farm practice. The actual time required for the different operations, the amount of seed used, and the amount of crop produced is carefully recorded; hence, the cost of production data obtained should be as accurate as that obtained in farm surveys, however carefully they are conducted.

ROTATION "L"

First year—Hay.

Second year—Hay, manured in autumn 12 tons per acre.

Third year—Hay, broken after harvest six inches deep and cultivated for balance of season.

Fourth year—Wheat.

Fifth year—Oats.

Sixth year—Barley, seeded with 4 pounds timothy, 4 pounds alsike, and 4 pounds red clover per acre.

This rotation was the original main farm rotation which used approximately 240 acres. More land was used in this rotation than the data from it justified; hence, sections of it were subdivided and used for the newer rotations started last season. The three large fields nearest the buildings were left untouched, and now constitute the "Live Stock" rotation.

This is a mixed farming rotation designed for districts where summer fallowing results in too heavy a growth of straw. While it has proven an excellent rotation in wet years, it was unsatisfactory in the dry years 1920-21-22. As this rotation was started in a new location, 1923 results will be of no value as the figures do not show the effect of crop sequence.

ROTATION "K"

First year—Hoed crop, corn.

Second year—Wheat.

Third year—Barley, seeded down with 10 pounds alfalfa and 10 pounds western rye per acre.

Fourth year—Hay, manure 15 tons per acre after harvest.

Fifth year—Pasture.

Sixth year—Pasture, broken early in August and cultivated for balance of season.

This rotation produced an average profit of $4.34 per acre for the past nine years, and a profit of 12 cents per acre for 1923. It stands third in the amount of profit produced per acre.

This is a mixed-farming rotation designed for a district where the precipitation is such that a summer-fallow substitute will give better results than a bare fallow. It is one of the most profitable rotations under test where more wheat is desired. Wheat might well be substituted for the barley crop, as wheat has proven to be one of our most satisfactory nurse crops.

Some farmers might object to one-sixth of their land being in hoed crop. This is not a serious drawback as sunflowers, roots, potatoes or greenfeed might be substituted for the corn. They would thus form a variety of crops that almost any farmer could make profitable use of, and handle without much inconvenience.

ROTATION "O"

First year—Hoed crop, potatoes.

Second year—Wheat.

Third year—Oats.

Fourth year—Summer-fallow.

Fifth year—Wheat, seeded with 10 pounds alfalfa and 10 pounds western rye grass per acre.

Sixth year—Hay, manured 15 tons per acre after harvest.

Seventh year—Pasture, broken early after harvest and cultivated for the balance of the season.

This rotation produced an average profit of $8.04 per acre for the past nine years, and a profit of $14.81 per acre for 1923.

This is essentially a mixed-farming rotation, and it has produced the most satisfactory results of any tested. The outstanding characteristics of this rotation are that it has two cleaning crops in the hoed crop and summer-fallow, which appear every third or fourth year in the rotation; it has two cash crops in wheat; the oat crop might be used as a cash crop or for feed; and the land is in two years in sod during which it is top dressed with 15 tons manure per acre. Although this land has been under cultivation for a number of years, soil drifting is not a problem and weeds are kept well under control.

ROTATION "C"

First year—Summer-fallow.

Second year—Wheat.

Third year—Wheat.

This is a straight wheat-growing rotation, and is the only one under test at this Station on which data is available. Although it has been fairly profitable to date, it has demonstrated that such a rotation is not a durable one for this district. The land, although carefully summer-fallowed every third year, shows evidence of becoming depleted in organic matter and contaminated with noxious weeds.

ROTATIONS STARTED IN 1923

Nine rotations were started in 1923. No data will be published for that year's results as the yields obtained do not show the effect of crop sequence. The land was all given the same treatment, and the crops were seeded so that they would occur in their right rotation in 1924.

In order to give the reader a knowledge of this work an outline of these rotations is given.

ROTATION " H "

First year—Wheat, stubble spring ploughed.
Second year—Oats.
Third year—Summer-fallow.
Fourth year—Wheat, seeded with 10 pounds alfalfa and 10 pounds western rye per acre.
Fifth year—Hay, 15 tons rotted manure applied in winter and harrowed in the spring.
Sixth year—Hay, broken after harvest.

This rotation has given most satisfactory results at the Dominion Experimental Station, Brandon. It is very similar to Rotation " O," which has given excellent results at Lacombe, with the exception that the intertilled crop following the sod is omitted.

ROTATION " LACOMBE "

First year—Hoed crop, sunflowers.
Second year—Wheat, seeded with 10 pounds western rye and 10 pounds sweet clover per acre.
Third year—Hay.
Fourth year—Hay, broken after harvest.
Fifth year—Oat greenfeed, stubble fall ploughed and rotted manure applied 10 tons per acre during the winter.

This is essentially a live stock rotation, and combines three of the most important forage crops used in central Alberta, with one cash crop. While this rotation would not be suitable for a dry district, it might be used to advantage where summer fallowing is not necessary. It would provide an abundance of feed, and one crop to provide ready money.

ROTATION " MANITOBA "

First year—Wheat.
Second year—Wheat stubbled in.
Third year—Oats, on spring ploughing.
Fourth year—Summer-fallow.

This rotation has been used extensively by a large percentage of grain growers of the West. Neither grass nor manure is used in it. It is similar to Rotation " C " in many respects, except that the land is summer-fallowed every four years instead of once in three years.

ROTATION " INTERTILLED "

First year—Wheat.
Second year—Wheat, stubble to be spring ploughed.
Third year—Oats, half intertilled and half seeded 1½ bushels per acre.

This is a three-year grain rotation designed to provide a comparison with Rotation " C " and also compare summer-fallow with grain seeded in rows and seeded thinly, the object being to ascertain if the summer-fallow is essential to profitable grain production in central Alberta.

ROTATION " SWEET CLOVER "

First year—Wheat, fall plough stubble.
Second year—Wheat, half seeded with biennial sweet clover.
Third year—Hay, half seeded with annual sweet clover, stubble fall ploughed.

This rotation is one being recommended by the Field Husbandry Department of the University of Saskatchewan for use in Saskatchewan. It is similar to Rotation " C " except that sweet clover takes the place of the summer-fallow. It also provided a comparison between annual sweet clover and biennial sweet clover when grown under feed conditions.

ROTATION " FALL RYE "

First year—Wheat, 15 tons rotted manure applied during the winter and ploughed under in spring.
Second year—Oat greenfeed, fall rye seeded when oats are 4 inches high.
Third year—Fall rye.
Fourth year—Summer-fallow.

This rotation is designed to furnish additional information concerning the economic possibilities of winter rye. At present there is little authentic information, as to the profits which might be derived from this crop. The above rotation makes use of a practice unfamiliar to many farmers, cross-seeding winter rye in oats for greenfeed when the oats are about 4 inches high. If rye will produce a reasonably good crop when handled in this way, it might prove to be one of the most profitable crops a farmer could grow. The summer-fallow following the winter rye is to ascertain if this practice will thoroughly clean land which has produced winter rye for wheat the following year.

ROTATION " ALFALFA "

Alfalfa continuously.

This rotation is designed to ascertain the profits which might be derived from growing alfalfa exclusively. It will also furnish some valuable information as to the yields produced by this crop, and the number of years it can profitably be left without renewing.

ROTATION " BROME "

Brome continuously.

Like the " Alfalfa " rotation, rotation " Brome " is designed to furnish information as to the returns one might expect from a hay farm when seeded to brome. It will also furnish information as to the yields produced by this crop and the number of years it can be profitably left without renewing.

ROTATION " LIVE STOCK "

First year—Silage crops and roots, manured 15 tons green manure per acre the preceding winter.
Second year—Oat greenfeed, seeded with 10 pounds sweet clover and 10 pounds western rye per acre.
Third year—Pasture, spring seed 1½ bushels oats and ½ bushel winter rye per acre, should grass winter-kill or fail to catch.

This rotation is designed to furnish information concerning the possibilities of making money from land where so much live stock is kept that only the roughages are produced and the concentrates are obtained from other sources; a condition which might obtain on large pure-bred live stock breeding establishments or on dairy farms near large cities.

In computing the cost of production in the rotation experiments, the following values have been used:—

COST VALUES

Rent per acre	$ 4 00
Manure per ton	1 00
Wheat per bushel	1 00
Barley per bushel	0 60
Oats per bushel	0 50
Corn per bushel	3 00
Potatoes per bushel	1 00
Timothy per hundred	18 00
Alfalfa per hundred	50 00
Rye Grass per hundred	15 00
Red Clover per hundred	20 00
Alsike per hundred	20 00
Sunflowers per hundred	13 00
Machinery per acre	1 00
Fordson tractor per hour	0 40
Rumley tractor per hour	0 60
Silo filling machinery per ton	0 25
Kerosene per gallon	0 27
Gear oil per gallon	1 00
Pasture per month	1 50
Manual labour per hour	0 30
Horse labour per hour	0 10
Twine per hundred	13 50
Threshing per bushel, wheat	0 10
" " barley	0 08
" " oats	0 06

RETURN VALUES

Wheat per bushel	$ 0 70
Barley per bushel	0 35
Oats per bushel	0 25
Hay per ton	10 00
Straw per ton	2 00
Ensilage per ton	3 00
Roots per ton	1 50
Potatoes per ton	0 40

The following explanation of the above cost and return values used in calculating the rotation results may be of interest to many.

RENT.—The amount of rent is obtained by multiplying the value of the land by the current rate of interest as obtained on first mortgages. To this amount is added the amount per acre of the taxes.

MANURE.—The charge for manure covers only the cost of applying the manure to the land and does not include any additional value it may have. The data at present available indicate that it is doubtful if the direct profits from the use of manure justify the expense of applying it to the land.

The cost of the manure is distributed equally to all the crops in the rotation.

MANUAL LABOUR.—The rate for manual labour is an average of the prevailing summer wages in the district for hired help. The number of hours charged to any crop includes only that required to complete the work under average farm conditions and includes all work required in the growing, harvesting and storing of the crop.

HORSE LABOUR.—The rate for horse labour is arbitrary. It includes the cost of feed, the interest on the value of the horse, the depreciation in the value of the horse, and the wages for the manual labour required to care for the horse.

MACHINERY.—The charge for farm machinery was established to cover the interest and depreciation on the machinery used on an average farm. Where a tractor is used, the rate per hour, which is a reasonable charge to cover depreciation and interest on investment, is added. Where silo filling machinery is used, the charge per ton is sufficient to cover the rental of the machinery for a full day's work.

THRESHING.—The charge per bushel for threshing covers the total cost incurred from stook to granary, and is representative of the price charged on custom work in the district.

SEED.—When the grass and clover seeding does not fail, its cost is distributed equally among each hay and pasture year in the rotation. When it does fail and there is no hay crop, the charge is made against the whole rotation and not against any one crop.

SUMMER-FALLOW.—The entire cost of the summer-fallow is charged against the following crop. The charges against the summer-fallow include rent, machinery and labour.

COST AND RETURN VALUES.—The cost value of seeds, twine, oil, etc., are actual values which pertained in the district for the class of material used. The return values which are used are those which obtain on November 1.

Ensilage is given a value on the basis of 300 pounds of ensilage in the silo, being equal to 100 pounds of hay in the mow or stack, while roots are given a value per ton exactly one half that of silage.

In presenting the data from the rotation experiments, the rotation summary only is given. This gives the more important items, while the smaller details of less importance are omitted.

SUMMARY OF YIELDS, VALUE AND PROFIT AND LOSS PER ACRE, ROTATION "O" 1923

Crop	Yield, 1923	Value	Cost of Production	Profit or Loss
		$ cts.	$ cts.	$ cts.
Hoed Crop (potatoes)	11·5	154 38	77 79	76 79
Wheat	41·3	33 18	18 89	14 29
Oats	97·9	29 26	21 34	7 92
Summer-fallow			8 60	−8 60
Wheat	29·3	25 68	20 23	5 45
Hay (failure, oats, seeded for silage)	10·1	30 30	18 47	11 83
Pasture		3 72	7 62	−3 90

Average profit per acre, $14.81.

ROTATION "O" RETURN VALUES

Year	First year hoed crop	Second year wheat	Third year oats	Fourth year summer-fallow	Fifth year barley	Sixth year hay	Seventh year pasture	Average profit per acre
	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
1914	58 19	23 64	17 75	− 9 20	9 78	− 4 22	− 4 22	13 10
1915	7 17	45 07	19 03	− 8 31	15 14	14 95	− 4 33	12 67
1916	− 4 20	13 21	25 40	− 8 31	5 51	16 58	− 4 75	6 21
1917	10 72	27 06	17 38	− 7 78	21 58	14 97	− 3 21	11 53
1918	10 77	4 78	4 60	− 6 04	15 00	− 2 69	− 2 79	3 38
1919	13 40	40 78	28 91	−16 24	39 05	− 9 50	− 9 94	12 35
1920	6 39	32 07	11 25	− 9 25	4 17	0 36	− 1 36	6 23
1921	−16 03	20 67		−10 85	2 29	3 53	9 60	1 32
1922	10 38	5 43	− 4 36	− 7 76	− 0 99	− 4 01	− 7 30	−1 23
1923	76 63	14 30	7 93	− 8 60	5 43	11 83	− 3 90	14 81
Average	17·34	22·70	12·79	− 9·23	11·70	4·18	− 3·22	8·04

SUMMARY OF YIELDS, VALUE AND PROFIT AND LOSS PER ACRE, ROTATION "K", 1923

Crop	Yields, 1923	Value	Cost of production	Profit or loss
		$ cts.	$ cts.	$ cts.
Hoed crop, corn	6·97	20 91	28 99	−8 08
Wheat	38·6	31 28	16 71	14 57
Barley	56·1	23 27	17 90	5 37
Hay (failure, stubbled in for silage)	5·4	16 21	17 29	−1 08
.....	.....	3 28	8 66	−5 38
.....	.....	3 37	8 72	−5 35

Average profit per acre, $0.12.

ROTATION "K" RETURN VALUES

Year	First year hoed crop	Second year wheat	Third year barley	Fourth year hay	Fifth year pasture	Sixth year pasture	Average profit per acre
	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
1914	13 75	23 10	4 35	14 70	− 3 29	− 4 98	7 98
1915	11 02	31 49	11 01	9 70	− 4 40	− 3 92	9 15
1916	3 07	5 78	4 14	9 82	− 4 55	− 5 00	2 21
1917	3 18	4 78	7 98	11 72	− 4 26	− 4 61	3 13
1918	4 45	5 44	10 81	8 86	− 5 10	0 59	4 18
1919	14 71	15 44	17 87	6 64	−10 70	−10 36	5 60
1920	− 9 65	25 07	− 0 88	− 6 68	4 90	6 63	3 23
1921	10 60	20 13	1 08	− 3 21	− 2 75	− 2 51	3 89
1922	29 54	5 52	− 2 35	− 0 50	1 67	− 9 83	4 01
1923	− 8 08	14 57	5 37	1 08	− 5 38	− 5 35	0 12
Average	7 29	15 13	5 93	5 00	− 3 39	− 3 93	4 34

SUMMARY OF YIELDS, VALUE AND PROFIT AND LOSS PER ACRE, ROTATION "C", 1923

Crop	Yields, 1923	Value	Cost of production	Profit or loss
		$ cts.	$ cts.	$ cts.
Summer-fallow	.....	.....	8 87	−8 87
Wheat	48·0	38 90	14 54	24 36
Wheat	23·0	19 06	11 52	7 54

Average profit per acre, $7.68.

RETURN VALUES, ROTATION "C"

Year	First year summer-fallow	Second year wheat	Third year wheat	Average profit per acre
	$ cts.	$ cts.	$ crs.	$ cts.
1914	− 6 37	14 75	13 92	7 43
1915	−10 07	5 61	8 93	1 49
1916	− 8 74	16 35	2 21	3 27
1917	− 8 61	11 79	9 38	4 19
1918	− 7 36	18 62	− 3 71	2 52
1919	− 8 57	51 80	38 04	27 09
1920	− 9 40	14 66	2 75	2 67
1921	Rotation discontinued this year.			
1922	− 7 04	9 25	6 15	2 79
1923	− 8 87	24 36	7 54	7 68
Average	− 8 34	18 58	9 47	6 57

COST OF PRODUCING FARM CROPS

The figures quoted in this statement are taken from the rotation experiments. The values used in calculating the profit or loss per acre are based on current prices in 1923, and are representative of the district.

——		Variety	Acre area	Cost
				$ cts.
Wheat	per bush.	Marquis	2·42	0 457
Wheat	"	Marquis	2·42	0 954
Wheat	"	Marquis	1·0	0 449
Wheat	"	Marquis	1·0	0 501
Wheat	"	Ruby	3·63	0 433
Barley	"	O.A.C. No. 21	3·6	0 319
Oats	"	Banner	2·42	0 214
Potatoes	"	Mixed	2·42	0 201
Oats for silage	per ton	Banner	2·42	1 79
Barley for silage	"	O.A.C. No. 21	3·56	3 20
Corn	"	Northwestern Dent	3·5	4 15
Sunflowers	"	Mammoth Russian	25·0	3 56
Corn	"	Gehu	5·0	2 74
Mangolds	"	Yellow Globe	5·0	2 93

The cost of production figures indicate that of the cereals wheat is the only one that might have been produced with a reasonable margin of profit in 1923. The prices realized for the other crops were so low that it was impossible for a reasonable profit to be shown.

Potatoes produced at the rate of 386 bushels per acre. This high yield brought down the cost of production to 20.1 cents per bushel, making this crop the most profitable produced at the Station. It would be difficult, however, for a farmer to handle and find a market for a large acreage of this crop.

The cereal silage was produced from oats and barley stubbled in where there was not sufficient seeding to justify leaving the stand for hay. The season was favourable and excellent crops were produced. In addition to making a better quality silage, the oats produced a cheaper silage than the barley. Where there is sufficient moisture, it is doubtful if there is a cheaper silage crop than oats for central Alberta. The yields produced are as large as the ordinary corn crop, while the bundles are more easily handled than either corn or sunflowers; in addition no additional machinery is required to seed and harvest the crop.

PROFIT AND LOSS PER ACRE FROM THE DIFFERENT FARM CROPS AS GROWN IN THE DIFFERENT ROTATIONS

Crop	Preceding crop	Rotation	Number of years average	Profit per acre	Loss per acre
				$ cts.	$ cts.
Wheat	Hoed crop	O	10	22 70	.....
Wheat	Summer-fallow	C	9	18 58	.....
Hoed crop	Pasture	O	10	17 34	.....
Wheat	Hoed crop	K	10	15 13	.....
Oats	Wheat	O	10	12 79	.....
Barley	Summer-fallow	O	10	11 70	.....
Wheat	Wheat	C	9	9 47	.....
Hoed crop	Pasture	K	10	7 29	.....
Barley	Wheat	K	10	5 93	.....
Hay	Barley	K	10	5 00	.....
Hay	Barley	O	10	4 18	.....
Pasture	Hay	O	10	.....	3 22
Pasture	Hay	K	10	.....	3 39
Pasture	Pasture	K	10	.....	3 93

The above figures bring out the point that wheat is the most profitable crop produced at the Station. It is also quite clear that the profit is influenced by the preceding crop to a large extent.

The results from the areas in pasture indicate that it is impossible to make a profit from high-priced land when it is in pasture. It would appear as though it were more profitable to cut hay on land in sod wherever possible. Also, it would seem inadvisable from the standpoint of profit per acre to leave the land in sod longer than is necessary for the seeding to fully develop, so that a maximum amount of root fibre will be left in the soil.

Where an intertilled crop can be utilized to advantage it would be a good practice for farmers to use this class of crop as much as possible for a summer-fallow substitute. While intertilled crops cannot take the place of summer-fallows exclusively, where conditions are such that these crops can be utilized at a margin of profit they will materially assist in increasing the profit per acre. It is true that larger yields result from summer fallowing. On the other hand, an intertilled crop leaves the land in almost perfect condition for the seed drill. Usually a stroke of the harrow is all that is necessary in the spring. It naturally follows that where ploughing and further cultivation are eliminated, the cost of production is materially lowered and the profit per acre is increased.

CULTURAL EXPERIMENTS

The investigational work with cultural methods which was started in 1911 was continued for eight years. Much of the work had been carried to a conclusion, and as many new problems of vital importance had arisen, it was deemed advisable to discontinue the old experiments and inaugurate new projects that would cover any points included in the old experiments that required further investigation, and would also embody any new problems that have arisen during the past few years. The principle of anticipating any new problems that may result from adapting new cultural practices was followed in planning all these experiments. As they now stand, the new cultural experiments consist of eleven separate projects and utilize 471 plots.

In 1921 the old cultural plot field was heavily manured, ploughed and cropped with sunflowers. Sunflowers utilize a large amount of moisture and plant food in their growth, and it was thought they would leave the field more uniform with respect to moisture and fertility than any other crop or cultural method; also, the intertillage given the sunflowers would clean the land of some of the weeds. In 1922 the crop was mainly a preparatory one to get the rotation of the experiments started. In addition to this, the season was so dry that where comparisons were possible, negative results were obtained.

SUMMER-FALLOW TREATMENT AND SUMMER-FALLOW SUBSTITUTES

This work was designed to afford some comparisons in the different methods of handling the summer-fallow where it is kept black and where certain crops and methods of cropping are utilized as summer-fallow substitutes. As the experiment has been under way for two years only, it has progressed to the second year of the rotation followed in the experiment; and we have in this year's results the effect of the different cultural methods and the crop sequence effect of the different fallow substitutes.

SUMMER-FALLOW TREATMENT FOR WHEAT

The object of this experiment is to obtain data concerning the most successful and economical method of summer-fallowing for wheat. A three-year rotation, summer-fallow, wheat and oats, is followed. The treatment for oats

on the different plots is uniform, while the summer-fallow treatment on the different plots varies, as indicated in the following table. Plots 1, 3, 7 and 11 are checks, and indicate the productiveness of the different sections of the range of plots.

SUMMER-FALLOW TREATMENT FOR WHEAT

Plot No.	Treatment Given	Yield per Acre, 1923	
		bush.	lbs.
1	Plough 6 inches deep June 15, cultivate as necessary	26	40
2	Plough 6 inches deep May 15, cultivate as necessary	33	20
3	Plough 6 inches deep June 15, cultivate as necessary	30	.....
4	Plough 6 inches deep July 15, cultivate as necessary	30	.....
5	Plough 6 inches deep June 15, and September 15, cultivate as necessary	26	40
6	Fall cultivate after harvest and plough 6 inches deep June 15, cultivate as necessary	31	40
7	Plough 6 inches deep June 15, cultivate as necessary	34	10
8	Fall plough 4 inches after harvest and plough 6 inches June 15, cultivate as necessary	35	.....
9	Disc after harvest and cultivate throughout the summerfallow year (do not plough)	40	....
10	Cultivate throughout the summer-fallow year (do not plough), cultivation is first deep with narrow feet and then with wide feet	30	50
11	Plough 6 inches deep June 15, cultivate as necessary	31	40

The results, as indicated by the table, show little variation as a result of varied cultural treatment. When the yields of the check plots and experimental error are considered, the yields as presented are not significant. The precipitation received last season fell at such opportune times that all the plots made a very heavy growth of straw. The difference in yields, as indicated by the check plots, was due to some extent to the particular location of the plot in the range. This experiment must be repeated before any conclusive deductions are permissible.

It will be noticed that a second ploughing of the summer-fallow in the fall resulted in a decreased yield per acre. While this practice might be advisable where land is contaminated with weeds with creeping root stalks, it is doubtful if it is advisable on reasonably clean land, especially in a dry year, when such a ploughing would result in a serious loss of moisture.

Plot 9 and 10, which were not ploughed, are worthy of some attention. It will be noticed that the yields on these two plots compare favourably with the check plots on either side.

SUMMER-FALLOW SUBSTITUTES

The object of this experiment is to determine whether some of the standard intertilled crop and oat greenfeed will produce satisfactory results as summer-fallow substitutes. The yield of the various summer-fallow substitutes as well as the yields of grain following these crops is recorded. In this experiment a three-year rotation is followed; first year, summer-fallow or substitutes; second year, wheat; third year, wheat. The results obtained are presented in tabular form.

SUMMER-FALLOW SUBSTITUTES

Plot No.	Treatment or Summer-fallow Substitute	1922	1923		
		Yields of summer-fallow substitutes	Total yield of grain and straw	Yield of wheat	
		lbs.	lbs.	bush.	lbs.
1	Summer-fallow	.....	6,750	28	20
2	Corn	21,400	4,950	24	10
3	Sunflowers	24,000	4,500	30	50
4	Greenfeed	14,000	5,000	30	50
5	Summer-fallow	.....	7,150	30	00
6	Oats, seeded 3 bushels per acre	940	3,900	18	20
7	Oats, seeded 1½ bushels per acre	640	3,650	18	20
8	Summer-fallow	.....	7,700	32	30
9	Two drills of oats alternating with 36-inch intertilled space	1,360	3,600	19	10
10	Three drills of oats alternating with 36-inch intertilled space	1,440	3,700	22	30
11	Summer-fallow	.....	7,600	22	50
12	Four drills of oats alternating with 36-inch intertilled space	1,680	4,300	21	40
13	Five drills of oats alternating with 36-inch intertilled space	1,480	3,900	18	20
14	Summer-fallow	.....	7,600	24	10

The results as presented in the table contradict the field observations to some extent. In looking over the plots before harvesting one was struck with the uniformly stronger growth made by the crops grown on plots which were summer-fallowed the previous year as compared with crops following summer-fallow substitutes. On the other hand, summer fallowing in 1922 did not appear to have grown the weeds out of the land as the crops on summer-fallowed plots were the weediest of any in the range. This might possibly be one of the factors responsible for the narrow margin between the yields of crops grown after fallow and fallow substitutes, even when the summer-fallowed plots made a much heavier growth of straw.

In presenting the yields obtained in the above experiment, the reader's attention is drawn to the fact that the above table represents one year's experimentation only; hence, the results are in no wise conclusive. It is felt that the yields as presented are not a true representation of the comparative value of the different summer-fallow substitute crops. On the other hand, they indicate the trend of the comparative effect of the different crops in that with one exception the summer-fallowed plots outyielded the summer-fallow substitute plots in grain. The total yield of both grain and straw, however, is a truer indication of the crop produced on the different plots. It will be noticed that where the total yields are considered, the summer-fallow plots are consistently heavier yielders than the summer-fallow substitute plots.

STUBBLE TREATMENT

This experiment was inaugurated to obtain data on the most successful and economical method of cultivating stubble land in preparation for wheat and oats. A three-year rotation, summer-fallow, wheat, wheat and oats is used. All plots receive uniform treatment in the summer-fallow year, the treatment of the first year stubble being varied.

WHEAT STUBBLE TREATMENT FOR WHEAT

Plot No.	Treatment Given	Yield per Acre, 1923	
		bush.	lbs.
1	Plough in autumn	26	40
2	Plough in spring	30	50
3	Disk stubble in spring and seed	34	10
4	Plough in autumn	28	20
5	Burn stubble in spring, plough and seed	30	.....
6	Burn stubble in spring, disk and seed	30	50
7	Plough in autumn	25	.....

WHEAT STUBBLE TREATMENT FOR OATS

8	Plough in autumn	51	16
9	Plough in spring	67	22
10	Burn stubble in spring, disk and seed	54	14
11	Plough in autumn	39	24

In this experiment the fall-ploughed land produced the lowest yields. This method has one advantage in that the land is ready for the seed in the spring.

Both spring and fall ploughing produced a crop freer from weeds than where the seed was stubbled in. On the other hand, the spring-ploughed land showed no increased yield per acre over that which was stubbled in.

The land stubbled in without first burning the stubble was badly contaminated with volunteer oats and weeds. Where there is sufficient stubble it apparently is a good practice, from the standpoint of weed control, to burn it. Where this practice is followed, not only weed seeds and volunteer grain but also the injurious insects and plant diseases which winter over on the stubble and straws are destroyed.

There appeared to be no advantage in spring ploughing after the land had been burned, except with the oat crop, where spring ploughing showed a substantial increase over stubble burning.

In comparing the results obtained in the above experiment, the reader must bear in mind that one year's results only are presented, and that conclusive comparisons are not justified without further experimentation.

CULTURAL WORK WITH GRASSES AND CLOVERS

In this work, methods of seeding grasses and clovers, rates of seeding grasses and clovers, and methods of breaking sod from cultivated grasses are compared. The season of 1922 was so dry, however, that the catch of seeding obtained was almost negligible; hence, the results obtained are of little experimental value and, for that reason, have been omitted from this report.

BARNYARD MANURE FOR SUNFLOWERS

In this experiment, methods, rates and rotted and fresh barnyard manure are being tested on both fall and spring ploughing for sunflowers. A three-year rotation is followed, consisting of sunflowers, wheat and wheat. The manurial treatment is given on the second year wheat stubble. Plots 1, 4 and 8 are checks, and receive no special treatment; they are included for comparison.

BARNYARD MANURE FOR SUNFLOWERS

Plot No.	Treatment	Yield per Acre	
		tons	lbs.
1	No manure, second year wheat stubble ploughed in autumn	17	800
2	10 tons rotted manure applied on second year wheat stubble in fall and fall ploughed	20	800
3	10 rotted manure applied on second year wheat stubble in spring and spring ploughed	16	760
4	No manure, second year wheat stubble ploughed in autumn	16	40
5	20 tons rotted manure applied on second year wheat stubble in spring and spring ploughed	19	1,000
6	10 tons unrotted manure on second year wheat stubble in spring and spring ploughed	21	120
7	No manure, plot summer-fallowed	25	400
8	10 tons rotted manure applied before ploughing, plot summer-fallowed	26	1,400
9	No manure, second year wheat stubble ploughed in autumn	19	160

The results obtained in the above experiment show a considerable margin in favour of the summer-fallowed plots. It is doubtful, however, if the increased yields as a result of summer fallowing are large enough to justify the land being without a crop during the summer-fallow year. The application of manure to the land before summer fallowing apparently did not result in enough increased yield to justify the expense of putting the manure out.

It will be noted that in all cases the application of manure tended to increase the yields. On the other hand, the margin between the manured and unmanured plots was not large enough to justify much expenditure in the application of manure.

The sunflowers grown on summer fallow were the tallest and showed less tendency to break down by the wind, while those heavily manured broke down the most.

There was no apparent difference in the maturity as a result of the different treatments.

BARNYARD MANURE FOR WHEAT

In this experiment, methods and rates of applying barnyard manure and straw for wheat production are compared. Plots 1, 5 and 8 are check plots and receive no manurial treatment; they are included for comparison. A three-year rotation of summer fallow, wheat and wheat is followed. The treatment is given for the third year of the rotation or the second year in wheat.

BARNYARD MANURE FOR WHEAT

Plot No.	Treatment	Yield per Acre	
		bush.	lb.
1	No manure, first year stubble ploughed in autumn	18	20
2	10 tons rotted manure applied on summer-fallow before ploughing	25	.....
3	10 tons rotted manure applied on first year stubble and fall ploughed	19	10
4	The quantity of straw produced on plot is ploughed under in fall for second year grain and likewise when summer-fallowing	19	10
5	No manure, first year stubble ploughed under in autumn	19	10
6	Second year grain top dressed with 10 tons rotted manure when crop is three inches high	25	.....
7	10 tons of unrotted manure applied on first year stubble and fall ploughed	24	10
8	No manure, first year stubble ploughed in autumn	26	40

The application of 10 tons rotted manure on summer-fallow before ploughing has apparently given more satisfactory returns than any other treatment. The treatment used on plots six and seven also resulted in an increased yield; however, when the check plots 5 and 8 are compared a difference in the fertility

of the soil at this particular part of the range is indicated, and it is doubtful if the increased yields of plots 6 and 7 are wholly due to the manurial treatment.

It is quite apparent that this work will have to be continued for a number of years before conclusive deductions may be drawn. The experiment has not progressed far enough to give the influence of the manure on both years in wheat.

BARNYARD MANURE FOR POTATOES

In this experiment methods of applying manure for potatoes is tested. A three-year rotation is followed.

BARNYARD MANURE FOR POTATOES

Plot No.	Treatment	Yield per Acre	
		bush.	lb.
1	No manure, land summer-fallowed	420	.....
2	10 tons rotted manure applied on summer-fallow before ploughing	460	40
3	No manure, second year oat stubble fall ploughed	413	20
4	10 tons rotted manure on second year oat stubble in fall before ploughing	468	40
5	10 tons rotted manure on sets in drills, second year oat stubble fall ploughed	560	.....

The season of 1923 was particularly favourable for potato production. Even where no manurial treatment was given, most satisfactory yields were obtained. It will be noted that plot No. 3 which had no special treatment yielded almost as well as the plot which was summer-fallowed; also, that manurial treatment in all cases gave a marked increase in the yield per acre. The increased yields resulting from placing the manure on the sets in the drill at planting time is no doubt partially due to some unknown factor; nevertheless, a large crop of clean tubers, free from disease, was harvested.

GREEN MANURE

In this experiment a legume is compared with a legume sod, a grass sod, and a bare fallow. A three year rotation is used, first year, green manure crop; second year, oats; third year, oats.

GREEN MANURE FOR OATS

Plot No.	Treatment	Yield per Acre	
		bush.	lbs.
1	Summer-fallow	40	.....
2	Sweet clover ploughed down about June 21, and fallow for balance of season	36	40
3	Sweet clover hay harvested, plough immediately and work for balance of season	36	40
4	Western rye hay harvested, plough immediately and work for balance of the season	40	50
5	Summer-fallow	40	50

It will be noticed that all the green manuring crops, with one exception, resulted in a decreased yield per acre. This might be explained by two factors; first, the soil is not so depleted in organic matter that the incorporation of all or part of a growing crop will result in an increased yield; second, the season of 1922 was so dry that ploughing during the season green manuring crops are turned under opened up and dried out the soil to such an extent that any beneficial effects resulting from ploughing under a green crop were more than counterbalanced.

PLACE IN ROTATION TO SEED FALL RYE

Winter rye is becoming more important as a standard crop in central Alberta as farmers realize its possibilities as a cereal, hay and pasture crop. To date its adaptation to different cultural practices has never been appreciated. The following experiment was outlined to give further information on this subject. With one exception a three-year rotation is followed, the winter rye appears in the second year of the rotation.

The problem upon which the experiment is outlined to furnish information is whether there is some place in the rotation that winter rye will fit, and thus avert the loss of one season's crop, as is the case where the summer-fallow is used as a preparation for fall rye, and whether the increased yields as a result of summer-fallowing compensate for the loss of any nurse crop which might be used for the winter rye.

PLACE IN ROTATION TO SEED FALL RYE

Plot No.	Treatment	Yield of Nurse or Preceding Crop, 1923	Yield of Fall Rye 1923
		lbs.	lbs.
1	Seeded on summer-fallow	.....	600
2	Seeded with wheat in spring	1,800	1,100
3	Seeded on disced wheat stubble after harvest	2,400	600
4	Seeded with barley in spring	1,950	200
5	Seeded in summer-fallow	.....	500
6	Seeded on disced barley stubble after harvest	1,750	600
7	Seeded on ploughed barley stubble after harvest	2,200	400
8	Seeded with oats in spring	2,250	950
9	Seeded on summer-fallow	.....	1,000
10	Seeded on disced oat stubble in fall	3,350	1,100
11	Seeded with oats for greenfeed about June 20. Land to be fall ploughed and worked in spring before seeding	4,708	1,200
12	Seeded between rows of sunflowers before last cultivation	6,235	2,200
13	Seeded on summer-fallow	.....	.....
14	Seeded with oats when oats are about 4 inches high	6,072	1,200
15	Seeded on western rye grass sod, ploughed after hay crop is removed	.....	.....

The growing of winter or fall rye with another crop to eliminate the loss of one year without a crop, as in the case where fall rye is seeded on summer-fallow, produces some interesting data. In all cases the fall rye, when seeded with cereals in the spring, acts as a weed and reduces the yield of both grain and straw.

Seeding winter rye with other cereals furnishes some interesting points other than yield per acre. As this experiment has progressed for one year only, field observations would at this stage of the experiment be of more interest and value than yield per acre data. When taken collectively the yields and field observations indicate the trend of the experiment; on the other hand, the results are in no way conclusive.

Where fall rye is seeded with wheat in the spring, the yield of both the grain and straw is reduced. The fall rye develops scattered heads throughout the crop which, should they mature their grain, would render the wheat practically useless for milling purposes. In stubbling in fall rye on wheat stubble, the wheat is seldom harvested early enough in this district to permit the fall rye developing sufficient growth to go through the winter in good condition. In addition to this, the rainy season is usually past, and the surface soil is so dry that a very uneven germination results. Where there is sufficient moisture in the surface soil to insure germination, and where harvesting is over by September 15, the chances are that a reasonably good catch of rye will develop.

When seeded with barley as a nurse crop in the spring, the barley is affected in the same way as the wheat crop. As barley matures in a shorter number of days than wheat or oats, the trouble with the rye ripening in the grain is not a serious factor. Fall rye does not appear to do well on fall-ploughed barley stubble. Ploughing loosens up the ground too much in a dry season with the result that there is an uneven germination and a larger percentage of frost injury during the following winter. Barley appears to be the best crop to stubble in fall rye after as it is harvested earlier in the season and does not use as large an amount of moisture to develop its growth as does wheat and oats. Stubbling in on barley stubble appears to give better results than seeding with the barley in the spring or seeding on ploughed barley stubble.

When seeded with oats in the spring, the results are very similar to the seeding with wheat in the spring, except that seeding with oats in the spring results in a weaker development of the rye plants. Oat harvest also is usually too late to permit the rye plants making sufficient growth before freeze-up. Cross-seeding the winter rye in oats to be used for greenfeed when the oats are four inches high is a very promising method. When seeded in this way, the fall rye does not develop heads, is not shaded so long by the growing crop as is the case where other nurse crops are used, while cutting the crop as greenfeed permits the rye to make a sturdy growth before winter sets in. Where the oat bundles are removed as is the case where oats are used for silage, the method would be even more promising.

Seeding fall rye on western rye grass sod ploughed, worked down and seeded immediately after the hay crop has been harvested, is not a very promising method. The results are very disappointing in a dry year, as there is seldom sufficient moisture left in the soil to develop the crop. In a series of wet years the results would doubtless be more promising.

DATES OF SEEDING FALL RYE

In this rotation a three-year rotation of summer-fallow, fall rye and oats is followed. The seedings are made on the first and fifteenth of each month. The first seeding is on July 1, and the last is on October 1. The results obtained are presented in the following table:—

DATE OF SEEDING FALL RYE

Plot No.	Date of Seeding	Yield per Acre	
		bush.	lbs.
1	July 1	18	42
2	July 15	12	28
3	August 1	23	12
4	August 15	28	32
5	July 1	19	36
6	September 1	51	44
7	September 15	46	24
8	October 1	.....	.....
9	July 1	20	30

In this experiment, the earlier seedings developed heavy growth which, during the latter part of the season, became very fine-stemmed as the number of tillers increased. The plot seeded on September 1 gave the highest yield of both grain and straw per acre. The main point in seeding fall rye appears to be one of seed on such a date that a four-inch sturdy growth will develop. Earlier seeding than September 1 developed too heavy a growth and resulted in smothering.

DATE OF SEEDING SUNFLOWERS AND CORN

In this experiment six successive seedings are made at seven-day intervals, the first seeding being made on May 1. A three-year rotation is followed in the experiment; sunflowers or corn, wheat and oats. The results obtained are presented in the following table:—

Date of Seeding	Yield per acre			
	Green weight		Dry matter	
	tons	lbs.	tons	lbs.
May 1	13	1,000	2	887
May 7	10	880	2	445
May 14	12	360	2	677
May 21	9	1,680	1	1,306
May 28	10	400	1	1,427
June 5	9	960	1	680

In maturity, the above seedings varied from 1 per cent in bloom on the latest seedings to seed in the dough stage on the earliest seedings. Plants from the earliest seedings were very woody at the butts.

It will be noticed that there is little difference in the yield per acre of the first three seedings while there is a decided falling off in the later seedings. Until more authentic information is available, it would be advisable to plan to seed around May 15.

DATE OF SEEDING CORN

Date of Seeding	Yield per acre			
	Green weight		Dry weight	
	tons	lbs.	tons	lbs.
May 1	10	880	1	1,216
May 7	13	40	1	1,698
May 14	12	1,080	1	1,812
May 21	11	1,640	1	1,759
May 28	12	1,320	1	1,783
June 5	11	800	2	81

In this experiment the maturity of the corn varied from the early silk stage in the last seeding to the medium dough stage in the earliest seedings. The seeding made on May 1 did not appear to germinate evenly; apparently the soil at that time was too cold to promote good growth. This seeding came on later, however, and made a reasonably good stand.

Judging from the yield of dry matter produced per acre, it would seem inadvisable to seed corn before May 15, while later seedings will produce the same amount of dry matter per acre. In addition to this, the later seeding permits one or two crops of weeds being germinated and destroyed before the corn is planted; thus, eliminating considerable cultivation and hand work among the growing crop.

THINNING EXPERIMENT WITH SUNFLOWERS AND MANGELS

The object of this experiment is to determine the distance apart in the row that sunflowers should be thinned to result in the highest production per acre,

and if there is any advantage in having the rows spaced 36 inches or 42 inches apart. The results obtained are presented in the following table:—

THINNING SUNFLOWERS AND MANGELS

Distance between rows	Distance between plants in row	Yield per acre			
		Green weight		Dry weight	
Inch	inch	tons	lbs.	tons	lbs.
36	3	15	720	3	660
36	6	16	520	3	504
36	9	18	840	3	705
36	12	15	1,560	3	1,196
42	6	16	1,600	2	1,779

It will be noticed that when the yields are reduced to dry matter yield per acre there is little difference in the yields produced by the different distances of thinning in the 36-inch rows, but that widening the rows tended to reduce the yield.

Field observations showed that the thicker stands had a greater tendency to lodge, while dry matter determinations indicate that there was a tendency toward a higher percentage of dry matter in the thinner planting. The thinner planting also showed a greater tendency towards woodiness in the butts of the stalks.

HORTICULTURE

The season of 1923 was very favourable for all horticultural crops, with the exception of tomatoes and similar plants. The moist cloudy weather prevented the tomatoes from setting much fruit. September was very warm and dry, and the absence of killing frosts during the first half of the month permitted some of the later crops to reach greater maturity than they have for some years.

VEGETABLES

VARIETY AND STRAIN TESTS OF ASPARAGUS

Two varieties of asparagus, Palmetto and Eclipse, are grown at this Station. These beds are getting run out and seed was taken last season for starting new beds.

VARIETY AND STRAIN TESTS WITH BEANS

Fifteen varieties of beans were tested in 1923. They were sown May 25th in 30 foot rows, 30 inches apart. The results obtained are given in tabular form.

VARIETY TESTS WITH BEANS

Variety	Source	Date ready for use	Yield from 30 foot row	
			lbs.	oz.
Masterpiece	O-2745	August 12..	37	0
Bountiful	O-2825	" 12..	29	2
Stringless Green Pod	O-2747	" 12..	27	7
Davis White Wax	O-2772	" 12..	27	8
Wardwell Kidney Wax	O-2823	" 12..	26	3
Round Pod Kidney Wax	O-2845	" 12..	24	0
Extra Early Valentine	O-2543	" 12..	23	9
Round Pod Kidney Wax	Graham	" 12..	22	7
Challenge Black Wax	O-2826	" 12..	22	1
Yellow Eye Yellow Pod	O-2821	" 22..	21	3
Yellow Eye Wax	O-2822	" 22..	21	3
Hodson Long Pod	O-2748	" 22..	19	7
Refugee 1,000 to 1	O-1631	" 22..	17	12
No. 1 White Pole	O-3209	" 22..	15	3
Plentiful French	O-2824	" 22..	11	0

The early-maturing varieties gave by far the highest yields, and they also had much better table quality, being more tender. The later-maturing varieties had a tendency to be tough and stringy.

VARIETY AND STRAIN TESTS WITH GARDEN BEETS

Eight varieties of beets were tested in 1923. They were sown on May 4 in rows 30 inches apart and were later thinned to 3 inches apart in the row.

Crimson Globe, Crosby Egyptian and Detroit Dark Red are standard, dependable varieties that give satisfactory results. The medium-sized beets have better eating qualities than the larger-growing varieties which are usually more stringy.

Dates for Seeding Beets.—The first seeding was made on May 4 and subsequent seedings were made at ten day intervals up to July 11. The early seedings gave the highest yields, but the later seedings produced beets of the best quality for winter use.

VARIETY AND STRAIN TESTS WITH CABBAGE

Twenty varieties of cabbage were seeded in the cold frame on April 18, and were transplanted to the open garden on May 29.

The cabbage were harvested October 18. Summer Ballhead, the heaviest yielding variety, produced a yield of 140 pounds from six heads, the heaviest head weighing 26 pounds. There appears to be as much difference in different strains of the same varieties as there is between the different varieties. It will be noted that the second highest yielding sort was from seed grown at this Station.

The Flat Swedish, Copenhagen Market, and the Danish Roundhead are standard varieties for the main crop, while Early Jersey Wakefield is suitable for early cabbage.

Plants from seed sown in cold frames appeared to give better results than seed sown in hotbeds. The plants did not get so leggy, were sturdier, and transplanted to better advantage.

VARIETY AND STRAIN TESTS WITH CAULIFLOWER

Two varieties of cauliflower were sown in the cold frame on April 20, and were transplanted into the open on May 28. The results obtained were as follows:

Variety	Ready for use	Weight of 6 heads
		lbs.
Snowball	July 27	28
Dwarf Erfurt	" 29	26

These are two well-known varieties, and there appears to be little choice between them. Like cabbage, there is often greater difference in the seed of the same variety than between the two varieties. Both varieties produced heads in 1923 that were greatly admired for size, whiteness and quality.

VARIETY AND STRAIN TESTS OF CARROTS

Eight varieties of carrots were sown on May 7 in rows 30 inches apart, and were later thinned to 2 inches apart in the row.

All the varieties produced roots that were clean, of good shape, and free from spliting. Shorthorn, Chantenay and Danvers are standard varieties that will give satisfactory results.

DATES FOR SEEDING CARROTS

Carrots were seeded at intervals from early in the season to as late as July 11. The early seeding produced the highest yields, while the later seeding produced the best quality for table use.

VARIETY AND STRAIN TESTS WITH CELERY

Eleven varieties of celery were seeded in the hotbed on April 20, and were transplanted to the open on June 4 in rows 30 feet long and 3 feet apart, the plants being spaced 6 inches apart in the row.

Golden Self Blanching and White Plume are standard sorts that will give good results under average conditions.

In cultural experiments, planting in single rows gave bigger yields per plant than did the double rows. Planting in trenches gave larger yields and better quality than planting on the level. Planting on level and earthing up results in better quality than blanching with boards.

VARIETY AND STRAIN TESTS WITH SWEET CORN

Thirteen varieties of corn were seeded on May 28 in hills 3 feet apart each way.

Pickaninny, Early Malcolm and Early Squaw will be found to give best results. Owing to pressure of work, the half of the corn was not suckered last season; hence, the corn was not so early as had this practice been followed out.

VARIETY AND STRAIN TESTS WITH CUCUMBERS

The cucumber seed was planted directly into the open on May 28, but the results obtained were far from satisfactory. Cucumbers apparently need special treatment and protection.

VARIETY AND STRAIN TESTS WITH LETTUCE

Twelve varieties were seeded on April 20 in rows 15 inches apart and were later thinned to 6 inches apart in the rows. The results obtained are tabulated.

VARIETY TESTS WITH LETTUCE

Variety	Source	Type	Ready for use	Quality
Black Seeded Simpson	Ewing	Loose Leaf	June 23	Fairly good quality.
Iceberg	Ewing	Cabbage	" 20	Good flavour, crisp, fine.
Tom Thumb	Suttons	"	" 18	Good flavour, hard and crisp.
Cos Trianon	D. & F.	Cos	July 3	Large, good flavour.
Ideal	Suttons	Cabbage	June 24	Not so good as Tom Thumb.
Improved Hanson	Ewing	Loose Leaf	" 21	Medium.
Satisfaction	Suttons	Cabbage	" 20	Fairly good quality.
Grand Rapids	Ottawa	Loose Leaf	" 16	Very early, useful.
Salamander	MacDonald	Cabbage	" 24	Fairly good quality.
Earliest Wayahead	D. & F.	"	" 20	Rather inclined to bolt to seed.
Crisp as Ice	Will	"	" 22	Good flavour, crisp, fine.
Big Boston	Steele Briggs	Loose Leaf	" 18	One of the best for general purposes.

The lettuce made an excellent growth last season, and very few of the varieties bolted to seed.

Several sowings were made, the last being made on July 11. The season was so favourable that there was lettuce for table use from June 18 to late in the fall. Black Seeded Simpson, Big Boston and Crisp as Ice are all excellent varieties.

VARIETY AND STRAIN TESTS WITH ONIONS

Onions were a very disappointing crop last season. They were handled in three different ways; seeded directly in the open; sets set in the open; and sown in the hotbeds and transplanted. Those sown in hotbed and transplanted were the only ones which produced a crop. The onion maggot took so many of the plants that the yields are of no value for comparative purposes. The most promising varieties are Yellow Globe Danvers, Giant Yellow Prize Taker and Long Red Wethersfield.

VARIETY AND STRAIN TESTS WITH PARSLEY

Three varieties of parsley were planted on May 3 and were ready for use June 2. Of the three varieties tried, Double Curled, Triple Curled and Moss Curled, there appeared to be little preference.

VARIETY AND STRAIN TESTS WITH PARSNIPS

Two strains of the Hollow Crown variety were seeded on April 27 in rows 30 inches apart. The Steele Briggs selection yielded 40 pounds from a 30-foot row, while the same area of Ottawa 1909 yielded 43 pounds.

VARIETY AND STRAIN TESTS OF GARDEN PEAS

Sixteen varieties were tested in 1923 as a green table vegetable. They were planted on April 29 in rows 30 inches apart.

Last season was very favourable for peas. The yields obtained were decidedly above the average. Some of the outstanding varieties are Stratagem, English Wonder, American Wonder and Thos. Laxton. These varieties are all for sale by local seed-houses.

In an experiment to determine the advisability of seeding both late and early varieties at one time as compared with seeding one variety at intervals of 10 days, seeding early, medium and late varieties on the same day produced better results than seeding at 10-day intervals. Where spaced at different distances apart in the row, the 1 inch spacing yielded 21 pounds, the 2 inch

spacing gave 21¼ pounds, and the 3 inch spacing gave 22¾ pounds from a 30-foot row.

Some of the newer crosses from Ottawa and the newer sorts from Suttons and Daniels (English seed firms) are proving very promising. It will be necessary to grow these for a number of years, however, before it can be definitely determined whether they are an improvement on our standard lading varieties.

VARIETY AND STRAIN TESTS WITH POTATOES

Thirty-two varieties of potatoes were tested in 1922. They were planted on May 17 and were harvested on October 8. They were planted in rows 30 inches apart, and the sets were dropped 12 inches apart in the row. The sets were cut to average exactly 2 ounces in weight.

Eighteen varieties have been grown for the past five years, while the yields of Early Ohio presented are for four years only. The yields produced in 1922 were so abnormally low that the yields produced in that year were omitted, the years used in obtaining the five-year average being 1918-19-20-21-23.

AVERAGE YIELD OF POTATOES FOR THE YEARS 1918-19-20-21 and 23 INCLUSIVE

Variety	Yield per acre	
	bush.	lbs.
Houlton Rose	431	36
Empire State	430	36
Table Talk	423	42
Burnaby Mammoth	395	56
Country Gentleman	394	32
King Edward VII	393	47
Duchess of Norfolk	392	53
Ash Leaf Kidney	384	51
Early Norther	383	55
American Wonder	376	37
Early Hebron	373	27
Wee MacGregor	368	15
Gold Coin	353	37
Carter Early Favourite	343	22
Irish Cobbler	342	4
Green Mountain	337	36
Extra Early Eureka	311	19
Early Ohio	280	58

The yields produced in 1923 were decidedly above the average. The season was ideal for the crop which grew to perfection.

While the season was ideal for the development of tubers, potato diseases were much more prevalent than is usually the case. Common scab (Actinomyces scabies) and black scurf (Rhizoctonia solani) were most prevalent. Black scurf (Rhizoctonia solani) affects both tubers and stalks, and materially lowered both the grade and quantity of tubers in many of the varieties. This disease affected the earlier maturing varieties to a much greater extent than it did the later maturing varieties. With common scab certain varieties appeared practically free from the disease, while other sorts were very badly affected.

The five-year averages give a fairly authentic comparison of the productivity of the different varieties. It will be noticed that all the yields are comparatively high. In selecting a variety (for either garden or commercial purposes), table quality, maturity and immunity to prevalent diseases, must be considered as well as yield.

The outstanding potatoes tested to date are as follows:—

Empire State.—The best variety for the late or main crop: plant is a strong grower and is very productive; tubers tapering oblong to long, white with medium to deep eyes; excellent table quality.

Gold Coin.—One of our best medium late varieties; a strong grower and good cropper; tubers are white, oblong and inclined to be flattened; excellent table quality; eyes shallow to medium in depth.

Gold Nugget.—A medium early variety originated by Dr. Seager Wheeler, of Rosthern, Saskatchewan; a strong grower and fairly productive; tubers are spherical in shape, with very shallow eyes; skin is white and often finely netted; table quality is excellent; one of the most promising early sorts.

Early Ohio.—The earliest-maturing variety under test. Not as productive as some of later-maturing varieties; tubers round-oblong; skin pink, eyes numerous, shallow or protruding; quality good; useful where early maturity is an important factor.

The above varieties are suggested as the writer believes that there is no one variety that will produce best results under all conditions. The suggested varieties have been found to be the outstanding sorts of their respective classes.

CULTURAL EXPERIMENTS WITH POTATOES

A number of experiments covering different cultural methods were conducted. Irish Cobbler was the variety used throughout. Unless otherwise stated, the potatoes used for seed in these experiments were planted on May 17 and were harvested on October 8. They were planted in drills 30 inches apart and the sets were spaced 12 inches apart in the row. The sets were cut to average 2 ozs. in weight, and the drills were 4 to 5 inches deep.

PLANTING POTATOES AT DIFFERENT DATES

In this experiment the potatoes were planted on seven different dates with seven-day intervals. They were all harvested on October 8. The results obtained were as follows:—

Date planted	Percent marketable	Yield per acre	
		bush.	lbs.
May 1	68	454	8
" 8	76	386	27
" 15	84	373	21
" 22	64	410	28
" 29	68	375	32
June 5	60	281	39
" 12	60	279	28

This experiment indicated that early planting will produce the heaviest crop. The difference is not very marked for the May plantings, but the later June plantings show a considerable falling off. A later-maturing variety than the Irish Cobbler would show a greater difference in favour of the early planting. The plants from tubers planted early in May usually are frozen back once or twice after they come up. Where tubers are stored in a cellar cool enough that they do not sprout badly it would doubtless be wise to delay planting until about May 24, but where they are stored in a warm cellar where they sprout badly, the earlier seeding is doubtless preferable.

PLANTING WHOLE AND CUT POTATOES

The kind and size of set used, the amount of seed per acre required, the per cent marketable potatoes produced, and the yield per acre, are given in the following table:—

Description of Set	Distance apart in row	Amount of seed required per acre		Percent marketable	Yield per acre	
		bush.	lbs.		bush.	lbs.
Large whole	1 foot	104	48	68	545	50
Large whole	2 feet	56	46	68	462	52
Large whole	3 feet	41	29	68	388	38
Large medium	1 foot	63	19	60	510	54
Large medium	2 feet	37	7	82	441	2
Small marketable	1 foot	50	13	78	585	8
Medium, cut in two	1 foot	40	39	74	516	16
Medium, 2 eyes in a piece without seed ends	1 foot	41	29	80	537	6
Medium, 1 eye in a piece without seed ends	1 foot	36	1	78	497	48
Medium, seed ends	1 foot	14	11	86	545	50

The season in 1923 was such that good yields of potatoes were produced regardless of the kind of set used. The above table indicates, however, that small marketable potatoes or medium-sized potatoes, either cut in two or cut to leave two eyes on the set, will produce the best crop of commercial potatoes.

PLANTING POTATO SETS OF DIFFERENT SIZES WITH ONE EYE IN EACH SET

The object of this experiment is to determine the influence of the size of the set on the yield of the resulting crop. The sets were cut to different weights, and only one normal eye was left on each set. The size of set, the amount of seed required per acre, and the yields are presented in the following table:—

Size of Set	Amount of seed required for 1 acre		Per cent marketable	Yield per acre	
	bush.	lbs.		bush.	lbs.
½ ounce	9	10	82	388	38
1 ounce	17	34	80	506	32
2 ounce	39	18	80	484	42
3 ounce	54	35	78	519	38

The above figures indicate that nothing smaller than a one ounce set should be used, while little increase in yield results from using a large set under soil and climatic conditions such as pertained with the above crop.

PLANTING POTATO SETS OF DIFFERENT SIZES AT DIFFERENT DISTANCES APART

The object of this experiment is to determine the most suitable distance apart in the row to space the different-sized sets, and which combination will produce the heaviest yields per acre. The size of set, the distance apart the sets were spaced in the row, the amount of seed used per acre, the per cent marketable potatoes produced and the yield per acre, are presented in the following table:—

Size of Set	Distance apart in row	Amount of seed required for one acre		Per cent marketable	Yield per acre	
	inches	bush.	lbs.		bush.	lbs.
1 ounce	12	15	17	86	484	46
1 ounce	18	9	10	80	419	12
1 ounce	24	7	26	80	323	8
2 ounces	12	44	46	84	528	22
2 ounces	18	24	1	74	462	52
2 ounces	24	15	17	72	371	10
3 ounces	12	66	49	74	589	30
3 ounces	18	56	46	72	510	54
3 ounces	24	30	34	72	480	20

In this experiment the average of the three ounce sets is greater than is the average of either the two or one ounce sets. In each case the yields are in favour of the closer planting. The results indicate that where seed potatoes are cheap the thicker planting would be profitable, but where seed is expensive a two ounce set planted from 12 to 18 inches apart in the row would produce the most economical crop.

PLANTING POTATO SETS OF EQUAL SIZE WITH A VARYING NUMBER OF EYES

The object of this experiment is to determine the effect of the number of eyes per set on the yield of potatoes. The sets were uniform in every respect other than the number of eyes per set. The results obtained are presented in the following table:—

Number of eyes per set	Per cent marketable	Yield per acre	
		bush.	lbs.
1 eye	80	532	44
2 eyes	70	554	34
3 eyes	78	534	55
4 eyes	80	519	3

The above figures indicate that the number of eyes per set has little influence on the resulting crop. When the experimental error is considered, it is doubtful if the difference in yield is sufficient to have any significance.

PLANTING EYES FROM DIFFERENT PARTS OF THE POTATO

The object of this experiment is to determine whether there is any difference in the producing power of sets taken from different parts of the tuber. Sets were cut from the stem end, the seed end and the middle portion of the potato. One eye only was left on each set. The results obtained are presented in the following table:—

Part of Potato set was taken from	Per cent marketable	Yield per acre	
		bush.	lbs.
From stem end	72	475	58
From seed end	72	528	24
From middle portion	82	475	58

The above experiment gives figures which are contrary to the general opinion that the seed end should be discarded. This is the second year, however, that the seed end sets have produced bigger yields than sets taken from either the centre or stem end of the potato.

PLANTING ONE, TWO AND FOUR POTATO SETS PER HILL

The object of this experiment is to determine whether there is any advantage in halving or quartering potatoes with the object of increasing the number of stalks per hill, and thus, possibly, increasing the resulting crop. The hills were spaced 3 feet apart in the row, and either one whole, two half or four quarter potatoes, as the case might be, were placed in each hill. The results are presented in the following table:—

Sets per Hill	Percent marketable	Yield per acre	
		bush.	lbs.
One whole potato	86	375	32
Two half potatoes	102	445	24
Four quarters potatoes	115	502	10

The above figures indicate that it is advisable to cut potatoes instead of planting them whole. Possibly the advantage of the cut over the whole potatoes for seed purposes is not as great as indicated in the above table.

PLANTING POTATOES AT DIFFERENT DEPTHS

The object of this experiment is to determine the influence of the depth of planting on the yield of potatoes. Sets of similar sizes were planted in the same manner, except that the different lots were planted 3, 5 and 7 inches deep. The results obtained were as follows:—

Depth of Planting	Percent marketable	Yield per acre	
		bush.	lbs.
3 inches deep	68	510	54
5 inches deep	68	510	54
7 inches deep	72	545	50

The above results indicate the deepest planting will produce the largest yields. In a year with excessive rainfall the shallower planting might give better yields, although there is less trouble from sunburn with the deeper planting.

VARIETY AND STRAIN TESTS WITH PUMPKINS

Four varieties of pumpkins were seeded in hills 9 feet apart each way on May 28. The pumpkins were seeded directly into the open ground. The Veitch Giant proved to be too late for this country, although the other varieties gave fairly satisfactory results. The Connecticut Field and the Small Sugar are most satisfactory.

VARIETY AND STRAIN TESTS WITH RADISHES

Of the six varieties tested the French Breakfast and the White Icicle are the two best varieties. They were seeded on April 24, and subsequent seedings were made to provide a supply over a longer period. The late crop was destroyed by root maggots.

VARIETY AND STRAIN TESTS WITH RHUBARB

Ten varieties of rhubarb were under test in 1923. This is a new plantation started in 1922.

Rhubarb is one of the most useful things grown in the garden. Its usefulness has never been appreciated by many people of the West. With the exception of Linnaeus, which was started from seed sown in 1921, all the varieties were propagated from root divisions. Daws Champion was the outstanding variety, having colour, quality and yield. Linnaeus is a very productive sort, but lacks the colour and uniformity of the Daws Champion. On the other hand, the Linnaeus, being started from seed, would naturally show a variation in type.

A number of hills of rhubarb were forced outside by the method outlined in the 1922 report. Also, some hills were removed to the hotbed at the same time. The rhubarb lifted and removed to the greenhouse did not produce as satisfactory results as that forced in the open. That forced in the open was covered with leaves and straw April 11, and the first picking was made on April 25, two weeks later. This rhubarb of excellent quality was a valuable addition to the menu at this season.

VARIETY AND STRAIN TESTS OF SALSIFY

Two varieties of salsify or oyster plant were seeded in the open on May 3. Mammoth Sandwich Island produced 16 pounds and Long White Sandwich Island produced 15 pounds from a 30-foot row.

VARIETY AND STRAIN TESTS WITH SPINACH

Two varieties of spinach were seeded May 2. The Victoria produced 10 pounds and the New Zealand produced 25 pounds on a 30-foot row. The New Zealand variety is very superior to the Victoria, which has a great tendency to bolt to seed. The New Zealand does not bolt to seed, but produces a luxuriant foliage throughout the season.

VARIETY AND STRAIN TESTS WITH SQUASH AND MARROW

Four squash and four marrows were tested last season. They were seeded in the open on May 28.

Squash and marrows do not transplant readily, and do best when seeded directly in the open. The Long White marrow and the Green and Golden Hubbard squash are the outstanding varieties.

VARIETY AND STRAIN TESTS WITH TOMATOES

Twenty-one varieties of tomatoes were tested in 1923. They were seeded on April 5 in the hotbeds. Four of these varieties did not produce any fruit.

Alacrity, Earliana and Bonny Best are the most suitable varieties for our climatic conditions. Seed of the earliest and best shaped fruit was saved for planting next year. This selection will be continued, and it is possible that a strain may be evolved which will be more suitable to our conditions than the existing varieties.

The tomatoes were all pruned to one stem and not permitted to develop more than three bunches of fruit per plant. By handling in this way a larger amount of fruit was matured than would have been possible had the vines been left unpruned.

TREE FRUITS

The attempts to produce an apple that would be hardy in this district have not met with much success. A large number of trees of all the hardiest known varieties have been planted. While small quantities of fruit have been grown at different times, to date none have proven sufficiently hardy to justify their recommendation for commercial purposes. Quite a number were planted in 1921. Practically all of these were killed the following winter. In 1922 an additional lot was planted out, and these trees are making an excellent showing at the present time. It would seem that farmers would be well advised not to spend too much money on apple trees until it becomes more definitely established that they can be grown successfully.

Manitoba seedling plums are giving us quite a quantity of fruit. These plums exhibit wide variations, and it may be possible by selection to evolve a strain that will be suitable for our conditions.

Sand cherries are very promising. It may be possible to select strains from these that will be an improvement over any of the types now on the market. The Pin cherry and the Compass cherry are also hardy, and may be used to advantage for household purposes.

SMALL FRUITS

The small fruits at Lacombe this year were quite a feature. Fruit was exhibited at numerous fairs where it attracted much favourable comment. Apparently most people are unfamiliar with the fact that bush fruits can be grown so successfully in central Alberta. It has been definitely proven, that where hardy varieties are given suitable treatment, that the yield obtained will equal those produced in more favourable districts.

STRAWBERRIES

A new plantation of sixteen varieties of strawberries was laid down last season, but no fruit from these was recorded. Two varieties, Senator Dunlap and Steven's Late, were planted out in 1922 and yields from these only are available. A variety of the everbearing type, Superb, is very promising. Fruit from this variety was picked as late as October 15.

RASPBERRIES

A new plantation of raspberries was started in 1922 and additional varieties were added in 1923. These are just coming into bearing. Of these varieties Early King, Herbert and Cuthbert are the best.

GOOSEBERRIES

Eight varieties of gooseberries are under test in the new plantation. As some of these varieties were planted this year, the yields produced are not representative of the comparative value of the different varieties. Duncan and Silvia are very promising varieties, and appear to be an improvement over the other standard sorts, such as Houghton.

BLACK CURRANTS

The new plantation of black currants is proving very productive. Of the different varieties tested Magnus, Eagle and Clipper are quite dependable and can be purchased from most nurseries.

RED CURRANTS

The new plantation of red currants did not bear well. Rankins Red, Red Dutch and Red Grape are standard dependable sorts.

CEREALS

The season of 1923 was most favourable for the production of all cereals. The spring opened with sufficient moisture to insure the germination of the seed. This was followed by warm weather with an absence of cold and frosty nights. When the grain reached the tillering and shot blade stages a series of showers came which forced a very luxuriant growth. As the grain reached

maturity there was a cessation of these showers, the weather being ideal for harvesting and threshing. The yields obtained in the test plots, while high, do not represent the high yields reported by individual farmers in the district which are hardly credible.

The cereal plots were seeded on land broken from alfalfa sod the previous autumn and cultivated for the balance of the season. Ploughing was done so late that none of the previous season's moisture was stored up in the soil; hence, the growth of the cereals is the result of the current season's precipitation.

VARIETY AND STRAIN TESTS OF SPRING WHEAT

During the past season nineteen varieties and strains of wheat were tested. The plots were all sown in duplicate on April 28. The results obtained are presented in the folowing table:—

VARIETY TESTS WITH SPRING WHEAT

Variety	Date of ripening	Number of days maturing	Length of straw	Strength of straw	Yield of grain per acre	Weight per measured bushel
			ins.		bush. lbs.	lbs.
Bishop Ottawa 8	Sept. 2	127	43·0	10·0	57 55	60·2
Crown Ottawa 353	Aug. 27	121	43·0	10·0	55 ..	63·2
Duchess Ottawa 933	Aug. 27	121	41·5	7·5	56 40	64·2
Early Red Fife Ottawa 16	Sept. 4	129	47·5	10·0	51 15	63·0
Garnet Ottawa 652	Aug. 27	121	41·0	9·5	61 15	61·0
Huron Ottawa 3	Sept. 3	128	43·5	10·0	54 10	64·0
Kitchener	Sept. 4	129	42·0	10·0	58 45	64·0
Marquis Ottawa 15	Sept. 1	126	43·5	10·0	57 30	62·2
Marquis 10B	Sept. 1	126	43·5	9·0	54 10	62·0
Major Ottawa 522	Aug. 28	122	44·0	9·0	46 40	60·5
Master Ottawa 520	Aug. 22	116	43·5	10·0	43 45	61·0
Prelude Ottawa 135	Aug. 22	116	41·0	10·0	40 25	64·0
Producer Ottawa 197	Aug. 31	125	43·0	10·0	59 10	62·2
Ruby Ottawa 623	Aug. 25	119	44·0	9·0	45 25	61·2
Reward Ottawa 928	Aug. 24	118	43·5	10·0	46 40	64·0
Red Bobs Early Triumph	Sept. 1	126	44·0	10·0	62 30	59·6
Red Bobs Supreme	Sept. 2	127	43·0	10·0	63 45	59·0

As one year's results do not indicate the true value of a variety, the five-year averages in yields and number of days required to mature, as presented in the following table, are a more authentic indication of the comparative value of the different varieties:—

SPRING WHEAT—FIVE YEAR AVERAGES

Variety	Number of days to mature	Yield per acre
		bush. lbs.
Producer Ottawa 197	121	51 20
Huron Ottawa 3	123	46 38
Bishop Ottawa 8	123	46 4
Garnet Ottawa 652	115	45 56
Kitchener	127	45 53
Early Red Fife Ottawa 16	125	43 17
Marquis Ottawa 15	124	43 6
Crown Ottawa 353	118	40 36
Major Ottawa 522	121	38 41
Ruby Ottawa 623	117	38 5
Prelude Ottawa 135	112	31 21

The above five-year averages give a more authentic comparison of the different varieties under test than does the one season's results. The reader's attention is drawn to Producer Ottawa 197 which heads this list. This variety is somewhat similar to Marquis in type but is slightly earlier in maturing, and at this Station has been a consistently heavier yielder. It is possible that, for some districts, this variety may take the place of Marquis.

The reader's attention is also drawn to Garnet Ottawa 652, a new wheat that belongs to the very early maturing group, and which is one of the most promising new sorts tested at this Station. While there is little difference in the maturity of Garnet and Ruby, the Garnet is a distinctly heavier yielding variety, and will doubtless replace Ruby as an early maturing commercial wheat.

As a description of the different varieties has been given in previous reports from this Station, the reader is refered to them, while the different reports of the Dominion Cerealist will give the ancestory of the newer strains and varieties.

Variety and Strain Tests of Oats

During the past season eighteen varieties and strains of oats were tested. They were seeded in duplicate plots on May 4. The results obtained are presented in the accompanying table.

Variety Tests with Oats

Variety	Date of ripening	Number of days maturing	Length of straw	Strength of straw	Yield of grain per acre		Weight per measured bushel
			ins.		bush.	lbs.	lbs.
Alaska	Aug. 15	103	42·0	7·0	63	8	42·0
Banner Ottawa 49	Aug. 29	117	48·5	10·0	97	2	45·0
Banner Dixons	Aug. 30	118	53·0	9·5	84	19	45·0
Banner Waughs	Aug. 31	119	50·5	10·0	88	8	47·0
Banner McDonald	Aug. 31	119	50·0	10·0	94	4	46·6
Banner Dows	Sept. 2	121	51·5	10·0	77	7	44·5
Banner Saskatchewan	Aug. 29	117	49·0	10·0	93	13	45·2
Daubeney Ottawa 47	Aug. 15	103	38·5	7·0	83	28	39·8
Gold Rain	Aug. 26	114	49·0	8·5	97	2	48·0
Irish Victor	Aug. 28	116	48·0	8·5	94	4	47·0
*Liberty Ottawa 480	Aug. 16	104	42·5	10·0	58	3	52·0
Longfellow Ottawa 478	Aug. 22	110	47·5	8·5	88	8	42·5
*Laurel Ottawa 477	Aug. 21	109	41·0	8·5	58	28	54·2
Legacy Ottawa 678	Aug. 20	108	45·0	9·0	95	20	42·5
Leader	Aug. 26	114	46·5	9·0	107	12	45·2
O.A. C. No. 3	Aug. 15	103	38·0	6·5	80	5	38·5
Tartar King	Aug. 24	112	46·0	9·5	77	7	44·8
Victory	Aug. 28	116	48·0	9·5	94	29	49·2

*Hulless variety.

A new feature in variety and strain tests with oats was started this season. It has been definitely established that Banner is still our highest-yielding commercial variety of oats. At present there are several distinct strains of Banner oats in the seed trade. Six of these strains were grown in the test plots in 1923, and further additons will be made to this list in 1924.

The attention of the reader is drawn to the fact that too much importance should not be placed on the yields of these strains the first year they are grown under new conditions. In many cases there is a great difference in the weight per bushel of the seed used, and before dependable comparisons can be drawn the seed of the different strains should all be grown under similar conditions as to soil and climate.

It will be noticed that Leader is the highest-yielding variety in 1923. This is a side or mane oat and is one of the heaviest yielders of that type. It has a multiflorous spikelet, and under favourable conditions will produce three and four kernels per spikelet. The season of 1923 was an ideal year for growth, and Leader made an excellent showing. One year's results, however, do not give a true comparison of the value of the different varieties, and the reader is referred to the five year averages presented in the following table:—

OATS—FIVE YEAR AVERAGES

Name of Variety	Number of days maturing	Yield per acre	
		bush.	lbs.
Banner Ottawa 49	111	94	7
Daubeney Ottawa 47	99	60	..
Gold Rain	109	82	18
Irish Victor	113	89	12
Leader	114	91	1
*Liberty Ottawa 480	99	41	20
Tartar King	109	65	30
Victory	112	84	5

*Hulless variety.

The above table indicates that Banner Ottawa 49 is the highest-yielding variety. This variety is recommended for the general crop under conditions that obtain in central Alberta. Victory and Leader have been grown quite extensively in this province, but as a rule will not produce as large yields as Banner.

Daubeney Ottawa 47 is recommended for districts where Banner is liable to be injured by early fall frosts. It is doubtful, however, if there is any district in central Alberta that Banner will not mature.

VARIETY AND STRAIN TESTS OF BARLEY

During the past season, seventeen varieties of barley were tested in duplicate plots. The plots were seeded on May 23. The results obtained are presented in the accompanying table:—

VARIETY TESTS WITH BARLEY

Variety	Date of ripening	Number of days maturing	Length of straw	Strength of straw	Yield of grain per acre		Weight per measured bushel
			ins.		bush.	lbs.	lbs.
Albert Ottawa 54	Aug. 22	89	40·0	7·5	58	16	50·0
Barks	Sept. 6	104	38·5	9·0	73	21	52·0
Bearer Ottawa 475	Sept. 4	102	47·0	8·0	80	35	52·0
Chinese Ottawa 60	Sept. 2	100	44·5	6·5	61	22	54·0
Duckbill Ottawa 57	Sept. 4	102	41·5	10·0	53	31	55·2
Feeder Ottawa 561	Aug. 30	97	43·5	5·0	51	27	55·2
Fenil Ottawa 670	Sept. 1	99	46·0	8·0	36	22	58·2
Gold	Sept. 4	102	36·5	9·0	51	2	55·5
Himalayan Ottawa 59	Aug. 23	90	35·0	4·5	65	30	62·5
Junior Ottawa 471	Aug. 23	90	35·0	6·5	71	17	64·0
Manchurian Ottawa 50	Sept. 1	99	41·0	7·5	52	29	54·0
O.A.C. No. 21	Sept. 2	100	41·0	7·0	56	37	52·2
Stella Ottawa 58	Aug. 31	98	43·5	9·0	58	16	52·0
Success	Aug. 22	89	41·0	5·5	59	18	53·0
Trebi	Sept. 2	100	36·0	7·5	71	42	52·5

As one year's results do not give results from which authentic conclusions may be drawn, the average yield per acre and number of days required to mature are presented in the following table:—

BARLEY—FIVE YEAR AVERAGES

Variety	Number of days maturing	Yield per acre	
		bush.	lbs.
Albert Ottawa 50	96	38	41
Barks	116	68	13
Bearer Ottawa 475	115	68	13
Duckbill Ottawa 57	114	46	9
Gold	113	58	34
Junior Ottawa 471	101	54	44
Manchurian Ottawa 50	109	47	25
O.A.C. No. 21	107	58	12
Stella Ottawa 58	108	49	29
Success	95	41	34

It will be noticed that Barks and Bearer Ottawa 475 have exactly the same average yield per acre. It would seem as though these are the two outstanding varieties under test at this Station. While Barks yields as heavily as Bearer Ottawa 475, it has characteristics which make the latter preferable to it. Barks has a shorter straw and when grown under adverse conditions is difficult to gather with the binder. It is slightly later in maturing and is decidedly more subject to disease than the Bearer Ottawa 475. Under field conditions Barks stood up much better this past season than some of the other varieties, such as the O.A.C. No. 21, which are grown locally. This was largely due to the seasonal storms. Severe storms which lodged most of the crop struck most of the barley about a week before it was fully ripe. Barks, being a later-maturing sort, did not have heavy heads at the time of the storm, and consequently did not lodge to any appreciable extent. An erroneous impression concerning its strength of straw has become prevalent for this reason.

VARIETY AND STRAIN TESTS OF PEAS

During the past season seven varieties of peas were tested in duplicate plots. They were all seeded on May 3. The results obtained are presented in the following table:—

VARIETY TESTS WITH PEAS

Variety	Date of ripening	Number of days maturing	Average length of straw	Yield per acre	
			ins.	bush.	lbs.
Arthur Ottawa 18	Sept. 9	129	46	48	20
Cartier Ottawa 19	Aug. 30	119	48	53	40
Champlain Ottawa 32	Sept. 1	121	46	53	20
Chancellor Ottawa 26	Aug. 26	115	45	52	..
Early Feed Ottawa 30	Aug. 27	116	46	63	..
Golden,Vine Sask. 625	Aug. 29	118	48	55	..

Early maturity is one of the most important characteristics of any pea that will produce best results in central Alberta. Peas grown in our dry climate tend to split in threshing to a greater extent than when grown under more humid

conditions. For this reason some of our larger-seeded varieties split so much in threshing that it would be difficult for a farmer, equipped with his limited cleaning machinery, to get his seed from the threshed crop.

A variety to be suitable for this district must combine early maturity and the small-seeded characteristic with reasonable productivity. Of the varieties tested at this Station, Chancellor Ottawa 26 combines these different characters to a greater extent than any of the others.

Golden Vine, Sask. 625, an early maturing selection out of Golden Vine, is similar to Chancellor in many respects but does not mature quite so early. Where Chancellor seed is not available, the above variety, if procurable, should be used.

VARIETY AND STRAIN TESTS OF WINTER RYE

During the past season five varieties of winter rye were tested in duplicate plots. They were seeded September 2, 1922, and made a good strong, uniform growth before freeze up. The results obtained are presented in the following table:—

VARIETY TESTS WITH WINTER RYE

Variety	Date of ripening	Length of straw	Strength of straw	Yield per acre bushel	
		ins.		bush.	lbs.
Advance 668	Aug. 13....	41·5	7·5	47	28
Common	Aug. 13....	46·0	7·5	43	52
Dakold 295	Aug. 13....	42·5	7·5	47	48
North Dakota 959	Aug. 13....	44·0	7·0	47	8
Rosen	Sept. 1....	50·0	10·0	21	54

Dakold 295 and North Dakota 959 are two strains of the same selection. They appear to be identical in every way. They appear to be more winter-hardy than any of the other varieties and, in addition to this, are heavy yielders. They can be recommended where ever winter hardiness is the limiting factor in the production of this crop.

Advance 668 appears to be an improvement over common but is not quite as hardy as the previous two varieties mentioned.

Common, where seed of the improved strains are not available, can be depended upon to give a reasonably good crop, but is not quite as winter-hardy as North Dakota 959.

Rosen, a variety that has been widely advertised in the seed trade, lacks winter hardiness to such an extent that the risk of this variety winter-killing is too great to justify any one seeding it under climatic conditions similiar to Lacombe. It is a large-seeded variety, and where it does not winter-kill will produce large yields. The crop in 1923 was produced on a secondary growth that developed on the plants which were only partially winter-killed. The grain produced showed a large percentage of ergot. It is believed, however, that the lateness of the crop maturing was responsible for this, as ergot develops to a greater extent on the late-maturing varieties of both winter and spring ryes than on those sorts which mature early.

VARIETY TESTS OF SPRING RYE

During the past season, one variety of spring rye, O.A.C. No. 62, was seeded on May 4 and matured in 123 days and produced 33 bushels, 32 pounds per acre. On the same date the adjoining plot was seeded with winter rye. This plot developed a thick mat on the ground and developed a limited number of

heads. Very few of the heads developed grain, 13 bushels 56 pounds being the yield produced. The tonnage of hay produced was 3,800 pounds as compared with 6,000 pounds, the total weight produced by the spring rye. There is apparently no advantage to be gained in seeding winter rye in the spring for either hay or grain.

VARIETY AND STRAIN TESTS OF BUCKWHEAT

During the past season, four varieties of buckwheat, Common, Silverhulled, Japanese and Rye or Rough, were tested. They were seeded on June 8, and made a strong, uniform growth. The young bloom was killed by a light frost early in August. The frost was not sufficient to register on our thermometers. The whole crop was completely killed by a more severe frost early in September and the crop was cut for feed. The crop had not developed sufficiently after the first frost to mature any seed; and, when frosted, there appeared to be little difference in the maturity of the different varieties.

VARIETY AND STRAIN TESTS OF FLAX

During the past season, three varieties, Common, Premost and Resistant No. 52, were tested. They were seeded on June 8 and were not harvested until threshing time. All growth was stopped by 6.5° of frost on September 11. There appeared to be little difference in the maturity of the different varieties. They appeared to be approximately 60 per cent matured when frosted. Common produced 12 bushels, 40 pounds per acre, Premost 11 bushels, 20 pounds, and Resistant No. 52, 9 bushels, 20 pounds per acre. There appeared to be no difference in the growth and development of the different varieties.

FORAGE PLANTS

The season of 1923 was very favourable for forage crops. The moisture in the early spring was sufficient to insure a strong germination of spring-sown crops, and gave the perennials and biennials a good start, while the later rains during June and July forced a very rapid, strong growth. Both spring and fall were particularly free from frosts. Cutworms were quite serious in many localities and worked on all roots, corn, sunflowers, greenfeed and other crops seeded at this season.

The yield per acre is obtained in the following manner. The green weight is taken in the field. A portion of the crop is run through a cutting box and a two-pound sample is weighed out accurately. This is air dried in drying racks, and dry matter determinations are made from this sample. For yield of hay per acre, ten per cent is added to the yield of dry matter per acre. With corn, sunflowers, etc., the actual yield of dry matter per acre is given.

GRASSES AND CLOVERS

VARIETY AND STRAIN TESTS WITH ALFALFA

These plots were seeded June 1, 1922, and were cut on September 1 of the same year. The plots made such a growth that this cutting was cured and the hay weighed up. Three of the varieties yielded over one ton, while the balance yielded upwards to a ton. They came through the winter in good condition, any difference in winter killing being due to factors other than winter hardiness.

VARIETY AND STRAIN TESTS WITH ALFALFA

Variety	Source	1st cutting yield of hay per acre	2nd cutting yield of hay per acre	Total yield of hay per acre
		tons lbs.	tons lbs.	tons lbs.
Grimm	Northern Seed Company	1 1,186	1 1,379	3 565
Grimm	C.P.R.	1 1,007	1 1,246	3 253
Baltic	Steele Briggs	1 513	1 984	2 1,497
Canadian Variegated	Steele Briggs	1 98	1 870	2 968
Turkestan	Steele Briggs	1 132	1 20	2 202
Liscombe	McKenzie	.. 1,890	1 71	1 1,961
Mixed F. I.	M.A.C.	1 162	1 826	2 988
H.S. No. 62	M.A.C.	1 379	.. 1,888	2 266

It will be noticed that the second cutting in most cases exceeded the first. This was due to the seasonal rainfall and the warm weather during July and August which forced a strong second growth.

Grimm, from the Northern Seed Company, was grown near Belvedere, approximately one hundred miles north of Lacombe. This is very similar to the Grimm from the C.P.R., seed grown in the irrigation belt of southern Alberta. These two varieties are undoubtedly the best grown under test at this Station. When grown under field conditions this variety was perfectly hardy, and produced upwards to three tons per acre from the two cuttings.

Baltic, Canadian Variegated and Turkestan appear to be reasonably hardy, but they do not come through the winter in as vigorous a condition as the Grimm from native-grown seed. The same statement applies, only in a more emphatic way, to the Liscombe variety. This variety was used under field conditions, and did not prove nearly as satisfactory as Grimm from locally grown seed.

Mixed F.I. and H.S. No. 62 are two strains selected by Professor Southworth of the Manitoba Agricultural College. Certain sections of these plots winter-killed, but it was considered that this was due to some condition of the soil rather than lack of winter hardiness; hence, the yields as presented in the above table are not a true criterion of the value of these two selections.

VARIETY AND STRAIN TESTS WITH SWEET CLOVER

On June 1, 1922, five varieties of sweet clover were seeded. These made an excellent growth; in fact, the growth was so heavy that it was considered advisable to cut to prevent smothering during the winter. They were cut on September 1, and record kept of the hay produced. During the following winter all but the Arctic Biennial, from the University of Saskatchewan, winter-killed. The results obtained in this experiment are presented in the following table.

VARIETY TESTS WITH SWEET CLOVER

Variety	Source	Yield per acre	
		1922	1923
		tons lbs.	tons lbs.
White Blossomed, Biennial	Steele Briggs	2 ..	.. ..
Yellow Blossomed, Biennial	Steele Briggs	1 520	.. ..
Hubam, Annual	Michigan State Farm Bureau	2 200	.. ..
Artic, Biennial	University of Saskatchewan	1 ..	1 1,376
Southworth Biennial	Manitoba Agr. College	1 1,720	.. ..

The outstanding fact shown in this experiment is the apparent winter hardiness of the Arctic. The other varieties were completely winter-killed, while the Arctic did not appear to have suffered from winter injury in the least.

One interesting point came up in connection with the plots which were winter-killed. There was a considerable growth developed late in the summer. Apparently a quantity of seed did not germinate the first season, and lay in the ground all one summer and one winter before it grew. This might be an important factor in the production of this crop. If this seed were to lie in the ground for some time without germinating, it would have a tendency to make this crop a weed. This fact should be borne in mind by farmers before sowing the seed.

VARIETY AND STRAIN TESTS WITH RED CLOVER

In this experiment fifteen varieties and strains of red clover were seeded without a nurse crop on June 1, 1922. The seed of these clovers came from different sections of Europe and Canada, and included all the known hardiest strains, among them being the Altaswede developed by the University of Alberta, and a strain of Mammoth Red Clover developed by the C.P.R. Demonstration Farm of Brooks, Alberta. These strains should have proven more suitable to the district than some of the imported seeds. However, all the varieties were completely winter-killed.

VARIETY AND STRAIN TESTS WITH WHITE DUTCH CLOVER

Five strains of White Dutch clover were used in this experiment. While all plots showed a strong, even germination, none of them appeared to be sufficiently winter hardy to justify one recommending them for pasture purposes in Central Alberta.

VARIETY AND STRAIN TESTS WITH WESTERN RYE

In this experiment twenty-five strains of western rye developed by the Division of Forage Crops of the Central Experimental Farm, Ottawa, were tested. The results obtained are presented in the following table:—

STRAIN TESTS WITH WESTERN RYE GRASS

Strain	Green weight	Per cent dry matter	Yield of hay per acre	
	lbs.		tons	lbs.
Ottawa No. 2	9,560	38·5	2	49
Ottawa No. 3	12,360	39·9	2	1,425
Ottawa No. 4	11,480	39·6	2	1,000
Ottawa No. 5	9,600	40·3	2	255
Ottawa No. 6	7,440	42·0	1	1,437
Ottawa No. 7	10,080	44·4	2	922
Ottawa No. 8	12,080	42·3	2	1,621
Ottawa No. 9	10,720	41·0	2	834
Ottawa No. 11	10,280	27·7	1	1,132
Ottawa No. 14	10,600	35·2	2	104
Ottawa No. 15	12,080	32·3	2	292
Ottawa No. 17	11,040	41·2	2	1,002
Ottawa No. 18	11,000	42·5	2	942
Ottawa No. 19	10,520	37·4	2	327
Ottawa No. 20	10,560	38·6	2	483
Ottawa No. 29	12,160	39·2	2	1,243
Ottawa No. 47	15,720	32·7	2	1,654
Ottawa No. 78	12,360	35·9	2	880
Ottawa No. 81	10,640	38·7	2	529
Ottawa No. 85	12,000	39·5	2	880
Ottawa No. 89	12,680	38·0	2	1,299
Ottawa No. 91	10,560	42·4	2	924
Ottawa No. 93	12,120	40·4	2	1,385
Ottawa No. 98	8,960	43·5	2	287
Ottawa No. 118	12,400	43·1	2	1,878

There does not appear to be sufficient difference in the yields produced in 1923 by the different strains to justify one being recommended over the other.

ANNUAL HAY CROPS

During recent years the importance of the different annual hay crops has been brought more to the attention of farmers and experimentalists. The annual forage crops frequently were of material assistance in solving a serious feed shortage. The annual forage crops were seeded on fall-ploughd alfalfa sod. No manurial treatment was given. The seasonal precipitation gave these crops an excellent start and developed a very heavy growth, but had a tendency to make the crop slow in maturing.

MISCELLANEOUS CROPS USED AS ANNUAL HAYS, 1923

Variety and Class of Crop	Rate of planting	Height in inches	Date cut	Green weight	Per cent dry matter	Yield per acre of hay	
						tons	lbs.
Commercial Timothy	8 lbs.	34	Sept. 10	10,560	36·4	2	184
Boon Timothy	8 "	35	" 10	11,200	35·7	2	400
Grazer Western Rye	20 "	38	" 25	14,240	35·0	2	1,480
Commercial Western Rye	20 "	38	" 25	15,920	34·2	3	32
Grimm Alfalfa	20 "	30	" 20	16,080	27·3	2	387
Hubam Annual Sweet Clover	20 "	38	Aug. 25	31,600	15·2	2	1,280
White Flowered Biennial Sweet Clover	20 "	32	Sept. 10	19,080	24·4	2	1,117
St. Clet, Quebec, Red Clover	12 "	24	" 10	24,560	16·7	2	510
Mammoth Red Clover	12 "	26	" 25	21,120	17·1	1	1,973
Banner Oats	3 bush.	60	" 10	34,000	31·5	5	1,436
Irish Victor Oats	3 "	61	" 10	36,200	27·7	5	1,031
Banner Oats and Early White Peas	2½ bush. to ½ bush.	60	" 10	32,160	25·4	4	985
Beardless Barley	3 bush.	42	" 1	26,800	32·0	4	1,434

The crops connected with the above experiment were all seeded on June 9, and were harvested on the dates mentioned in the table. The rate of seeding, height, green weight and per cent dry matter are given in addition to the yield of hay per acre.

It will be noticed that the Banner oats yielded decidedly more per acre than any of the other crops, and approximately one ton per acre more than the beardless barley or the mixture of peas and oats. There appears to be no doubt that oat greenfeed should continue to be our standard forage crop. As oat green feed does not constitute a balanced ration for live stock, it might be supplemented to advantage with some of the other crops mentioned in the table. Oat greenfeed has a decided advantage in weed control. The seed germinates quickly and makes a strong, rapid growth which will smother and control weeds.

The beardless barleys have a place as annual hay crops in that they develop a strong, rapid growth similar to oats, and in addition attain that stage of maturity when they are cut for greenfeed approximately ten days sooner than the oats. For that reason there would be less liability of the weeds which might develop with the crop maturing seed. On the other hand, barley will not produce as heavy yields.

The timothys, western ryes, alfalfas and clovers, when treated as annuals and seeded on a well-prepared seed bed, will all produce excellent crops of hay. They have one disadvantage in that they develop slowly when they first germinate and are not effective in controlling weeds. When seeded on weedy land the quality of the hay is liable to be seriously impaired by the admixture of weeds in it. They have one decided advantage over the cereals, however,

providing they do not winter-kill. They eliminate the labour and cost of preparing the land and seeding for the hay crop the following year.

The hay produced by the timothys and the western ryes was very fine in texture and, although somewhat immature, made a palatable hay. Of the sweet clovers tested, the White Flowered Biennial made the finest quality hay, but none of them could compare with the alfalfa in this respect. Of all the legumes tested as annuals, the alfalfa is by far the most promising. In addition to the quantity and quality of the fodder produced, the chances of the alfalfa living through the winter and producing a crop the following season, providing a hardy strain is used, is much greater.

The red clover from St. Clet, Quebec, was more promising than the Mammoth variety. It is earlier in maturing, produces a heavier tonnage per acre, and the hay is finer in quality.

VARIETY TESTS WITH MILLETS AND OTHER ANNUAL GRASSES

In this experiment nine varieties were tested. They were seeded on June 9 and were harvested on September 10. The results obtained are presented in tabular form.

VARIETY TESTS WITH MILLETS AND OTHER ANNUAL GRASSES

Variety	Rate of planting	Height in inches	Green weight	Per cent dry matter	Yield of hay per acre	
					tons	lbs.
Common	2 pecks...	30	12,840	40·0	2	1,650
Siberian	2 " ...	32	17,160	32·0	3	41
Hungarian	2 " ...	31	13,120	39·2	2	1,658
Japanese	2 " ...	40	35,320	22·8	4	857
Early Fortune	2 " ...	34	18,680	30·2	2	1,764
Golden	2 " ...	29	16,640	32·4	2	1,931
Hog Millet	2 " ...	36	23,360	25·3	3	503
Sudan Grass	2 " ...	35	29,280	20·3	3	538
Teff Grass	8 lbs.....	24	16,080	30·5	2	1,394

It will be noticed that the yield produced by the Japanese millet is outstanding. This is undoubtedly the heaviest-yielding variety. As grown at this Station it seldom makes a full development. If the season permitted it attaining full maturity, the yield would undoubtedly be increased.

The Common, Siberian, Hungarian, and Early Fortune varieties are earlier maturing than the Japanese, but they do not possess its heavy-yielding characteristics. On the other hand, they produce a hay that is finer in quality and possibly more palatable. Hog millet and Sudan grass are late maturing and do not yield as well as the Japanese. The Sudan grass appears to be more susceptible to frost injury than any of the millets.

Teff grass seed is similar to that of hulled timothy seed in many respects. The hay produced in 1923 was very fine in texture. The stems were fine and there appeared to be an abundance of leaf; and it appeared to have every characteristic of a No. 1 hay. This grass, with the Japanese millet, were the two most promising crops belonging to this class.

HARVESTING OATS AT DIFFERENT STAGES OF MATURITY

In this experiment Banner oats seeded on the same date were harvested on six different dates. The green weight, per cent dry matter, and the yield of hay per acre are presented in the accompanying table.

CUTTING OAT GREENFEED AT DIFFERENT DATES

No. of Cutting	Rate of planting	Height in inches	Green weight	Per cent dry matter	Yield of hay per acre	
			lbs.		tons	lbs.
1st Cutting	3 bush....	60	37,600	20·3	4	395
2nd Cutting	3 "	60	34,400	23·0	4	603
3rd Cutting	3 "	60	35,000	27·5	5	586
4th Cutting	3 "	60	33,200	28·2	5	388
5th Cutting	3 "	60	29,340	31·2	5	243
6th Cutting	3 "	60	21,600	39·7	4	1,434

In this experiment the first cutting was made three days after the oats were in bloom, and the other cuttings were made at four-day intervals until the oats had reached the dough stage. In the sixth cutting the oats were injured by frost.

It will be noted that the per cent of dry matter increased as the crop neared maturity, and that there was a tendency for the crop to decrease in green weight. This experiment indicates that the best time to cut oats for greenfeed is between the second and third week after the crop is in bloom. There appears to be little increase in the yield of dry matter per acre following the third week after blooming, while there no doubt is a hardening of plant tissues as the plant nears maturity. With this hardening of the plant tissue there apparently is a corresponding decrease in the palatability of the fodder.

VARIETY TESTS WITH INDIAN CORN FOR ENSILAGE

In this experiment thirteen varieties and strains of corn were tested. The results obtained are presented in the accompanying table.

VARIETY TESTS WITH CORN FOR ENSILAGE

Variety	Source	Height in inches	Yield of green weight per acre	Per cent dry matter	Yield of dry matter per acre	
			tons lbs.		tons	lbs.
Compton's Early	I. O. Duke	85·5	18 1,050	14·1	2	1,224
Longfellow	I. O. Duke	85·5	18 790	13·2	2	856
Leaming	J. Parks	85·0	15 240	15·4	2	657
Quebec No. 28	Macdonald College	77·5	16 980	14·1	2	650
Wisconsin No. 7	J. Parks	79·5	14 1,770	14·7	2	376
White Cap Yellow Dent	Steele Briggs	82·5	16 110	16·0	2	138
Leaming	I. O. Duke	83·5	12 1,440	15·6	1	1,969
Gehu	McKenzie	56·5	12 180	16·3	1	1,914
Golden Glow	I. O. Duke	84·5	13 520	13·8	1	1,660
North Dakota Flint	Steele Briggs	84·0	14 1,770	11·7	1	1,483
North Western Dent	McKenzie	67·5	12 1,740	13·4	1	1,449
Wisconsin No. 7	I. O. Duke	80·0	14 1,250	11·4	1	1,334
Howes Alberta Flint	University of Alta	43·5	5 1,830	19·2	1	271

The high yields presented in the above table are representative of the excellent growth made by corn in this district during the past year. The possibilities of corn as a silage and dry fodder crop are being brought more to farmers' attention by the large yields of excellent fodder the earlier-maturing varieties are producing.

It will be noticed that the two highest-yielding corns in this experiment are flints. In all cases the highest-yielding varieties were quite immature, while the lower-yielding sorts are the early-maturing varieties. The season in 1923 was longer than usual. Had the usual fall frosts checked the growth of

corn at the usual time, the results would have been more in favour of the early-maturing sorts, such as the Northwestern Dent, Quebec No. 28, and Gehu. For the production of field crops, one of the above-mentioned varieties is recommended if reasonably well-matured corn is desired.

VARIETY AND STRAIN TESTS WITH SUNFLOWERS

During the past season ten varieties of sunflowers were grown under test. They were seeded on May 26 and harvested September 13. The results obtained are presented in the accompanying table.

VARIETY TESTS WITH SUNFLOWERS

Variety	Source	Date of appearance of first flower	Height, inches	Yield per acre green weight	Per cent dry matter	Yield of dry matter per acre
				tons lbs.		tons lbs.
Mammoth Russian	McDonald		83	16 110	19·7	3 326
Russian Giant	Disco		86	15 745	19·4	2 1,965
Mammoth Russian	C.P.R.	Aug. 24	78	15 1,590	17·8	2 1,625
Mixed	C.P.R.	" 20	73	14 860	17·1	2 925
Nanteca	C.P.R.	" 15	65	13 585	16·8	2 466
Mixed Mennonite	Rosthern	July 30	56	12 1,140	18·1	2 188
Black	C.P.R.	Aug. 18	70	10 710	17·3	1 1,585
Manchurian	McKenzie	" 18	75	8 1,875	19·0	1 1,396
Ottawa 76	Central Exp. Farm	" 10	72	10 1,190	15·2	1 1,221
Lacombe	Lacombe	July 25	37	8 1,160	18·0	1 1,089

It will be noted that Mammoth Russian and Russian Giant strains are the highest-yielding varieties under test. These are undoubtedly the best varieties to grow for ensilage purposes. While some of the earlier-maturing sorts will attain much greater maturity, they will not produce the tonnage per acre. In many cases the early-maturing sorts are such a mixture of types that the grower is never sure what he is buying. Farmers would be well advised to purchase their sunflower seed by sample. Purchase only clean, bright seed that is uniform in size, shape and colour. There apparently is considerable abuse of the sunflower seed trade by unscrupulous seedsmen who place on the market seed that is fit only for feed.

BREEDING PURE STRAINS OF SUNFLOWERS

This work was started in 1921 in a small way, and with the assistance of the Division of Forage Crops of the Central Experimental Farm, has increased until 130 strains were grown in 1923. Up to date, the work has been largely a study of types to determine which would be most suitable for silage purposes. Sunflowers of almost every conceivable type are included in the above strains. A careful study of these leads us to believe that a multi-branched type with the lateral branches carried at an angle of 160°; the heads averaging six inches in diameter; the plant approximately eight feet in height, would constitute a plant that could be handled with least difficulty by the available machinery in the field and at the silo. In addition to this, the plant should mature sufficiently early to permit seed being ripened before the severe fall frosts occur.

The varities of sunflowers now on the market are largely of the tall-growing, late-maturing, single-stem type. A ten foot crop of sunflowers is very difficult to handle both in the field and at the silo. They seldom reach sufficient maturity to make the best silage, and when they do, the large heads cause considerable trouble by blocking up the rollers of the cutter box. This

trouble is accentuated in the earlier-maturing types. The more mature the head is, the more difficulty it causes at the cutter box. There is also a greater tendency for these large heads to lop over when cutting, and form a ragged uneven bundle.

The different strains grown in 1923 showed a great difference in susceptibility to frost injury. A few strains were killed by 6·5° of frost on September 10, while a few were not injured by 10° on September 22. A few strains were badly affected with a wilt, some appeared to be unable to make a normal development in our climate, while others growing under similar conditions made a strong, vigorous, healthy growth.

The above remarks will indicate to the reader the possibility of improvement in the sunflower crop. This can be accomplished by selection and breeding.

FIELD ROOTS

Field-root experiments were started last season, but were destroyed by a serious outbreak of cutworms which destroyed the young plants when they were about three inches high. This made it too late to reseed with anything but turnips and swedes. These were reseeded on June 26, but the crop did not make sufficient development to permit comparisons being drawn.

POULTRY

Prices for eggs, poultry, ducks and geese have been discouragingly low during the past year but, in spite of this, interest in poultry is steadily increasing in Alberta. Enguiries for pure-bred breeding stock and questions on care and management have shown a decided increase. A great many turkeys were raised in the province last year. The price early in the fall was fair, but farmers were advised to hold their turkeys for the Christmas and New Year trade. Many did so and were then forced to accept a price which did not pay them for their work. The effect of this has been felt generally, and some farmers are changing from turkeys to ducks or geese.

THE PLANT

The poultry plant consists of seven permanent buildings and a number of colony houses. The two main poultry houses were renovated and rearranged inside and new cotton fronts were put in. The log house had a cement floor put in, also a new front with cotton and glass. A partition was put in dividing the house, and new trap nests were installed. This is now a first-class house for laying or breeding stock. A number of the colony houses were fixed up for breeding pens.

THE STOCK

Two breeds of poultry are kept; namely, White Wyandottes and Barred Rocks. Single-comb Rhode Island Reds were previously kept, but have been discarded during the past year. This breed has not measured up to the White Wyandottes or Barred Rocks in hardiness or laying ability. A small flock of Pekin ducks are kept. The following is a classification of stock kept at this station.

——	Males	Hens	Pullets	Totals
White Wyandottes	9	134	54	197
Barred Rocks	4	.....	55	59
Pekin Ducks	4	.....	9	13
Totals	18	134	118	269

In the past year a start was made in the pedigreeing of breeding stock, but unfortunately all the pedigreed chicks were burned in the brooder house when some 350 chicks were lost early in April. Later incubation results were very low, and most of the chicks saved were from the early incubation. These numbered 200 when fully developed. The pullets were run on open range until the first of November when they were moved into the main poultry house for the winter. These were then an exceptionally well-developed lot of pullets and at the end of the year give promise of making some high records. The ten highest White Wyandotte pullets completing their laying year in 1923 made the following records: 207, 185, 183, 181, 177, 175, 175, 174, 172 and 171 eggs.

Good cockerels were sold as stock birds. These were not pedigreed birds, but all were by cockerels from hens with records of 200 eggs or more.

To replace the loss of stock which was burned as chicks a number of hens and pullets were shipped from some of the other Experimental Stations. These included 25 White Wyandotte hens from Saanichton, B.C.; 25 White Wyandotte hens from Summerland, B.C.; 25 White Wyandotte pullets from Summerland, B.C.; 50 Barred Rock pullets from Morden, Man.; 30 Barred Rock pullets from Lethbridge, Alta.

These are all pedigreed stock from high-producing hens and by cockerels from high producers. They are a valuable addition to the flocks at this Station.

White Wyandotte cockerels were obtained from the Experimental Farm at Indian Head, Sask., and also from the Stations at Summerland and Saanichton, B.C. Barred Rocks were obtained from the Lethbridge Station. These are high class cockerels, all outstanding individuals, and from hens with high records. These are the stock birds for the 1924 matings.

All chicks hatched in 1924 will be pedigreed. The laying stock have been culled severely, and only first class hens and pullets kept. The cockerels are all from high producers. The 1924 batch of chicks should, therefore, be the best that this Station has produced.

COMPARISON OF WHITE WYANDOTTES, BARRED ROCKS AND SINGLE-COMB RHODE ISLAND REDS WHEN FATTENED ON BARLEY AND BUTTERMILK

Object—To compare White Wyandottes, Barred Rocks and Single-comb Rhode Island Reds for fattening purposes when fattened on barley chop and buttermilk.

Plan—Four representative cockerels of each breed were selected and put into the fattening crate where for two weeks they were fed all the barley chop and buttermilk they would clean up. They were started to fatten November 2, and were fed in crates in one of the poultry houses.

		White Wyandottes	Barred Rocks	S.C. Rhode Island Reds
Number of birds of each breed		4	4	4
Number of days fed	days	14	14	14
Initial weight	lb.	22	24	22
Initial average weight	"	5·5	6·0	5·5
Final weight	"	27	28	25
Final average weight	"	6·75	7·0	6·26
Total gain	"	5	4	3
Average gain per head	"	1·25	1·00	0·75
Feed Required				
Barley at 60c. a bushel	lb.	14	14	21
Buttermilk at 20c. a hundred	"	15	15	15
Cost of feed	cts.	20·5	20·5	29·2
Cost per pound of gain	"	4·1	5·12	9·73

In this experiment the White Wyandottes were the best feeders and gained one and a quarter pounds each in two weeks. The Barred Rocks gained one pound each, and the Reds three-quarters of a pound each. Two of the Rhode Island Reds were great eaters, but poor fatteners, and this was largely responsible for the difference in gains. They ate half as much more grain as the other two breeds, which required 14 pounds of barley chop each. It cost 20.5 cents to fatten the White Wyandottes and Barred Rocks, but the Rhode Island Reds cost 29.2 cents. It cost 4.1 cents per pound of gain for the White Wyandottes, 5.12 cents for the Barred Rocks and 9.73 cents for the Single-comb Rhode Island Reds.

In this experiment barley chop proved to be a first class fattening feed when fed along with buttermilk. It, however, gave a dry firm finish to the birds. When cooked the meat of the barley-fed cockerels was much drier than that of wheat-finished cockerels.

BEES

The results obtained with bees at this Station continue to be satisfactory. Although 1923 was not entirely satisfactory from a beekeeper's standpoint, the average yield per colony was decidedly above the average. While the increased yield was largely due to the greater experience of the man in charge of the apiary, the fact still remains that the park belt of central Alberta is admirably suited to this branch of agriculture.

The work with bees at this Station has been largely that of determining whether bees can be profitably kept in this district. It has been definitely established that central Alberta is one of the most promising fields for this work; hence, last season the apiary was enlarged and more comprehensive experiments were inaugurated.

WINTER PROTECTION

In this experiment two colonies were packed in a wintering case. They were placed side by side in the case, having six inches of cut straw around the side and bottom and ten inches over the top. They were placed in their wintering case at approximately the same time the other colonies were placed in the cellar—during the first week of November. Eleven colonies were wintered in the cellar under the office, from which they were all removed by April 9. They were all thoroughly examined on April 16. The following table shows in tabular form the result of the experiment:—

WINTER PROTECTION

Hive Number	Weight		Frames Covered with Bees		Method	Weight of Extracted Honey produced
	September 1 before feeding	April 16, out of Winter Quarters	September 1	April 16		
1	63	40	7	4	Open	49·5
2	70	51	8	6	"	208·5
3	42	40	8	5	Cellar	75·0
4	52	42	8	4	"	60·0
5	72	38	8	8	"	307·5
6	43	30	7	5	"	135·5
7	56	46	8	3	"	45·0
8	48	55	7	7	"	15·0
9	58	35	8	3	"	73·0
10	73	36	8	3	"	40·5
11	35	26	8	2	"	60·0
12	64	36	7	5	"	79·5
13	59	38	8	5	"	60·0

Before drawing conclusions from this table, it must be borne in mind that 6 frames of brood in all stages were removed from No. 2 hive as nucleii for new colonies, while No's. 3, 5 and 6 each had 2 frames and No's. 9, 10, 8 and 4 each had 1 frame removed for the same purpose. Colonies No. 7 and 8 each brought out a swarm.

When the yield of the different colonies is considered, there appears to be little advantage in favour of either method. Had the spring been as late as usual in opening up, there possibly would have been some loss in the weaker colonies wintered in the cellar. As it was, these were removed early in the season and were able to make a cleansing flight, and, as they had an abundance of stores, developed into strong colonies.

It might be of interest to many to note the increases made during the season. This information can best be given in tabular form, which is presented in the accompanying table.

INCREASE IN 1923

Colony number of increase	Date started	From colony number	Kind of Increase	Kind of hive increase was placed in	Queen left with increase	Weight in fall before feeding
14	June 12	7	Swarm	Jumbo	New queen	40
15	May 22	2	2-frame Nucleii	10-frame Langstroth	Ripe cell	35
16	July 14	2	2 "	8 "	Old queen (from No. 11).	38
17	July 1	3	2 "	10 "	2 young queens	40
18	July 20	5	2 "	10 "	Old queen	54
19	July 14	6	2 "	10 "	"	60
20	June 10	2	2 "	10 "	Young queen	60
21	July 12	9	1 "	Jumbo	Old queen	57
		10	1 "		"	
22	June 14	8	1 "	8-frame Langstroth	Ripe cell	60
23	June 4	4	1 "	8 "	"	58
	June 12	8	Swarm	Lost		

It will be noted that 3 two-frame nucleii were started from colony No. 2. These at $20 per colony, with 208.5 pounds of honey at 20 cents per pound would give that colony $104.10 while colony No. 5 from which 1 two-frame nucleii was started which, given the same valuation with 307.5 pounds of honey at 20 cents, would give that colony a credit of $81.50.

Some interesting points in the management are brought out by the tables. It will be noticed that where there is a market for bees at $20 per colony, such as there is in Alberta, increasing the number of colonies by the nucleii method is more profitable than honey production; also, that increases by the two-frame nucleii method are as strong in the fall as are increases made by the swarming method, while there is not as great a chance of loss with the nucleii as with the swarm.

SUMMER PROTECTION

An experiment with different methods of summer protection was carried out. Where Kootenay cases were used for protection, they extended the full height of the colony. When a super was added a corresponding Kootenay case lift was also added. Where the brood chamber only was protected, a Kootenay case was placed around the brood chamber and packed with cut straw. The unprotected colonies were given no protection except that afforded by the natural surroundings.

SUMMER PROTECTION

Colony Number	Spring weight	Frames covered with bees in spring	Protection	Weight extracted honey produced
1	40	4	Kootenay cases	49·5
2	51	6	"	208·5
3	40	5	"	75·0
4	42	4	"	60
5	38	8	"	307·5
6	30	5	"	135·5
7	46	3	Protected brood chamber	45
8	55	7	" "	15
11	26	2	Unprotected	60
13	38	5	"	60

It will be noted that the colonies protected by Kootenay cases gave the most satisfactory yields, while those with the brood chamber only protected were the least satisfactory. The unprotected colonies gave apparently more satisfactory results than the colonies with the brood chamber only protected.

Colonies 7 and 8, which had the brood chamber only protected, were the only ones in the apiary that threw off swarms. Apparently the bees would not work in the supers, and the brood chambers became so congested that it was difficult to keep them from swarming. The possible explanation for this is that there was sufficient difference in the temperature of the brood chamber and the super during the cool nights to keep the bees from working in the supers. This experiment, however, must be repeated before definite conclusions can be drawn.

COMPARISON BETWEEN HIVES

The object of this experiment is to determine the relative merits of the ten-frame Langstroth and the ten-frame Jumbo hives. The results are given in the following table.

THE JUMBO VS. LANGSTROTH WITH SUPER

Colony Number	Size of Hive	Yield of of Honey	Increases made
9	Ten-frame Jumbo	73·0	1 frame with queen.
10	" "	40·5	1 "
12	" "	79·5	None.
11	" Langstroth	60·0	"
13	" "	60·0	"

When the increase from the Jumbo hives is considered we see that they produced much more satisfactory yields than did the colonies working on the Langstroth frames. In addition to this, the colonies working in the Jumbo hives had to draw new combs for both the brood chamber and supers, while those working in the Langstroth hives had to draw new combs in the supers only.

The advantage of the Jumbo over the Langstroth appears to be that the Langstroth hive is not large enough to accommodate a prolific queen, while the Jumbo appears to be large enough for this purpose. The colony appears to develop better where all the brood is in one chamber instead of divided.

WINTERING TWO QUEENS IN ONE HIVE

This work was started last season and gave excellent results. The queens came through in excellent condition, and the extra queen was used for requeening a colony whose queen had developed into a drone-layer in the spring. This is one of the advantages of the practice, as, where a number of colonies are kept, there is usually a small percentage of the colonies either queenless or with drone-laying queens in the spring. If an extra queen or two can be carried over the winter, it saves uniting these queenless colonies with one of the others.

PREVENTION AND DETECTION OF SWARMING BY MANAGEMENT

Shallow supers were used on all Langstroth hives for facilitating the detection of swarming. These supers were given in the spring as soon as the bees were covering nine combs in the regular brood chamber. These supers were placed on nine colonies. These were examined every week, and on appearance of active queen cells they were treated as follows: In colonies 2, 5 and 6 the old queens with two frames of brood each and adhering bees were removed and placed in separate hives as nucleii which later developed into strong colonies. All the queen cells were destroyed but one which was permitted to hatch and form the new queen for the old colony.

With colonies 1, 3, 4, 11 and 13 the Demarie system, which consists of removing to the upper super all the brood from the brood chamber at the first appearance of active queen cells, leaving the old queen below, was used. After this treatment no further preparations was made for swarming.

Colonies 9, 10 and 12 were Jumbo hives. With 9 and 10 on appearance of active queen cells, the old queen and one frame of brood were placed in a hive made for wintering two queens in the one hive. No. 12 was treated by destroying queen cells as they appeared.

Colonies Nos. 7 and 8 would not work in the shallow supers placed above the brood chamber, and brought out swarms before they had built up queen cells. In no case were queen cells found in the brood chamber where shallow supers were used. On the other hand it was clearly demonstrated that bees, under certain conditions, refuse to use the shallow super as a part of the brood chamber. In no case where shallow supers were used were queen cells found other than on the bottom bars of the frames of the shallow super. There is no doubt that the use of shallow supers for the detection of swarming would greatly facilitate this work in a commercial apiary.

GENERAL NOTES

EXTENSION WORK.—An exhibit including display material on gardening, grain and forage crops, poultry and bees was taken to seven local fairs. One of the assistants to the superintendent was in charge of this exhibit, and was able to answer many and varied questions from farmers, distribute publications dealing with these subjects and increase our mailing list of interested farmers. A special educational exhibit was made at the Lacombe Fair where the sales pavillion was assigned to the use of the Experimental Station. This exhibit included horses, cattle, sheep, bacon hogs, poultry, bees, field crops and horticulture, and was one of the most interesting features of the fair. By request a large exhibit of vegetables, fruits, flowers and shrubs was made at the Calgary Horticultural Show. The superintendent and his assistants acted as judges at eight summer fairs. Two field days were held, on July 27th and August 18th. About one thousand farmers were present. While special emphasis was placed on the field experiments and plot work, the visitors were taken systematically over every division of the experimental work. Approximately one thousand farmers were present on these two field days, and in addition several hundred farmers visited the farm singly and in small parties.

During the year the superintendent and his assistants addressed forty-two farmers' meetings. Numerous articles were prepared for Seasonable Hints, and daily papers and agricultural journals.

A herd of Aberdeen-Angus cattle were shown at Calgary, Edmonton, Red Deer and Lacombe with very favourable results against strong competition.

At the Edmonton Spring Show groups of five wethers and wether lambs of each of the six breeds were shown in the fat sheep and carcass competition. Sheepmen were very much interested in this comparison of the breeds, and it afforded an opportunity to distribute much information on the sheep breeding and feeding experiments.

ALTERATIONS AND IMPROVEMENTS IN BUILDINGS AND GROUNDS.—During the year considerable improvement was made in the farm buildings and in the accommodation for the employees. The herdsman's house was divided so as to make suitable quarters for both the cheese-maker and the herdsman. The upper storey of the pump house was divided into bedrooms, making quarters for seven men. Three of the buildings were painted for the first time since they were built in 1908.

Rows of Manitoba maple and green ash were planted along the front of the grounds in 1908. Neither proved hardy, and as the maples were dying rapidly both rows were removed. The ground has been thoroughly summer-fallowed, and a row of Colorado Blue spruce and Northwestern poplar will be planted.

EXPERIMENTAL PROJECTS UNDER WAY AT THE EXPERIMENTAL STATION, LACOMBE, ALTA.

ANIMAL HUSBANDRY

HORSES

Project No.	Title.
A. 298.	Breeding pure-bred draught horses (Clydesdales and Shires).
A. 293.	Cost of horse labour.

BEEF CATTLE

A. 191.	Establishing pure-bred herd beef cattle (Aberdeen-Angus).
A. 478.	Commercial feeding of Aberdeen-Angus cows and heifers.
A. 375.	Cost of rearing beef-bred calves and heifers.
A. 457.	Cost of maintaining breeding bulls.

DAIRY CATTLE

A. 216.	Establishing herd of dairy cattle (Holstein).
A. 56.	Cost of milk production.
A. 479.	Influence of sire in breeding daughters excelling dams.
A. 58.	Record of Performance (Holstein cattle).
A. 57.	Record of Merit (Holstein cattle).
A. 480.	Oat green feed vs. alfalfa hay for milk production.

DAIRYING

A. 84.	Manufacture of cheese.
A. 100.	Manufacture of butter.
A. 481.	Relative profit from the manufacture of cheese and butter.

SHEEP

A. 310.	Grading up flocks with pure-bred rams of various breeds.
A. 482.	Comparison of graded up ewes of various breeds.
A. 483.	Comparison of lambs from graded up ewes of various breeds.
A. 484.	Comparison of wethers from graded up ewes of various breeds.
A. 485.	Comparison of lambing results from graded up ewes of various breeds.
A. 486.	Comparison of lamb losses for various breeds.
A. 487.	Comparison of wool grades from graded up sheep.
A. 488.	Comparative show ring and slaughter tests of graded up sheep.
A. 489.	Marketing lambs locally vs. at stockyards.
A. 490.	Marketing wool locally vs. through co-operative channels.
A. 395.	Comparison of yearling vs. lamb wethers as feeders.
A. 491.	Oat green feed vs. lowland hay for fattening ewes.
A. 492.	Roughages for feeding yearling wethers.
A. 493.	Grain rations for lamb feeding.

SWINE

A. 234.	Establishing pure-bred herds (Berkshires, Duroc-Jerseys, Yorkshires).
A. 451.	Comparison of breeds and crosses in breeding characteristics.
A. 425.	Prolificacy of different breeds of swine.
A. 156.	Comparing breeds of swine and crosses in feeding characteristics.
A. 431.	Economy of early vs. late spring litters.
A. 494.	Economy of early vs. late fall litters.
A. 162.	Economy of spring vs. fall litters.
A. 120.	Self feeding vs. trough feeding for bacon production.
A. 146.	Inside vs. outside feeding of bacon hogs in summer.
A. 496.	Mineral supplements in indoor feeding of hogs.
A. 163.	Cost of pork production.

FIELD HUSBANDRY

ROTATION EXPERIMENTS

Project No.	Title.
F. 102.	Alfalfa continuously.
F. 104.	Brome grass continuously.
F. 107.	Three-year rotation—Summer-fallow; wheat; wheat.
F. 110.	Three-year-rotation—Wheat; wheat; sweet clover.
F. 111.	Three-year rotation—Wheat; wheat; oats.
F. 112.	Three-year rotation—Silage and root crops; oat green feed; pasture.
F. 113.	Four-year rotation manured—Summer-fallow; wheat; wheat; oats.
F. 115.	Four-year rotation—Summer-fallow; wheat; oat green feed; fall rye.
F. 119.	Five-year rotation—Sunflowers; wheat; hay; hay; oat green feed.
F. 121.	Six-year rotation—Summer-fallow: wheat; hay; hay; wheat; oats.
F. 126.	Six-year rotation—Corn; wheat; barley; hay; pasture; pasture.
F. 128.	Six-year rotation—Wheat; oats; barley; hay; hay; hay.
F. 130.	Seven-year rotation—Potatoes or roots: wheat; oats; summer-fallow; wheat; hay; pasture.

CULTURAL EXPERIMENTS

F. 144.	Summer-fallow treatment.
F. 145.	Summer-fallow substitutes.
F. 146.	Stubble treatment.
F. 147.	Breaking sod from cultivated grasses and clovers.
F. 153.	Place in rotation to seed fall rye.
F. 156.	Dates of seeding corn and sunflowers.
F. 157.	Date of seeding fall rye.
F. 166.	Rates of seeding grasses and clovers.
F. 169.	Methods of seeding grass and clover mixtures.
F. 180.	Thinning mangels to different distances.
F. 181.	Thinning sunflowers to different distances.

MANURE AND COMMERCIAL FERTILIZER EXPERIMENTS

F. 189.	Manure for wheat.
F. 192.	Manure for corn; sunflowers or potatoes.
F. 194.	Green manure crops.

FARM MANAGEMENT EXPERIMENTS

F. 195.	Cost of producing farm crops.
F. 196.	Cost of operating tractor.

SOIL MOISTURE EXPERIMENTS

F. 200.	Influence of various cultural treatments upon soil moisture, as determined by moisture determination.

HORTICULTURE

VEGETABLE GARDENING

H. 54.	Asparagus, variety experiment.
H. 61.	Bean, variety experiment.
H. 68.	Beet, variety experiment.
H. 70.	Brussels sprouts, variety experiment.
H. 77.	Cabbage, variety experiment.
H. 83.	Carrots, variety experiment.
H. 88.	Cauliflower, variety experiment.
H. 94.	Celery, variety experiment.
H. 309.	Citron, variety experiment.
H. 102.	Corn, variety experiment.
H. 106.	Cucumber, variety experiment.
H. 110.	Kohl rabi, variety experiment.
H. 116.	Lettuce, variety experiment.
H. 138.	Onion, variety experiment.
H. 140.	Parsley, variety experiment.
H. 145.	Parsnip, variety experiment.

Project No.	Title.
H. 153.	Pea, variety experiment.
H. 157	Pepper, variety experiment.
H. 186.	Potato, variety experiment.
H. 188.	Pumpkin, variety experiment.
H. 192.	Radish, variety experiment.
H. 195.	Rhubarb, variety experiment.
H. 199.	Spinach, variety experiment.
H. 201.	Squash, variety experiment.
H. 211.	Tomato, variety experiment.
H. 214.	Turnip, variety experiment.

ORNAMENTAL GARDENING

H. 274.	Perennial flowers, variety experiment.
H. 377.	Wild flowers, variety experiment.
H. 298.	Hedges, variety experiment.
H. 376.	Ornamental evergreen shrubs or trees, variety experiment.
H. 307.	Trees and shrubs, ornamental and shelter, variety experiment.

CEREALS

Ce. 1.	Common spring wheat, test of varieties or strains.
Ce. 5.	Oats, tests of varieties or strains.
Ce. 6.	Barley, tests of varieties or strains.
Ce. 7.	Field peas, tests of varieties or strains.
Ce. 9.	Flax, tests of varieties or strains.
Ce. 10.	Spring rye, tests of varieties or strains.
Ce. 11.	Winter rye, tests of varieties or strains.
Ce. 12.	Buckwheat, tests of varieties or strains.
Ce. 50.	Multiplication of cereals.

FORAGE PLANTS

Ag. 1.	Indian corn, variety tests for ensilage purposes.
Ag. 3.	Indian corn, distances between rows.
Ag. 5.	Indian corn, rates of seeding.
Ag. 16.	Mangels, variety tests for yield and purity.
Ag. 36.	Carrots, variety tests for yield and purity.
Ag. 46.	Turnips, variety tests for yield and purity.
Ag. 51.	Swedes, variety tests for yield and purity.
Ag. 66.	Sugar beets, variety tests for yield and purity.
Ag. 76.	Sunflowers, variety tests for yield and purity.
Ag. 77.	Sunflowers, breeding of pure strains.
Ag. 162.	Sweet clover, methods of seeding for hay production.
Ag. 163.	Sweet clover, rates of seeding for hay production.
Ag. 165.	Sweet clover, rates of seeding for seed production.
Ag. 166.	Sweet clover, seeding with vs. without a nurse crop for seed production.
Ag. 178.	Alsike clover, variety tests.
Ag. 201.	Timothy, variety tests for yield and purity.
Ag. 212.	Brome grass, rates of seeding for hay production.
Ag. 213.	Brome grass, methods of seeding for seed production.
Ag. 221.	Western rye, variety tests for yield and purity.
Ag. 222.	Western rye, methods of seeding for hay production.
Ag. 223.	Western rye, rates of seeding for hay production.
Ag. 231.	White Dutch clover, variety tests for yield and suitability.
Ag. 241.	Annual hay crops, variety tests for yield and suitability.
Ag. 241 (A).	Grain varieties, variety tests for yield and suitability.
Ag. 241 (B).	Legume varieties, variety tests for yield and suitability.
Ag. 241 (C).	Other grasses, variety tests for yield and suitability.
Ag. 251.	Millets, variety tests.
Ag. 255.	Miscellaneous grasses, variety tests.
Ag. 256.	Miscellaneous legumes, variety tests.

CHEMISTRY

C. 10.	Sugar beet investigation.
C. 11.	Agricultural meteorology.

POULTRY

Project No.	Title.
P. 1.	Best type or make of incubator (Candee vs. Cyphers).
P. 3.	Best date for incubation.
P. 12.	Hatching results by breeds.
P. 13.	Hatching eggs vs. day-old chicks.
P. 22.	Brooding costs.
P. 31.	Rearing costs.
P. 40.	Capons vs. roasters.
P. 42.	Methods and rations for fattening and finishing roasters.
	Exp. (*a*) Crate vs. pen fattening.
P. 43.	Costs and gains in fattening roasters.
P. 62.	Costs of egg production.
P. 76.	Standard (home-mixed) vs. commercial grain.
P. 78.	Corn vs. barley.
P. 79.	Standard (home-mixed) vs. commercial mashes.
P. 80.	Dry vs. wet mash.
P. 86.	Tankage vs. beef-scrap.
P. 104.	Feeds for fertility and hatchability and viability.
P. 111.	Breeding for fertility, hatchability and viability.
	Exp. (*a*) Hens vs. pullets.
	Exp. (*c*) Effect of size of pen on fertility.
P. 128.	Rearing and fattening methods, rations and costs in raising green ducks.
P. 160.	Vitamine feeds for chicks (cod liver oil).

APIARY

Ap. 5.	Methods of detecting preparations for swarming.
Ap. 7.	Wintering in cellar.
Ap. 9.	Wintering in 2-colony cases.
Ap. 20.	Returns from apiaries.
Ap. 21.	Comparison of different sizes of hives.
Ap. 28.	Study of honey flows.
Ap. 30.	Outdoor versus cellar wintering.
Ap. 42.	Protected versus unprotected hives during summer.

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