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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 1922



Young fruit plantation at Lacombe. Note protection afforded by hedges and windbreaks.

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

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EXPERIMENTAL STATION, LACOMBE, ALTA.

REPORT OF THE SUPERINTENDENT, F. H. REED, B.S.A.

SEASONAL NOTES

The past season has been outstanding in that the poorest crops were harvested in the memory of the oldest residents of the district. This is accounted for by the fact that 1922 is the fourth of a series of years with precipitation considerably below the average, and the further fact that 1922 was one the the driest of these four years with precipitation 4.589 inches below the average.

The amount of moisture received in 1922 was 12.445 inches. This, with the exception of 1920 which had 12.415 inches, makes 1922 the driest year in the history of the Station. Owing to the three dry years which preceded 1922, this shortage of moisture was felt to a greater extent than in 1920.

January was a very mild month. The first sleighing of the season was on the 20th, which resulted from a snowfall of seven inches. February, with an average mean of 1.12°, was 10.04° below the average mean for the past fifteen years, and was, with one exception, the coldest February in the history of the Station. This extreme weather was followed by very mild weather during March, which melted all the snow, and left favourable prospects for early seeding. However, there was a cold wave during the latter part of March which set back work on the land for a short time.

April opened with warm, cloudy days which drew the frost from the ground very rapidly. Some work was done on the land as early as the 3rd, and some wheat was seeded on the 10th and 11th. Snow on the 12th, 17th and 18th held up all operations until the 20th, when seeding became general.

May was dry and very hot with frequent high winds which, together with the absence of moisture in the soil, resulted in a very poor growth in all grass and pasture crops. Similar climatic conditions prevailed during June, which had a precipitation 1.79 inches below the average. A hailstorm which occurred on June 19 gave .72 inches precipitation. This was the only shower during the month which penetrated the dust. A rain of 1.22 inches on July 6 and 7 revived the crops for a time, but was insufficient to carry them for very long.

August was quite the best growing month of the season, being warm and showery. However, this moisture was too late for the grain and hay, but materially increased the yields of the late fodder crops such as greenfeed, corn and sunflowers. It also developed a second growth in the oat stubble which, in many cases, was equal to the main crop. This second growth relieved a serious pasture shortage, but exhausted all the moisture held in the soil.

September was very dry and quite the warmest for the past fifteen years. Sunflowers cut on September 27 showed little sign of frost injury.

The precipitation for the six growing months, April to September inclusive, was 3.442 inches below the average for the same period. The effect of this shortage was accentuated by the fact that the greatest shortage occurred during June and July when the influence was most felt by the grain and hay crops, the crops of major importance in the district.

All root crops and second growth on the stubbles continued to grow until October 16, when all vegetative growth was stopped by low temperatures. The second growth, which developed on the stubble as a result of August rains, took out what little moisture there was in the soil, and made fall ploughing very difficult; hence, very little ploughing has been done.

The dates of farm operations will give a general idea of the season. The unusual climatic conditions influenced the date of farm operations to some extent. Grain harvest was earlier than usual on account of the dry weather prematurely ripening the cereals, while silage crops were harvested and ensiled later than usual as a result of the open fall and the freedom from early fall frosts.

DATES OF FARM OPERATIONS

First working on land (harrowing).....	April 11
Seeding wheat.....	April 22
Seeding oats.....	May 1
Seeding barley.....	May 20
Seeding spring rye.....	April 27
Seeding peas.....	April 28
Seeding corn.....	May 29
Seeding turnips.....	June 10
Seeding sunflowers.....	May 10
Spring ploughing.....	April 28
Summerfallow ploughing.....	June 15
Cultivating summerfallow.....	July 1
Cutting alfalfa—first crop.....	July 14
Cutting alfalfa—second crop.....	Sept. 1
Cutting hay.....	July 14
Ploughing sod.....	July 20
Cutting oats.....	Aug. 21
Cutting barley.....	Aug. 25
Cutting wheat.....	Aug. 25
Cutting spring rye.....	Aug. 31
Cutting peas.....	Aug. 27
Cutting greenfeed.....	Sept. 9
Threshing.....	Sept. 23
Cutting corn.....	Sept. 8
Cutting sunflowers.....	Sept. 25-28
Silo filling—	
Green feed.....	Sept. 9
Corn.....	Sept. 19
Sunflowers.....	Oct. 3-6
Harvesting turnips.....	Oct. 13
Fall ploughing.....	Oct. 15
Freeze up.....	Nov. 1

METEOROLOGY

Meteorological observations have been taken at this Station since 1908. A complete résumé of the data obtained was presented in the 1921 annual report and will give those not familiar with it a knowledge of the climatic conditions which prevail in Central Alberta. In this report the current year's records only are presented. Those wishing more complete data may obtain them by referring to the 1921 report or by writing to this office.

MONTHLY METEOROLOGICAL RECORDS FOR THE YEAR 1922

Month	Mean temperature	Maximum temperature	Minimum temperature	Precipitation	Bright sunshine	Number of days on which precipitation occurred
	Degrees F.	Degrees F.	Degrees F.	Inches	Hours	
January.....	16.2	49.8	-41.1	0.91	81.6	8
February.....	1.12	43.5	-36.6	0.24	141.8	4
March.....	21.65	49.0	-16.1	0.3	177.2	2
April.....	38.08	68.8	13.9	1.07	156.3	5
May.....	49.59	81.3	19.9	1.30	258.1	7
June.....	57.39	89.1	25.1	1.75	254.9	11
July.....	60.08	86.8	34.9	1.88	311.2	10
August.....	61.78	92.8	33.4	2.94	230.0	12
September.....	53.55	89.0	25.4	0.84	189.8	7
October.....	42.62	76.0	10.4	0.52	160.5	6
November.....	29.03	62.0	-10.1	0.02	129.8	1
December.....	7.65	54.8	-36.1	0.67	65.9	2
Totals.....				12.44	2,157.1	75

ANIMAL HUSBANDRY

HORSES

The horses at the Lacombe Experimental Station now number seventeen. These may be divided into driving horses and draught horses. The driving horses include two pure-bred Hackney mares, Serenade (imp.) -810-, and Bay Dora -1018-, and one pure-bred Hackney gelding, Rock. The draught horses number fourteen in all and, classified according to breeding, give seven pure-bred Clydesdales, all females, four grade Clydesdale mares, two aged grade Clydesdale geldings, and one two-year-old cross-bred gelding, out of a Clydesdale mare and by a Belgian stallion.

CLASSIFICATION OF HORSES AT THE EXPERIMENTAL STATION, LACOMBE

Name	Classification	Age	Weight Dec. 31, 1922
Serenade (imp.) 810 (21024).....	Pure-bred Hackney mare.	14	1,190
Bay Dora 1018.....	" " "	10	1,270
Rock.....	" " gelding	7	1,165
Lily McTaggart (imp.) 14972 (18960).....	Pure-bred Clydesdale brood mare.	16	1,850
L.E.S. Lady Jane 33723.....	" " "	10	1,615
Bankview Dandelion 40665.....	" " "	5	1,600
Jean of Kilallan 40898.....	" " "	5	1,830
L.E.S. Consuelas' Diadem 33722.....	Pure-bred Clydesdale mare.	10	1,630
L.E.S. Lady Jane 2nd 48133.....	Pure-bred Clydesdale filly	2	1,360
Hugo Belle L.E.S.....	" " "	6 mos.	735
Fanny.....	Grade Clydesdale mare...	10	1,670
Dolly.....	" " "	7	1,415
Belle.....	" " "	5	1,590
Maggie.....	" " "	5	1,710
	Cross-bred Gelding		
Blackie.....	Belgian-Clydesdale cross..	2	1,545
Roger.....	Grade Clydesdale gelding	22	1,630
Nigger.....	" " "	21	1,645

Two mares were bred to foal in 1922, but the old mare, Lily McTaggart, proved not to be in foal. L.E.S. Lady Jane, the other bred mare, foaled July 1. The foal was a very nicely marked filly, sired by Hugo Stamp 14451, the sire of Wee Donald, twice Champion at Chicago. This foal, Hugo Belle L.E.S., is a very neatly turned foal. She is exceptionally well made in front and has a beautiful top. She is deep and thick, and at six months weighs 735 pounds. Bankview Dandelion and Jean of Kilallan are bred to foal in 1923. The former is bred to the Alberta Government stallion, Craigie Masterpiece, and Jean of Kilallan is bred to Hilallandale, a beautiful three-year-old imported stallion owned by N. A. Weir of Ohaton, Alta. This mare is bred to foal in March.

It is planned to dispose of the two aged grade geldings, Roger and Nigger. They are old and showing wear to such an extent that their day of usefulness is past.

BEEF CATTLE

The beef herd consists of eighty-four head of which seventy-one are pure-bred Aberdeen Angus and 13 are grade Angus. The following tabulation gives the numbers and classification as to ages and sex of the two herds.

NUMBERS AND CLASSIFICATION OF HERD

Classification	Pure-bred Herd		Grade Herd		Total
	Males	Females	Males	Females	
Herd bull, 4 years old.....	1				1
Herd bull, 2 years old.....	1				1
Yearling bulls.....	10				10
Bull calves of 1922.....	8		1		9
Steers, yearlings or under.....	4		2		6
Mature cows 3 years and over.....		23		7	30
Heifers born in 1920.....		9		1	10
Heifers born in 1921.....		6		2	8
Heifer calves of 1922.....		9			9
Totals.....	24	47	3	10	84

During the past year, three mature cows have been sold. Flower Queen of Lakeside 9th, No. 6156, sixteen years of age, was one of the original herd foundation cows and left a number of excellent individuals in the herd. There are three daughters of this old cow with the herd at present, two of them mature cows and the other a heifer born in 1920. In addition to these three females, this cow dropped six bull calves, all of which have been sold with the exception of the last calf, born March 7, 1922, this is one of the best bull calves of the year. Flower Queen of Lakeside 9th was old and had become so crippled that she had to be sold for beef. Two other mature cows were sold during the year as breeding stock to go to British Columbia. Both these cows were sold in calf to Eliminator of Gwenmawr 3rd. These cows were L.E.S. Flower Queen 6697, 10 years old, a daughter of old Flower Queen of Lakeside, and L.E.S. Mayflower 8639, 9 years old, and out of another herd foundation cow, Elm Park Mayflower 15th. Two other mature cows reacted to the tuberculin test in May and had to be slaughtered. These were the only two reactors in the last three tests. They were Mayapple Yorklawn 6151, aged 12, and Elm Park Keepsake 12th, 5690, aged 10. This last cow was one of the original herd cows and was imported from the United States, while Mayapple Yorklawn 6151 came from the Elm Park herd at Guelph, Ontario.

Three young bulls were sold at the Kamloops bull sale in March, 1922, L.E.S., Blackbird Eliminator 27636, L.E.S. Eliminator 27633, and L.E.S. Monarch 27625. These three bulls sold for \$185, \$250 and \$150, respectively; they were sired by the herd sire Eliminator of Gwenmawr 3rd, and the prices, which gave the highest average for the sale, are an indication of the quality of these young bulls. A yearling bull, L.E.S., Glencarnock Metaphor 2nd, 27644 was lost from pneumonia last winter and one other young calf died from injury early in February. These constitute the losses to the herd during the past year.

The senior herd sire Eliminator of Gwenmawr 3rd, No. 17474 has proved himself a sire of exceptional worth. He is a great individual himself and of excellent breed type. The striking features about this bull are his masculinity, shown in a beautifully strong, broad head, and a well crested, well rounded neck without any excessive dewlap. He is a great fronted bull, very smooth throughout, and with a hide that handles like silk. He is very smooth over the back, at the hook bones, and tail head, and he has a good development of quarters. With a little more bone and fibre this bull would be almost perfect. He is a very prepotent sire, leaving a very even lot of calves. The striking similarity of the calves is shown in their heads, which are all like Eliminators; full of character and breediness. They are invariably thick-fleshed calves and make good feeders. His bull calves are particularly strong.

With regard to the breeding of the herd sire, he is a well-bred Ballindallock Blackbird out of Blackbird McHenry 83rd, and sired by that famous bull Edward of Glencarnock No. 5,948, the greatest sire of prize winning Angus of his day.

As there were a number of daughters of Eliminator of Gwenmawr 3rd of breeding age, it was necessary to buy a new bull to use as second herd sire, and, as a little more fibre, bone, and size were needed in the herd, Glencarnock Prideman 3rd, No. 26134 was bought in March of this year. This is a big, growthy, young bull, weighing 1,660 pounds, when two years old. He has plenty of size and bone and is a bull of excellent quality. He has a straight, strong top, and smooth, long hindquarters which are thick and deep. He lacks the masculinity, breediness and character of the senior herd sire, but he is strong where the other bull is weakest, and should help the herd because of this.

In breeding, Glencarnock Prideman 3rd, is particularly strong. He is a well-bred Pride of Aberdeen of the Fancy of Tillyfour Branch. His dam is Evening Pride 18908, and his sire Blackcap McGregor 12813, a wonderful show bull out of Edward of Glencarnock 5948.

The first bull used in this herd was Elm Park Wizard 4169, sired by Elm Park Ringleader 3rd, and out of an imported cow, Witch of Benton. While this bull left a number of good animals in the herd he was rather plain, and a number of his daughters in the herd are modelled along the same lines. The next bull used in the herd was Metaphor of Glencarnock 2nd, 17101, this was a very fair individual, used only for a short while. There are five purebred females in the herd by this bull. He was sired by Edward of Glencarnock and out of Norma Gordon of Glenlogie 5663, going back to pride of Aberdeen 581 and Champion 459.

The present senior herd sire Eliminator of Gwenmawr 3rd, is also sired by Edward of Glencarnock but out of a Blackbird McHenry cow, that is, he is unrelated on his dam's side but by the same sire. The present junior herd sire, Glencarnock Prideman 3rd, is sired by a son of Edward of Glencarnock and out of a well-bred Pride of Aberdeen cow which also goes back to Pride of Aberdeen 581 and Champion 459.

The system of breeding, then, for the last three herd sires has been one of fairly close line breeding and, judging from the young stock in the herd to-day, it has been a very successful practice. The sons and daughters of Eliminator of Gwenmawr 3rd are a marked improvement over the dams. Up to the present time the young bull has not been tried as a stock getter but there are eleven heifers bred to him and by next year he will have left his mark in the herd.

The original herd foundation cows were as follows:—Molly Rosebud 5929, Flower Queen of Lakeside 9th 6156, Elm Park Mayflower 15th 5685, May Apple Yorklawn 6151, Elm Park Keepsake 12th 5690, Norma Gordon of Glenlogie 5663, Millicent Queen 3870, Enchantress 8th 6155, Elm Park Countess 2nd 6259, Queenston Sonnet 5720.

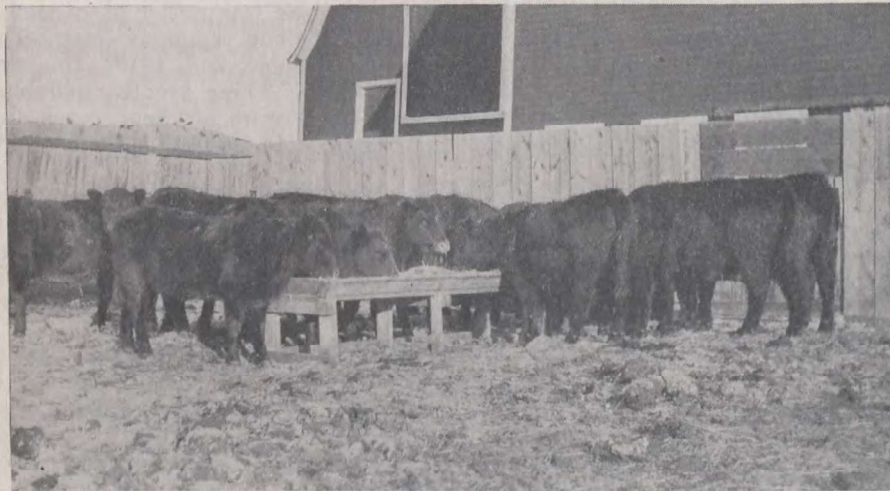
The Millicent family, bred from Millicent Queen, is the most outstanding family in the herd. Flower Queen of Lakeside 9th has left some very good stock, so also has Molly Rosebud and Norma Gordon of Glenlogie. The best individuals in the herd to-day are mostly from these four old cows.

During the past year there has been very little experimental work of any kind carried out with the beef herd. In summer the entire herd, with the exception of the bulls, has been on pasture some four miles distant from the Station, and in the winter months the buildings have been so crowded with milking cows, and calves, that there was no place for experimental work with the beef herd. As it was, the calves were much too crowded for their own good. However, records of feed required were kept wherever possible.

COST OF WINTERING MATURE CATTLE IN THE OPEN, WINTER OF 1921-22

In the winter of 1921-22, all dry, mature cows and two-year-old heifers were wintered in a poplar bluff at the back of the farm, they were watered at the slough, where a hole in the ice was opened each morning, they were fed oat greenfeed throughout the entire winter. Straw was fed from a large rack but, when allowed all the greenfeed they would clean up, they ate very little straw. These cows and heifers ate from 22 to 25 pounds of oat greenfeed per head per day; in cold weather they ate as high as 25 pounds per day, and in warm weather they ate 22 pounds per day. Figuring the oat greenfeed at cost of production, \$8 per ton, it cost from 8.8 to 10 cents per day to feed these cows. Taking the average at 9.4 cents it cost \$2.82 per month of thirty days to carry one mature cow, or a total of \$18.43 for the entire feeding period of six and one half months. The beef herd was fed from the middle of November to the end of May.

This is somewhat heavier feeding than is generally practised throughout the province, but as these were pure-bred breeding stock, mostly heavy in calf, they were fed fairly liberally to give the calves as good start in life as possible.



Aberdeen-Angus Heifers fed sunflower silage in corrals.

From this lot of cows and heifers there have been twenty calves, every one of them healthy. The cows milked well and there were no troubles during parturition. The cows and heifers wintered on this ration in excellent condition, losing little, if any, weight, even in the severest weather.

METHOD AND COST OF WINTERING YEARLING HEIFERS, 1921-22

The yearling heifers were wintered in a corral close to the barn where they could be fed grain and silage, though they could be fed more readily in the corral it has not proved a good place for wintering heifers. The corral is at the west end of the barn and exposed both to the north and west. The corral fences are high board walls. In winter this was a very cold place, it seemed that, if there were a breeze at all, it was worst in the corral. Though these heifers had straw to lie in they were not sufficiently comfortable to do as well as they should.

Taking the average for the winter they were fed the following ration each per day:—

4.5 pounds of oat greenfeed,
4.5 pounds of prairie hay,
20 pounds of sunflower silage mixed with 2 pounds of oat straw,
2.5 pounds of oat chop,
1.5 pounds of barley chop,
1 pound of bran.

The above ration cost 13.6 cents a day, making the cost per head \$4.08 a month, or a total of \$26.52 for the entire winter feeding period of six and a half months. Wintering in an open corral has proved an expensive method and it is hoped that shelter of some kind may be available before another winter.

THE WINTERING OF NURSING STOCK IN 1921-22

Cows about to freshen were brought into the stable a few days before they dropped their calf. They were kept in box stalls until the calves were well started and then were tied in stanchions until turned out in the spring. The calves were turned loose to nurse twice a day. As the cows were nursing calves they were fed a good, substantial ration as follows:—

5 pounds of oat greenfeed,
5 pounds of prairie hay,
40 pounds of sunflower silage mixed with 2 to 3 pounds of cut straw,
2.5 pounds of oat chop,
2.5 pounds of barley.

The above daily ration cost 18.2 cents per day, making a monthly cost of \$5.46. This is also an expensive ration, and is the objection to raising winter calves. Not only is the ration expensive but shelter of some kind is essential; otherwise, in cold weather the cows teats freeze, causing a great deal of trouble. The above ration has given very good results. The cows milked well and kept in a good thrifty condition. Those bred again gained flesh on this feeding.

COST OF RAISING BULLS TO ONE YEAR OF AGE

<i>Cost of Dam—</i>	
Cost of dam fed in stable or corral from Jan. 1 to May 30 at \$5.46 per month.....	\$27 30
Cost of dam on pasture from May 30 to Nov. 15 at \$1 a month.....	5 50
Cost of dam from Nov. 15 to Dec. 31 at \$2.82 a month.....	4 23
Total cost of keeping dam for one year.....	\$37 03
<i>Cost of Feed for Calf—</i>	
Calf fed in stable from Jan. 1 to May 30 ate—	
225 lbs. of oats at 1 cent a pound }	} 4 61
225 lbs. of alfalfa at \$21 a ton..... }	
Calf fed in corral from May 30 to Nov. 15 when it was weaned ate—	
275 lbs. of hay at \$16 a ton..... }	} 6 83
690 lbs. of corn silage at \$3 a ton }	
360 lbs. oats at 1 cent a pound.. }	
Calf fed after weaning Nov 15 in corral until Dec. 31 ate—	
315 lbs. hay at \$16 a ton..... }	} 8 37
900 lbs. sunflower silage at \$3 a ton }	
360 lbs. grain at 1½ cents a pound.. }	
Cost of feed over and above milk from dam.....	\$19 81
Total cost including dam's keep to raise a bull calf to one year of age.....	\$56 84

The above data were obtained from seven bull calves calved about the first of January, 1922. These calves were fed until May 30, in a boxstall in the beef barn. They nursed twice a day and were fed all the chopped oats and alfalfa they would clean up every day for the five months. This averaged 1½ pounds of each per day. They always had water to drink, and it is surprising the amount of water that calves will drink even when nursing. From May to

November 15 they were fed in corrals. During this time the cows came in off pasture every morning and evening to nurse the calves, and the calves were fed hay, silage and grain. The calves were weaned November 15 and were fed to the end of the year in an open corral without any shelter. The above figures are for winter calves, and will be used for comparison with spring or summer calves in the next annual report.

The above bulls will be fitted and sold at the spring sales in 1923. The last bulls fitted cost \$7 per month of thirty days. On the same basis these bulls sold March 31, 1923, will have cost \$77.84. They are good bulls, and even at the present low prices for cattle, they should show a fair profit.

COST OF RAISING PURE-BRED HEIFERS TO TWO YEARS OF AGE

Cost of Keep of Dam for the Calendar Year of 1920—

Fed in stable from Jan. 1 to May 31 on the following ration per day:—	
9 lbs. prairie hay at \$20 a ton.....	} \$ 36.43
40 lbs. sunflower silage at \$4 a ton.....	
2-3 lbs. cut straw at \$3 a ton.....	
5 lbs. of oatchop at 1½c. a lb.....	
Pasture from June 1 to Nov. 15 at \$1 a month.....	5.50
Fed in bush when dry for 1½ months at a cost of \$2.82 a month.....	4.23
Total cost of keep of dam for one year.....	\$ 46.16

Cost of Raising a Heifer from Jan. 1, 1921, to Dec. 31, 1922, to two years of age—

Fed in boxstall from Jan. 1, 1921 to May 31, 1921, nursed on dam twice a day; ate:	
200 lbs. of alfalfa hay at \$25 a ton.....	} \$ 6.72
150 lbs. of oatchop at 80c. a bush.....	
50 lbs. of bran at \$28 a ton.....	
Fed in corral from June 1, 1921 to Nov. 15, 1921, nursed on dam twice a day; ate	
230 lbs. alfalfa at \$25 a ton.....	} 11.81
650 lbs. sunflower silage at \$4 a ton.....	
325 lbs. oatchop at 80c. a bush.....	
Fed in corral outside from Nov. 15, 1921 to May 31, 1922. Average daily ration:	
4-5 lbs. oat greenfeed at \$10 a ton.....	} 26.79
4-5 lbs. prairie hay at \$18 a ton.....	
20 lbs. sunflower silage at \$3 a ton.....	
2-5 lbs. oatchop at 34c. a bush.....	
1-5 lb. barley chop at 40c. a bush.....	
1 lb. bran at \$14 a ton.....	} 5.50
Heifer on pasture from June 1, 1922 to Nov. 15, 1922, 5½ months at \$1 a month.....	
Heifer fed in bush from Nov. 16, 1922, to Dec. 31, 1922, daily ration:—	
8 lbs. prairie hay at \$20 a ton.....	} 6.30
12 lbs. oat greenfeed at \$10 a ton.....	
Total cost of feed and pasture for one heifer up to two years of age.....	\$ 57.12
Total cost including cost of keep of dam for one year.....	\$103.28

In compiling the above estimate, the costs of feed represent the costs of bought feed laid down at Lacombe. Because of this, these costs are much higher than a farmer growing most of his feeds, would charge up to his cattle. Two-thirds of the above charges would be a fairer estimate. Furthermore, the heifers used for the above data were pure-bred heifers, fed fairly heavily to get good growth. Under average farm conditions, the cattle would rustle for their living the greater part of the year with much lower total feed cost.

As costs vary so much from year to year and month to month, actual price values are only good for the time at which they were taken. With this in view, the amounts of feeds of various kinds are given below. These are also more generally subdivided into roughages and concentrates required to feed a heifer from birth to two years of age under the conditions outlined in the previous table. The amounts of feed required are much less variable, and, prices as they are, could be easily affixed.

The amounts of different feeds fed during two years of growth, where heifers are pastured for five and a half months in the year, and fed for six and a half months, and nursed by dam for ten and a half months, were:—

Roughages.—Alfalfa, 430 pounds; prairie hay, 1,237 pounds; oat greenfeed, 1,417 pounds; sunflower silage, 4,550 pounds.

Concentrates.—Oatchop, 962 pounds; bran, 245 pounds; barley chop, 292 pounds.

Total.—3084 pounds dry roughages, 4,550 pounds succulent roughages, 1,499 pounds concentrates.

DAIRY CATTLE

The Holstein-Friesian herd at this Station numbers sixty-six head. Forty-four of these are pure-bred and twenty-two are grades. The following table gives the classification and numbers according to sex and ages:—

CLASSIFICATION OF HOLSTEIN-FRIESIAN HERD

	Pure-bred	Grade	Totals
Herd bull, three years.....	1		1
Bulls, one year or over.....	1		1
Bull calves.....	5		5
Milch cows, three years or over.....	15	10	25
Two-year-old heifers milking.....	4	2	6
Two-year-old heifers, dry.....	2	3	5
Yearling heifers.....	6	4	10
Heifer calves.....	10	3	13
Totals.....	44	22	66

A number of cows have been disposed of during the year for various reasons. Of the pure-bred herd, three mature cows were sent to the butcher as unfit for further use. Maud Sarcastic 15370, twelve years old, received an injury to her hip which dislocated it, and as she also was not a sure breeder, it was decided to turn her off. L.E.S. Princess Korndyke Helbon 48022, a poor individual and a very poor milker, was sent to the butcher, so also L.E.S. Princess Mechthilde 63890. This heifer's udder was spoiled by mammitis, and as she was a low producer, she was not fit to hold for breeding purposes. L.E.S. May Echo Lee 52206 contracted a wry neck when she freshened and died shortly afterwards. One yearling heifer, L.E.S. Agnes Mechthilde 92948 died from blackleg contracted late in the winter, and another yearling heifer, L.E.S. May Echo Princess 93224, was found dead in a poplar bluff, apparently from injury. The loss of these heifers is unfortunate as they were the two most promising yearlings in the herd.

Of the grade herd two mature cows, Grades 39 and 79, were sold. Both these cows were off-type and detracted from the appearance of the herd. They also were low producers, and were consequently sold for beef.

Two pure-bred bulls were sold for breeding purposes and went to head herds in the province. One of these, L.E.S. Prince Echo Mechthilde out of Lawncrest Rosa Echo and sired by Prince Aaggie Mechthilde, was used at this Station as a second herd bull. He was three years old when sold, and was a big, useful bull with a great deal of scale and substance. He left a number of very fine calves in the herd. The other bull, L.E.S. Prince Mechthilde Lee, a half brother out of L.E.S. May Echo Lee, was sold as a yearling. This bull had more quality and was also developing into a fine, big, useful type of bull.

HERD BULLS

The first Holstein-Friesian herd sire used at this Station was Royalton Korndyke Count 13237, imported from the United States. The sire of this bull was Rag Apple Korndyke 5th, and his dam was Royalton Colantha Pride. There are five mature cows in the herd sired by this bull, all big, strong, rugged cows

with great capacity and the ability to milk. The daughters of this bull, with their records, are as follows:—

	Milk	Butter	Time
L.E.S. Nina Gem Lutske.....	18,921	858.5	365 days
L.E.S. Korndyke Rosa Echo.....	19,244	776.2	365 "
L.E.S. Daisy Johanna.....	14,569	575.0	365 "
L.E.S. Royaltan Korndyke Star.....	17,482	673.7	333 "
L.E.S. Korndyke Rosa.....	No record	as yet.	

The second bull used was Sir Evergreen Ormsby 20884, sired by King of the Ormsbys and out of Evergreen March 3rd 12659, a daughter of the famous old Evergreen March. This bull was used only for a short while. At present there are only two daughters of this bull in the herd. They, however, are outstanding cows. L.E.S. Evergreen Johanna has a R.O.P. of 15,530 pounds of milk and 615 pounds of butter. This cow also has a seven-day record of 27.7 pounds of butter, which is the second highest in the Prairie Provinces. The other daughter, L.E.S. Evergreen Rosa, has a R.O.P. of 18,261 pounds of milk and 698 pounds of butter. She is at present on R.O.M. work, and is making a very creditable showing.

Prince Aaggie Mechthilde 8482 has more daughters in the herd at present than any other bull. There are ten pure-bred daughters by this bull, and they are all big strong heifers with plenty of size and substance. These heifers are making very good records, and give promise of doing much better as they mature. This bull has a wonderful record behind him, having twenty-six qualified daughters and four qualified sons with many more sons and daughters yet to be heard from. Some of his daughters have made exceptionally good records. His sire, Prince DeKol Posch, has nineteen qualified daughters and ten qualified sons, while his dam, Ianthe Jewel Mechthilde 3rd, has one qualified daughter and 4 qualified sons. Her R.O.M. is 558 pounds of milk and 23.7 pounds of butter.

Roycroft King Spofford was used as a second herd sire to Prince Aaggie Mechthilde. He has left five pure-bred daughters in the herd. In justice to this bull, it must be said that his five daughters are the most promising heifers in the herd. The only one that has finished a record is L.E.S. Evergreen Gretchen with 13,627 pounds of milk and 561 pounds of butter. This heifer freshened at eighteen months of age, and in view of this her record is phenomenal. L.E.S. Johanna Alcartra, now on R.O.P., promises to give 17,000 pounds of milk as a two-year-old. Two other daughters on R.O.P. are performing equally well at the pail. Roycroft King Spofford was particularly rich in breeding on both his sire's and his dam's side. His sire was King Segis Alcartra Spofford, out of Fairmont Netherland Posch, with a four-year record of 32.54 pounds of butter. His dam was Het Loo Gretchen, out of Gretchen St. Lawrence with 23.76 pounds of butter, and by Pontiac Korndyke Het Loo, one of the best known sons of Pontiac Korndyke.

The present herd sire, Ottawa Korndyke Keyes 41184, already has eight pure-bred daughters in the herd. He is sired by Pietje Keyes of Sunnydale, out of a 28.22 pound cow, Helena Keyes Posch, by Inka Sylvia Beets Posch. His dam is Korndyke Canary Butter Maid 49648 with a two-year-old R.O.M. of 19.28 pounds of butter. This heifer is a granddaughter of Pontiac Korndyke, who was also the great grandsire of Roycroft King Spofford. Ottawa Korndyke Keyes is a bull of outstanding quality, conformation and breediness, and because of this quality, masculinity and type, should be the right bull to follow after Prince Aaggie Mechthilde, who had size, fibre and substance, but rather

lacking in quality. Whereas the heifers by the old bull were big and rough, the calves by Ottawa Korndyke Keyes are of finer fibre, but full of quality and breediness. They are a fine lot of calves which should do themselves credit later on.



Ottawa Korndyke Keyes — 41184 — Holstein-Friesian Herd Sire at the Dominion Experimental Station, Lacombe.

Three of the herd foundation cows are still with the herd. These are Nina Gem Lutske 16674, Lawncrest Rosa Echo 15021, and May Echo Lady 39918. The first two of these are fourteen and thirteen years old respectively. May Echo Lady is a seven years old cow by May Echo Lyon Segis out of Lawncrest Rosa Posch she in turn being by Inka Sylvia Beets Posch out of May Echo Darkness a three-quarter sister to May Echo Sylvia, the world's champion milk producer for from one to one hundred days. This is the best bred cow in the herd, and holds the highest yearly milk record held at present in the herd.

Nina Gem Lutske is of less fashionable breeding, but has left a number of very fine daughters and granddaughters in the herd. Lawncrest Rosa Echo is a very well-bred cow. She is sired by Inka Sylvia Beets Posch and out of Rosa Echo Verbelle. This cow and May Echo Lady are of similar breeding, both being of the May Echo Sylvia strain.

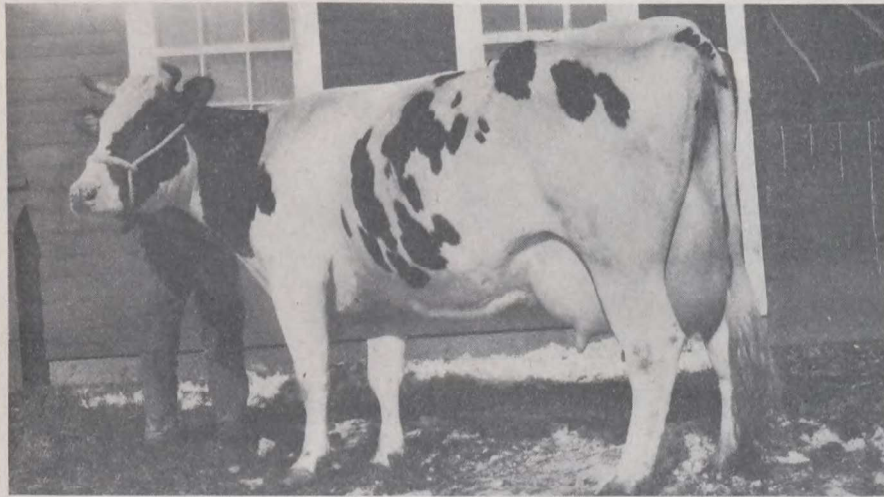
Two foundation cows which left good families in the herd were Daisy Johanna Ormsby and May Echo Lee. The latter cow was a half sister to May Echo Lady, by the same sire and out of Lee Keyes DeKol. The Johanna family is the highest testing family in the herd. They are good milkers and invariably test well. L.E.S. Evergreen Johanna, already mentioned as having the second highest R.O.M. in the Prairie Provinces, belongs to this family.

DAIRY HERD RECORDS

The following table is a compilation of the records of all dairy cows and heifers finishing their lactation period during the year 1922. The feed charges given in this table are for the feed eaten during the actual period of milking, no allowance being made for the dry period previous to calving.

In calculating the cost of feeds, the following values were used: Meal mixture, $1\frac{1}{2}$ cents a pound; succulent roughages, \$3 a ton; dry roughages, \$15 a ton.

The meal ration consisted of chopped oats, bran, oilcake meal and, for a few individuals, barley. The meal was mixed and fed in the following proportions: 220 pounds of oat chop, 120 pounds of bran, and 100 pounds of oilcake meal. For R.O.P. cows this varied somewhat to suit their individual tastes, but the above mixture was fed generally.



May Echo Lady No. 39918 with a R.O.P. of 21835 lbs. of milk and 848 lbs. of butter as a mature cow.

Charges for pasture have been omitted. Pasture has not played a very important part in the feeding of the dairy herd this past year. The pasture depended upon consisted entirely of cultivated crops, and because of the past dry year, the pastures did not give a great amount of feed. A mixture of rye and oats spring seeded gave the best results this year. Fall rye seeded in the fall of 1921 was about completely killed out in the winter, and had to be reseeded this spring.

The milch cows were fed a small grain ration with some corn silage throughout the summer months, and there was only a short time when the main herd did not receive hay as well.

Succulent roughages consisted of oat, corn and sunflower silages and roots. The roots were fed in the early winter months, November and December. These were fed in the proportion of 20 pounds of roots to 40 pounds of ensilage, making a total of about 60 pounds per head per day. These were charged at the rate of \$3 a ton, which is slightly over the cost of production.

The dry roughages include alfalfa, prairie hay, and oat greenfeed, and these are charged at the rate of \$15 a ton for the year. Alfalfa and prairie hay cost more than this, but were counterbalanced by the oat greenfeed, which cost less than \$8 a ton.

For butter a price of 30 cents per pound has been allotted. This represents the average wholesale price for 1922, as at times the price has been higher than this and at other times lower. Though whole milk is not sold at this Station, there is a column in the table for comparative purposes, which gives the value of the milk had it been sold as whole milk. The price of \$1.80 a hundred is the price f.o.b. Calgary, less freight charges.

DAIRY HERD - RECORDS FOR 1922

Age when freshened	Date of dropping calf	Number of days in lactation period	Total amount of milk in period	Daily average yield of milk	Average per cent of fat in milk	Average per cent of butterfat produced	Value of milk at \$1.80 a hundred	Value of butter at 30c.	Amount of meal at 14c. a pound	Amount of ensilage and roots at \$3 a ton	Amount of dry roughage at \$15 a ton	Total cost of feed	Cost to produce 100 pounds milk	Profit had milk been sold as butter at 30c.	Profit on milk sold at \$1.80 a hundred
Pure-bred Holsteins—															
11	Feb. 13, 1921	372	7,807	20.9	2.9	283.0	140.52	84.90	3,999	12,890	3,050	102.18	1.30	-17.28	38.34
12	May 17, 1922	156	5,760	36.2	3.9	283.1	103.68	84.93	1,921	6,610	1,552	50.36	0.87	34.57	53.32
7	Nov. 1, 1921	395	19,314	48.9	3.4	816.5	347.65	244.95	8,025	13,840	3,944	170.71	0.88	74.34	176.94
7	Mar. 21, 1921	497	16,340	32.9	3.3	671.0	294.12	201.30	7,191	15,831	5,201	170.61	1.04	30.69	123.51
5	Nov. 6, 1920	587	25,129	42.8	3.4	1,054.28	452.33	316.28	11,875	18,009	5,664	247.61	0.98	68.67	204.72
6	April 9, 1921	600	27,714	46.2	3.1	1,042.60	498.85	312.78	10,574	16,820	5,114	222.19	0.80	90.59	276.66
3	April 23, 1921	522	20,560	39.4	3.1	797.43	370.08	236.22	8,585	12,314	4,102	178.00	0.86	58.22	192.08
4	Jan. 4, 1921	542	19,383	35.7	3.3	792.25	348.89	237.67	7,266	15,465	5,736	175.20	0.80	62.47	173.69
3	Mar. 7, 1921	369	16,831	45.6	2.8	614.65	302.95	184.30	7,228	9,455	3,296	147.32	0.87	37.07	155.63
3	Oct. 23, 1921	204	3,826	18.7	3.3	155.60	68.87	46.68	2,479	6,119	2,068	61.86	1.61	-15.18	7.01
14	June 28, 1921	521	17,796	34.1	3.2	706.85	320.33	212.05	7,664	15,212	4,002	167.78	0.94	44.27	152.55
2	Sept. 15, 1921	422	14,061	33.3	3.2	541.37	253.09	162.41	6,484	10,705	3,847	142.05	1.01	20.36	111.04
2	Nov. 7, 1921	389	9,150	23.5	3.0	407.37	164.70	122.21	5,415	9,694	3,029	118.32	1.29	3.89	46.38
80.5	.....	5,579	203,671	458.1	.....	8,156.0	6.06	2,446.00	88,706	162,864	50,605	1,954.19	13.35	492.58	1,711.87
5.1	.....	429	15,667	36.5	3.20	625.0	282.00	188.21	6,823	12,828	3,892	150.32	1.027	37.89	131.68
Averages for pure-breeds—															
Grade Holsteins—															
2	Feb. 3, 1921	298	6,152	20.6	3.8	291.12	110.73	87.33	3,130	9,314	1,965	75.65	1.23	11.68	35.08
2	Nov. 13, 1921	383	8,125	21.2	3.8	368.07	116.45	105.32	3,984	13,093	3,043	102.21	1.25	13.31	44.22
4	April 8, 1922	290	8,135	27.6	3.8	368.07	110.77	87.49	2,264	7,825	1,496	57.06	0.92	30.39	53.71
4	June 13, 1921	274	8,726	32.1	3.2	547.25	158.82	107.32	3,746	6,791	1,657	78.04	0.88	29.28	80.28
5	May 15, 1921	328	10,666	32.3	3.2	432.30	192.04	129.69	3,972	2,080	88.39	0.83	41.30	163.65	
4	May 29, 1921	323	10,494	32.4	3.3	431.70	188.89	129.92	4,010	8,093	2,298	100.01	0.94	29.51	88.89
21.0	.....	1,826	50,400	164.5	.....	2,189.5	907.18	656.85	21,706	55,179	12,409	501.96	6.04	155.47	405.84
Averages for Grades—															
3.5	.....	304	8,400	27.4	3.49	364.9	151.19	109.47	3,617	9,196	2,068	83.56	1.008	25.91	67.64
Totals for herd—															
87.5	.....	7,405	254,071	622.6	63.9	10,345.5	4,573.24	3,103.60	110,412	218,043	63,014	2,455.55	13.39	648.05	2,117.71
Averages for herd—															
4.6	.....	389	13,372	32.7	3.26	544.5	240.69	163.34	5,811	11,476	3,316	129.24	1.02	34.10	111.45

RECORD PERFORMANCE AND FEEDING FOR HEAVY MILK YIELD

In addition to the lactation and feed records kept at this Station, the pure-bred herd is entered in the Record of Performance for pure-bred dairy cattle conducted by the Dominion Live Stock Branch. Since 1921, when this work was renewed, ten very creditable records have been completed, and there are nine cows at present on this work. Their records will be published in the next annual report.

HOLSTEIN-FRIESIAN CANADIAN RECORD OF PERFORMANCE TESTS AT LACOMBE EXPERIMENTAL STATION
APRIL 1, 1921, TO DECEMBER 31, 1922

Name and number of cow	Age at commencement of test	Number days milking	Lbs. of milk produced	Average % fat	Lbs. of fat produced	Lbs. 80% butter
	Yrs.					
May Echo Lady No. 39918	6	365	21,885	3.10	679	848
L.E.S. Daisy Johanna No. 31601	6	365	14,569	3.16	460	575
L.E.S. Korndyke Rosa Echo No. 35780	5	365	19,244	3.23	621	776
L.E.S. Evergreen Rosa No. 56204	3	365	18,261	3.06	559	648
L.E.S. May Echo Lee No. 56206	3	365	16,787	2.94	494	617
L.E.S. Evergreen Johanna No. 56199	3	365	15,530	3.17	492	615
L.E.S. Evergreen Gretchen No. 75005	1½	365	13,628	3.29	449	561
L.E.S. May Echo Mechthilde No. 70080	2	365	12,992	3.20	415	519
L.E.S. Nina Gem Lutske No. 34364	8	365	18,921	3.63	686	858
L.E.S. Aaggie Mechthilde Echo No. 56200	4	345	15,562	3.51	546	682

The cows and heifers on Record of Performance work were housed in the dairy barn, tied up in stanchions. As the mangers are too wide and deep and the stalls too short for large cows, these quarters have been none too comfortable. They would have been better off in roomy box stalls, but none were available for this work. In winter they are kept in the stable at all times, but in summer they were out in pasture morning, afternoon and at nights, only being kept in for feeding and milking and in the heat of the day. In hot weather the cows find it cooler and more comfortable in the shelter of the stable where they are protected both from heat and flies.

No fancy feeds were fed to these cows, the object being to use only such feeds as were within reach of every dairyman. The meal ration consisted of a mixture of 220 pounds of oat chop, 120 pounds of bran and 100 pounds of oil-cake meal. This is giving good results as a protein-rich feed for heavy-producing cattle. All cows are well fitted for R.O.P. The meal is restricted for a few days before calving and for some time after calving until the inflammation goes, and the cows are back to normal. There is then less danger of overfeeding or causing digestive troubles. At other times the cows are allowed practically all the meal they will clean up.

The dry roughages consist of alfalfa, prairie hay and oat greenfeed. Alfalfa forms the main bulk, but hay and greenfeed are fed as well, and it is found that the variety is better than any one feed. Oat and corn silages provide the bulk of succulent roughages. In the late fall and early winter months, swede turnips are fed. These are fed at the mid-day feeding. A sample daily ration for a cow giving 70 pounds of milk a day for this time of the year is as follows: Dry roughages, 12 pounds; oat silage, 35 pounds; swedes, 35 pounds; meal mixture, 22 pounds.

In summer the cows have rye and oat pasture as close to the building as possible. They are also fed silage, hay and meal as much as they will clean up.

Throughout their record, all cows are milked three times daily, at five in the

morning, one in the afternoon, and again at eight o'clock at night. They are fed meal on silage at the morning milking, hay after milking. At the one o'clock milking they again get meal on either silage or roots followed by hay, and at the evening milking more meal on silage followed by hay after milking. Salt at the rate of about one and a half ounces daily is mixed in the meal. Water is provided in bowls, and the cows are groomed daily. The stalls are well bedded, and the stable is cleaned morning and afternoon.

RECORD OF MERIT

During the past year, Record of Merit work has been taken up. This is a system of testing carried out under the supervision of the Holstein-Friesian Association. When the cows and heifers freshen, they are milked four times a day, and records are started from the eighth or tenth day. Seven, fourteen, and thirty-day records are taken. All the milk is weighed, a sample of every milking is taken and tested for butterfat percentage, and the records compiled from these data. This work was commenced in August last and already a number of records have been made which are given in the following table. The method of feeding and care given cattle in R.O.M. work is practically the same as for Record of Performance, with the exception that the cows are milked four times daily for the Record of Merit, and three times daily for Record of Performance.

RECORD OF MERIT RECORDS FOR 1922

Name of cow or heifer	Age	Number of days	Lbs. of milk	Lbs. of butterfat	Lbs. of 80% butter
L.E.S. Evergreen Johanna No. 56199.....	Mature.....	7	509.7	22.214	27.768
		14	1,033.1	43.818	54.770
		30	2,291.1	90.339	112.924
L.E.S. Korndyke Rosa Echo No. 35780.....	Mature.....	7	500.3	16.533	20.666
		14	999.2	33.141	41.426
		30	2,147.1	70.495	88.118
L.E.S. Daisy Johanna No. 31601.....	Mature.....	7	405.9	17.910	22.387
L.E.S. May Echo Gretchen No. 75006.....	Senior	7	440.0	13.169	16.462
L.E.S. Nina Alcartra No. 91370.....	2-year old	7	394.8	12.903	16.129
	Senior				
	2-year old				

COST OF RAISING DAIRY HEIFERS

The following is a statement of the gains made, the amounts of feed required, and the costs of raising dairy calves to six months of age. It is compiled from three calves dropped on dates averaging May 22, 1922. One calf was a pure-bred Holstein and the other two grade Holsteins. In the first table is a summary of the gains by months for the six months; in the second table the feed required by months with costs.

GAINS MADE BY THREE HOLSTEIN HEIFER CALVES DURING THE FIRST SIX MONTHS AFTER CALVING

	Date	Total weights	Average weights	Total gain for month	Average gain each for month	Average daily gains each for month
At date of birth.....	May 22..	243	81			
At the end of first month.....	June 22..	386	128.6	143	47.6	1.53
At the end of second month.....	July 22..	546	182	160	53.6	1.77
At the end of third month.....	Aug. 22..	768	256	222	74.0	2.38
At the end of fourth month.....	Sept. 22..	950	316.6	182	60.6	1.95
At the end of fifth month.....	Oct. 22..	1,211	403.6	261	87.0	2.90
At the end of sixth month.....	Nov. 22..	1,394	464.6	183	61.0	2.03

At the end of six months these calves were an average weight of 464.6 pounds. They were fed for a total of 184 days in which time they gained 1,151 pounds, which is an average daily gain each of 2.08 pounds for the first six months after birth.

AMOUNTS OF FEED REQUIRED TO FEED THREE HOLSTEIN HEIFER CALVES TO SIX MONTHS OF AGE—WITH COSTS

Month	Whole milk at \$1 a hundred	Skim-milk at 20c. a hundred	Oats at 34c. a bush.	Bran at \$20 a ton	Alfalfa at \$21 a ton	Hay and oats greenfeed at \$15 a ton	Silage at \$3 a ton	Roots at \$3 a ton	Total cost for milk	Average cost each per month
									\$	\$
Feed for first month.....	1116								11.16	3.72
“ second month.....	630	720	33	17	25		121		8.68	2.81
“ third month.....		1674	77	45	124		310		6.32	2.10
“ fourth month.....		1830	180	40		155	610		7.93	2.64
“ fifth month.....		1800	240	90		240	903		10.05	3.35
“ sixth month.....			310	124		260	1530	240	8.94	2.98
Totals for six months.....	1746	6024	840	316	149	655	3471	240	53.08	17.69

In the above table whole milk is charged at cost, \$1 a hundred, and not at the selling price of \$1.80 a hundred. The other feeds are charged at cost where home grown as with the silage, roots, oats and skim-milk. Alfalfa hay and bran are charged at prices laid down at Lacombe when bought. As would be expected, for the first month, when whole milk only was fed, the cost is highest. The cost to raise a calf to six months of age is \$17.69.

Method of feeding and care.—These calves were fed in a loose box-stall which held the three calves. For six weeks after calving they were fed whole milk six pounds at each meal twice a day. Grain was fed at the end of the first month, just what the calves would nibble at without letting it spoil. At the end of six weeks they were eating 16 pounds per day of whole milk. At that time they were gradually changed from whole milk to skim-milk. During the second month they were allowed grain, two parts of oats to one part of bran; also, alfalfa and corn silage. During the third month they received 18 pounds of skim-milk each daily, and during the fourth and fifth months, 20 pounds daily. At the end of the fifth month they were weaned from skim-milk and were fed only grain, hay, silage and roots during the sixth month.

These calves were allowed to run in the barnyard for an hour every day. During this time they had access to fresh water from a tank in the yard. This water was warmed by a tank heater in winter. In feeding these calves, they were always regularly fed; the amounts of milk and skim-milk were weighed out, and it was always fed at the same temperature, from clean sanitary pails.

As costs of feed vary with the different conditions on every farm, and costs also vary so much from time to time, the above costs can only be taken as arbitrary. The amounts of feed required are much more constant. The feed required for one of these calves to six months of age is as follows: Whole milk, 582 pounds; skim-milk, 2,008 pounds; grain, 385 pounds; hay, 268 pounds; silage and roots, 1,237 pounds.

THE EFFECT OF THE TUBERCULIN TEST ON MILCH COWS

There is a prevalent opinion among many farmers to the effect that the tuberculin test as carried out by the Federal Department of Agriculture has a detrimental effect on milking cows. The test has been blamed for many and varied troubles following directly after application. The test is most popularly believed to decrease the milk flow seriously. The following table gives a record of the milk yields of six high-producing cows for six days previous to the day of inoculation, and six days after inoculation during the past two tests taken at this Station. Still further, the records are included for the total herd of twenty-six milking cows for the May, 1922, test and also for the last test in November, 1922. For the first test in May some of the cows gave more on the day of the test and some gave less. This is also true of the second test. In the herd totals there is no apparent drop either on the day of testing or directly afterwards. Any decline there is can be accounted for by the natural decrease in milk flow, which is a steady decrease throughout the milking period. A slight drop would be expected, as at this time there is always an unusual stir or rush because of the work involved in testing. Such condition would naturally cause some slight variation. The results of this compilation very emphatically points out that the tuberculin test does not cause any decline in milk flow.

DAILY RECORDS OF 6 HIGH PRODUCING COWS WITH TOTALS AND HERD TOTALS BEFORE, DURING AND AFTER TUBERCULIN TEST SHOWING EFFECT ON MILKING COWS

MAY TEST

Date	L.E.S. Royalton Koradyke Star	L.E.S. Nina Gem Lutske	L.E.S. Johanna Alcartra	L.E.S. Evergreen Gretchen	L.E.S. Aaggie Mechthilde Echo	L.E.S. Iantha Aaggie De Kol	Totals for 6 cows	Daily totals for whole herd of 26 milking cows
May 2.....	58.6	58.7	64.0	40.7	49.1	42.0	313.1	911.3
" 3.....	60.3	58.0	63.9	40.9	47.5	42.1	312.7	905.0
" 4.....	60.5	59.1	65.6	40.6	48.6	42.9	317.3	909.0
" 5.....	62.3	60.1	63.0	38.8	46.4	42.7	313.3	893.3
" 6.....	62.7	60.4	64.1	40.8	48.2	44.5	320.7	902.6
" 7.....	58.8	56.1	60.2	37.8	46.0	41.2	300.1	879.5
Injected 8.....	59.7	56.5	57.8	37.2	43.3	42.3	296.8	843.0
May 9.....	59.2	58.2	61.3	38.9	44.5	41.7	303.8	863.8
" 10.....	61.3	57.2	62.6	39.8	44.7	41.7	307.3	871.9
" 11.....	58.5	57.1	60.9	39.2	45.4	43.5	304.6	867.5
" 12.....	55.8	57.3	61.3	39.3	45.6	44.5	303.8	852.3
" 13.....	56.9	57.7	61.1	39.5	44.6	43.7	303.5	839.0
" 14.....	57.6	54.6	60.3	39.1	46.1	44.1	301.8	848.4

DAILY RECORDS OF 6 HIGH PRODUCING COWS WITH TOTALS AND HERD TOTALS BEFORE, DURING AND AFTER TUBERCULIN TEST SHOWING EFFECT ON MILKING COWS—*Concluded*

NOVEMBER TEST

Date	L.E.S. Nina Alcartra	L.E.S. Princess Helbon	L.E.S. May Echo Gretchen	L.E.S. Evergreen Johanna	L.E.S. Johanna Alcartra	L.E.S. Korndyke Rosa Echo	Totals for 6 cows	Daily totals for whole herd of 26 milking cows
Nov. 7.....	55.4	45.6	63.7	59.2	39.5	62.3	325.7	806.8
" 8.....	56.4	42.3	60.9	57.2	49.2	61.1	318.1	882.1
" 9.....	53.8	47.4	61.8	60.5	37.8	59.9	321.2	855.7
" 10.....	56.6	45.0	59.8	56.1	39.9	61.5	318.9	879.1
" 11.....	55.4	46.0	62.7	57.2	41.9	62.7	325.9	864.8
" 12.....	54.8	46.9	62.8	56.2	42.1	63.8	326.6	862.8
Injected 13.....	57.2	45.9	59.9	54.0	40.2	61.2	318.4	847.9
Nov. 14.....	51.5	45.1	58.0	52.0	38.0	60.1	304.7	819.4
" 15.....	54.2	47.0	63.5	53.0	39.6	63.4	320.7	818.5
" 16.....	55.4	46.4	56.7	52.8	38.7	64.5	314.5	831.1
" 17.....	55.2	46.9	58.6	52.0	38.7	59.1	310.5	818.8
" 18.....	52.0	44.0	57.7	48.9	37.6	62.8	303.0	800.7
" 19.....	55.6	49.5	59.3	55.0	40.0	64.4	323.8	808.3

DAIRY MANUFACTURING

The dairy manufacturing at this Station is limited to cheesemaking. The only variety of cheese made is Cheddar, put up in small family size cheese of approximately ten pounds each. As cheese factories are still comparatively few in numbers throughout the province, most of the cheese consumed within the province has come from outside. There is a very keen demand for home-made cheese, and the greater part of the cheese made has been sold to local merchants or to merchants from nearby towns.

About half of each day's milk, roughly 500 pounds, is made into cheese. The whey from this is fed to the pigs. The balance of the milk is separated and the cream sold to the local creamery. The skim-milk is fed to the dairy calves and is a very valuable addition to their ration.

The following dairy report for the year 1922 brings out a very good comparison between the returns from milk sold as cheese and the returns had it been sold as cream. An average monthly butterfat test was taken, and this, multiplied by the monthly average price for butterfat per pound, gives the value of the milk had it been sold as cream to the local creamery.

Cheese has sold at an average price of 20 cents a pound for the year, while butterfat has sold at an average price of 33 cents. On this basis the milk sold as cheese was worth an average price of 65 cents a hundred more than the milk sold on the butterfat basis to the creamery. During the year 131,380 pounds of milk were made into cheese, showing a balance of \$853.45 in favour of cheesemaking.

DAIRY REPORT, DOMINION EXPERIMENTAL STATION, LACOMBE, FOR 1922

Month	Amount milk for cheese	Cheese made	Milk for one lb. cheese	Price of cheese per pound	Value of milk per cwt.	Per cent of fat in milk	Number of pounds butterfat	Price of butterfat per lb.	Value of milk per cwt.	Profit per cwt. of milk for cheese over butter	Average profit for year per cwt. of milk for cheese over butter
	Lbs.	Lbs.	Lbs.	Cts.	\$ cts.	%	Lbs.	Cts.	\$ cts.	\$ cts.	\$ cts.
January.....	8,727	828	10.5	20	1.89	3.6	314.17	31	1.11	0.78	
February.....	7,778	746	10.4	20	1.92	3.5	272.23	28	0.99	0.93	
March.....	12,724	1,246	10.2	17½	1.71	3.6	458.06	30	1.08	0.63	
April.....	11,983	1,139½	10.5	18	1.71	3.6	431.74	33	1.17	0.54	
May.....	11,568	1,074½	10.7	18	1.67	3.5	404.88	35	1.22	0.45	
June.....	7,042	640½	10.9	18	1.63	3.4	239.42	30	1.09	0.54	
July.....	11,445	1,101½	10.4	18	1.73	3.7	423.46	33	1.22	0.51	
August.....	13,843	1,323½	10.9	18	1.72	3.8	526.03	32	1.25	0.47	
September.....	12,878	1,223½	10.5	18	1.71	3.7	476.48	32	1.18	0.53	
October.....	11,261	1,107½	10.1	22	2.16	3.2	360.35	38	1.21	0.95	
November.....	11,527	1,110	10.3	22	2.11	3.5	403.44	36	1.24	0.87	
December.....	10,594	1,029½	10.0	21	2.04	3.8	402.61	36	1.36	0.68	
											-65

SHEEP

In 1917 a grading up experiment was commenced with sheep. A number of range ewes, mostly of Merino blood, were bought and mated to rams of the following six breeds: Leicester, Cheviot, Corriedale, Hampshire, Oxford and Shropshire. These six crosses have been kept distinctly separate for breeding purposes, and good pure-bred rams of good type have been used continually. At the present time, all of the original blood has been disposed of, and the breeding flock now consists of grade ewes of the above breeds. The mature ewes are mostly first cross ewes, about one-third of them being second cross. All the second cross mature ewes are two-shear ewes. The yearling ewes are all second cross ewes. The lambs are mostly second cross, the balance being third cross.

At the end of the year 1922, the flock numbers 836 head, including 18 rams, 395 breeding ewes, 51 cull ewes, 93 shearling wethers and 279 lambs of the 1922 lamb crop. Of the breeding ewes, 77 are yearling second cross ewes. This leaves the 218 head of mature ewes mostly first cross, although a number of the two-shear ewes are also second cross ewes. The lambs consist of 218 second cross lambs, 32 third cross lambs and 29 crossbred Shropshire and Leicester lambs. In the fall of 1921 there were 115 Shropshire ewes to be bred, and as there were only two shearling rams, it was decided to breed a number of the poorer ewes to a Leicester buck. The lambs from this mating will all be sold for mutton, leaving only the crosses of the original six breeds.

Owing to the shortage of feed for the winter of 1922-23, it is proposed to dispose of all cull ewes, the shearling wethers, the wether lambs and the 29 head of Shrop-Leicester cross-bred lambs. The difference between marketing the wethers as yearlings and lambs will be obtained, and this comparison will be published in the next annual report. These yearling and lamb wethers, cross-breeds and cull ewes will be sold early in the New Year.

As before mentioned, the principal work with sheep is a grading up experiment to compare the value of the six breeds when crossed upon range ewes. While different methods of handling would give different results, the following is an outline of the method of handling the flock. In the summer time the band is run on free range at the northeast end of Gull Lake from about the first of June to the last of October or early November. The sheep are then brought home, taking three days to make the trip of about thirty miles. They are cut out into breeding lots and bred, commencing about November 15. After the breeding season the ewes are again thrown together in large groups and housed in open corrals all winter. The corrals have board walls and no shelter, and are consequently very cold and windy in cold weather. Shortly after April 1st the bred ewes are moved to the exhibition buildings nearby, to lamb. As soon as possible after lambing they are shorn, dipped and turned out on summer range. The winter feed in 1921-22 was a mixture of prairie hay and oat greenfeed, roughly speaking two parts by weight of hay to one part of greenfeed. This made a very good ration as the ewes took to it kindly. They were healthy and lambed 111.2 per cent of strong, healthy lambs. There was no sign of goitre or other disease. Most of the slight troubles came through fox tail grass in the hay. This grass causes much suffering and a good deal of loss to sheep through getting into their eyes and mouths. The latter trouble is worse, as it is not so quickly seen, and once a sheep's mouth is really sore from fox tail, it is some time before the sheep will eat properly. This is quite a serious trouble in very cold weather. Salt and water were available at all times. Hay was fed in racks as well as spread round on the ground from time to time. It was found that the best method for feeding greenfeed was to feed often and in small quantities and spread it well when feeding. If fed in too much bulk the sheep eat the heads off, and tramp the remainder up and later will not touch it. A good

method in feeding sheep is to feed four or five times a day small quantities that will be eaten up clean. This is better for the sheep, it gives all a fair chance, and the most can be gotten out of the feed.

When it came to the lambing season there were 352 ewes. Of these 19 were dry ewes, 12 lambed prematurely and gave birth to dead lambs, and 321 ewes gave birth to 357 living lambs. Generally speaking, the lambs were a very healthy and vigorous crop, particularly the Cheviots. A number of Corriedale lambs when born were weak, listless, and of indifferent health. More losses occurred among the Corriedale lambs than of any other breed. In this respect the Corriedales were followed most closely by the Hampshires. A few lambs were lost from "stomach balls," a few died from injury, and a number from various other causes, with the result that 300 good, healthy lambs went out on summer range June 15. Of these 279 came in off range November 4. They are a very fine lot of lambs, averaging 61.1 pounds. They are not at all fat, but in a thrifty growing condition.

GRADING-UP EXPERIMENT

While this grading up experiment has not been carried on long enough to warrant the drawing of any very definite conclusions, some things are apparent and worthy of record. The following is a synopsis of the outstanding features in so far as the individual breeds have been noted up to the present.

Cheviots.—The outstanding feature about the Cheviots is their uniformity, both in regard to breed type and conformation. The ewes, wethers and lambs are strikingly even for type, size, condition, and fleece. There are fewer "ill sheep" among the Cheviots than in most of the other breeds. They are the ideal mutton sheep for this western country, where a small, compact carcass is desired. The Cheviots are all blocky, low-set, well-fleshed sheep, and the yearling wethers are a model in this respect. They are naturally a breed of sheep that are easily managed, and make excellent range sheep, as they invariably come in from the range in good condition. Because of their erect ears, white faces and striking carriage, they are the first to be noticed in the band.

Leicesters.—The Leicesters are a good type of sheep for mutton. They maintain their size well, and they also are remarkably uniform in appearance, size and conformation. They, however, are somewhat deceiving because of their coat of long wool. They appear the largest in the bunch, but on the scales they do not weigh out as well as some of the more compact breeds. The Leicesters are very true to type in the second and third crosses, and their weakness lies in their wool which is too open for this cold climate. Snow drifts into their fleece too easily, and for sheep running in the open, this is a serious drawback. However, the Leicesters are a fine-looking, big sheep, very stately in carriage, and make an excellent mutton sheep.

Hampshires.—The Hampshires are the heaviest sheep of all, and naturally this would be expected, as they are one of the heaviest of the Down breeds. They have a heavy, close coat of wool, which is much in their favour. As a breed they have not the uniformity of the Cheviots or Leicesters. There are more poor sheep among the Hampshires and the lambs are not as strong and active as they should be. There are quite a few losses among the young lambs. Because of their wool, their size and prolificacy, the Hampshires are a good general-purpose sheep, well adapted to the climate. They do particularly well in the feed lot.

Oxfords.—The Oxfords class well along with the Hampshires in that they have size, a good fleece and stand up well in this cold climate. They are more hardy than the Hampshires, and fewer of them go wrong than among the

latter. They are becoming a very popular breed and rightly so. They do well on the range and in the feed lot, though they do not give the same impression of uniformity noticed among the Cheviots and Leicesters.

Shropshires.—The Shropshires are the smallest of all the breeds, being beaten by the Cheviots, which are naturally a smaller breed. Some of the lack of size may be credited to the type of bucks used, as they have not always been as large as is desirable. One year a pair of ram lambs were used, which is not good practice. The Shropshires have had more culling than any other breed because they are the most numerous, and now present a very even appearance. Among the lambs and wethers, however, they lack uniformity, both in size and breed type. There are a number of misfits in size, colouring and conformation. They fall down in size under range conditions, but the lambs and wethers feed up with the heavier breeds. Their domesticated nature and close, dense fleece are very much in their favour.

Corriedales.—Up to the present, the place of the Corriedale is the most doubtful of all the breeds. It has many good, along with some quite derogatory, points. The quality of the fleece is an outstanding feature. It is very fine and dense, and a very high percentage always grades as a fine, medium-staple wool. The Corriedale excels in quality and flavour of its mutton, though it may not give as high a dressing percentage as do some of the other breeds. As a breed they are, in the words of the shepherd, a "slow breed"; that is, they are accustomed by nature to living in enclosures in which they wander and feed at will. Consequently, on the range they are not as aggressive as they might be and suffer accordingly. It is believed that were they kept in a band by themselves, they would appear to better advantage and would do much better. A large number of lambs came very weak, and the Corriedale lambs suffered the highest percentage of loss. There are quite a number of mediocre sheep among them, though some are outstandingly good. One lamb in particular came off the range weighing 90 pounds. This year the Corriedale lambs are undoubtedly the poorest, though later on these same lambs may do much better.

RAMS

At the present time there are 17 rams in use. There are three Leicester rams, one aged six years weighing 275 pounds, and the other two aged three years, weighing 260 and 240 respectively. The three Cheviot rams weigh 195, 185 and 150 pounds, respectively. The first of these is a four-year-old ram bred at the Experimental Station, Summerland, B.C., and the other two from the MacDonald College flock are two shear rams. Of the three Shropshire rams, one is a two shear ram weighing 225 pounds and from the flock at the Experimental Farm, Ottawa. The other two were bought in November, 1922, and are from the Prince of Wales ranch near High River, Alberta. Both of these are shearlings of very good conformation, and with good fleeces. They should prove valuable additions to the flock. Their weights are 205 and 175 pounds respectively. There are three Oxford Down rams in use, two of them, bred by the Western Stock Ranch of Calgary, weigh 265 and 240 pounds. The third ram was bought in November, 1922, and came from the flock of A. M. Olson, of Airdrie. This is a shearling ram weighing 270 pounds, and he is of exceptionally good conformation as well as being a large ram. He was placed third in the ring at Calgary Winter Fair in 1922 in a very strong class.

There are two Corriedale rams in use. The old ram is a four-year-old bought from the Wyoming Corriedale Sheep Co., Cheyenne, in 1920. He now weighs 235 pounds. A new ram was bought in December, 1922, from the same

company. The new ram is a better ram in respect to type. He is also a better woolled ram, both in covering of wool and quality of wool. He is a vigorous youngster, though only of fair size and should be a good ram to follow after his predecessor.

Two new Hampshire shearling rams were bought from the University of Alberta in 1922. These are both very good rams with very fair fleeces. They are blocky, thick set fellows, and should leave some good lambs. They weigh 210 and 200 pounds respectively. The two aged rams were sold in 1922. One was a four shear ram weighing 285 pounds, and the other a three shear ram weighing 255 pounds. These rams left some very good stock.

EWES—COMPARISON OF BREEDS BY WEIGHT

Breed	Average for all ewes, 1922	Average for all ewes, 1921	Weight of aged ewes in 1922, 2 years and over		Average for yearling first cross ewes, 1921	Average for yearling second cross ewes, 1921	Number of second cross ewes in 1922	Average weight of yearling, second cross ewes in 1922
			No.	Weight				
Leicester....	107.1	96.7	60	109.7	92.0	84.1	23	100.2
Hampshire..	117.5	102.6	44	121.3	88.2	85.5	8	96.2
Oxford.....	113.6	93.9	57	115.1	75.5	85.0	6	99.1
Corriedale..	107.5	94.4	34	114.4	89.3	94.0	9	81.6
Cheviot....	104.9	96.8	50	108.1	85.0	79.4	10	89.0
Shropshire..	102.1	85.2	73	105.4	81.7	80.0	21	90.7

SHEARLING WETHERS—COMPARISON OF BREEDS BY WEIGHT

Breed	1922 wethers all second cross wethers		Average weight of 1921 second cross wethers	Average fattened to weight of 1921 second cross wethers	Average weight of first cross wethers in 1921	Average fattened weight of first cross wethers in 1921	Average gains made by all wethers fattened in corrals, 1921
	No.	Average weight					
Leicester.....	20	114.7	93.1	118.8	92.1	117.2	25.5
Hampshire.....	9	115.5	97.6	120.5	93.7	114.6	21.4
Oxford.....	22	115.4	88.3	115.0	94.3	113.9	21.0
Corriedale.....	8	101.8	102.0	107.1	82.4	116.0	15.9
Cheviot.....	18	100.0	93.7	105.0	94.9	113.5	15.5
Shropshire.....	21	93.5	78.3	93.7	84.5	107.1	20.0

BREED GIVING THE BEST LAMBS ON PASTURE

Breed	No.	Average weight for all lambs in 1921, second and third crosses	Average weight for lambs in 1921, all second cross lambs	Average weight for lambs in 1920, first and second cross lambs mostly first cross lambs	Weights of second cross lambs in 1922		Weights of third cross lambs in 1922	
					No.	Average weight	No.	Average weight
Leicester.....	45	62.0	62.0	60.6	34	63.2	11	58.1
Hampshire.....	42	67.0	65.0	66.2	36	66.8	6	68.3
Oxford.....	40	67.0	62.8	60.5	39	67.4	1	50.0
Corriedale.....	19	56.8	56.4	57.6	18	57.7	1	40.0
Cheviot.....	50	58.4	59.2	66.2	42	59.0	8	55.0
Shropshire.....	54	57.5	52.1	56.3	49	57.9	5	53.0

In connection with this table, it is observed that the third cross lambs of 1922 are lighter than the second cross lambs. These were all from yearling ewes, which do not make as good mothers as older ewes, and their lambs are usually lighter. Taking the past three years into consideration, the Hampshire lambs lead in weight, coming off summer range. Oxfords are a close second, with the Leicesters an easy third. Of the remaining three breeds, the Cheviots stand up highest, followed by the Corriedales and Shropshires in this order.

BREED GIVING BEST LAMBS FOR WINTER FEEDING

Gains made by 1921 lambs from date of coming off summer range, November 4, 1921, to date of leaving for summer range, June 13, 1922. In the case of the latter weights the weight of the fleece is added.

Breed	Weights coming off Summer Range, Nov. 4, 1921			Weight, June 13, 1922—Fleece					Average corral winter gains
	No.	Total weight	Average weight	No.	Total weight	Average weight	Average weight Fleece	Average weight+Fleece	
Leicester.....	50	3,100	62.0	44	3,240	73.6	5.8	79.4	17.4
Hampshire.....	26	1,690	65.0	25	1,995	79.8	6.2	86.0	21.0
Oxford.....	39	2,450	62.8	40	3,100	77.5	5.7	83.1	20.3
Corriedale.....	21	1,185	56.4	22	1,360	61.8	6.1	67.9	11.5
Cheviot.....	26	1,540	59.2	28	2,100	75.0	4.9	79.9	20.7
Shropshire.....	50	2,605	52.1	48	2,970	61.8	5.5	67.3	15.2
Totals.....	212	12,570	59.2	207	14,765	71.3	5.7	77.0	17.8

The above table gives a comparison as to how the different breeds stand up under winter conditions when fed out in open corrals exposed to storms, rains and winds. The corrals are much colder even than a good poplar bluff would be. Generally speaking, these breeds could be roughly divided into heavy and light breeds, with the Leicesters, Hampshires and Oxfords as heavy breeds, and the Corriedales, Cheviots and Shropshires as light breeds.

Of the heavy breeds, the Hampshire has gained most, with the Oxford a very close second and the Leicester last. This is only to be expected, because the Leicester has a long, open fleece which lets the snow drift into it very easily, and once snow drifts into the fleece it takes some time to thaw out, and until it does thaw out and dry off, it keeps the sheep cold and uncomfortable over the back. This is a big consideration in our cold western winters.

Of the three lighter breeds, the Cheviot has gained much more than the two other breeds, and the Cheviot next to the Leicester has an open fleece. However, the Cheviot is an extremely hardy, active sheep which does remarkably well in this country. Though small sheep, the Cheviots stand next to the Hampshires in point of gains made over winter. The Shropshires and Corriedales stand at the bottom, with the Corriedales much lower than the Shropshires. Though they are a tight woolled sheep, the Corriedales do not take kindly to crowding in a corral or the feed lot. They are not enterprising enough to do well in a band of sheep, as they prefer to stand off and watch proceedings rather than push their way in for feed. For a small breed, the Shropshires have made very good gains.

BREED GIVING THE BEST YEARLING EWES AND WETHERS ON SUMMER RANGE

Breed	Ewes				Wethers				Average of ewes and wethers		
	No.	Average weight June 13	No.	Average weight Nov. 15	Average gains from June 13 to Nov. 25	No.	Average weight June 13	No.		Average weight Nov. 15	Average gains from June 15 to Nov. 25
Leicester.....	20	69.5	23	100.2	30.7	24	77.1	20	114.7	37.6	34.1
Hampshire.....	13	78.1	8	96.2	18.1	12	81.7	9	115.5	33.8	25.9
Oxford.....	18	72.8	6	99.1	26.3	22	81.4	22	115.4	34.0	30.1
Corriedale.....	12	57.9	9	81.6	23.7	10	66.5	8	101.8	35.3	29.5
Cheviot.....	15	71.0	10	89.0	18.0	13	71.9	13	100.0	28.1	23.0
Shropshire.....	27	60.7	21	90.7	30.0	21	63.3	21	93.5	30.2	30.1
Total average.....	105	67.7	77	93.5	25.8	102	74.0	93	107.0	33.0	29.4

For gains on summer range the Leicester leads by 4 pounds over any other breed. The Oxford and Shropshire follow with the same average gain of 30.1. The Corriedales have made very good gains, standing up much better under range conditions than in the corrals. The Cheviots have made the lowest gains, but it should be borne in mind that the Cheviots are a small sheep and went out on range in the best condition, and could hardly be expected to gain proportionately with thinner sheep. The Hampshires for a heavy breed have made comparatively poor gains.

GRADING UP EXPERIMENT—WOOL GRADING STATEMENT OF THE 1922 CLIP

Breed	Number of fleeces	One-half staple	One-half clothing	Three-eighths staple	Three-eighths clothing	One-quarter staple	Low one-quarter staple	One-quarter staple medium slightly seedy	One-quarter staple medium heavy seedy	Coarse	Average weight of fleeces
Shropshire—											
Rams.....	2					22					11.0
Ewes.....	106	79	8	381	77	74	9	7			5.99
2nd cross ewes.....	2			12							6.0
Lambs.....	47			166	57	10	9				5.3
Per cent in each grade.....		8.67	.87	61.36	14.59	11.50	1.97	.76			
Hampshire—											
Rams.....	2					19					9.5
Ewes.....	43			152	53	70					6.4
2nd cross ewes.....						25					
Lambs.....	26			94	20	25					5.4
Per cent in each grade.....				56.8	16.8	26.3					
Oxford—											
Rams.....	2										10.0
Ewes.....	52	6		210	45	65	20				6.4
2nd cross ewes.....	4			12	12		5		6		6.0
Lambs.....	45			148	20	77	11	5			5.8
Per cent in each grade.....		.93		59.19	11.99	22.11	5.62	.77	.93		
Leicester—											
Rams.....	3										10.6
Ewes.....	45			19		189	32				6.9
2nd cross ewes.....	10					56	56		10		6.9
Lambs.....	29	8		14		91	53			7	6.0
Per cent in each grade.....		1.36		5.63		50.0	40.10		1.70	1.19	

LAMBING STATEMENT 1922

Breed and Total Number of Ewes	Lambs from three and four Year Old Ewes				Lambs from two Year Old Ewes				Totals				Average weight in lbs.	Per cent of lambs to ewes.		
	Ram Lambs		Ewe Lambs		Ram Lambs		Ewe Lambs		Ram Lambs		Ewe Lambs				Totals	
	No.	Average weight in lbs.	No.	Average weight in lbs.	No.	Average weight in lbs.	No.	Average weight in lbs.	No.	Average weight in lbs.	No.	Average weight in lbs.			No.	Average weight in lbs.
Hampshire, 45.....	19	8.5	26	9.5	5	9.9	5	9.0	24	8.8	31	9.4	55	9.1	122.2	
Oxford, 48.....	27	9.8	22	9.3	2	9.0	2	9.0	29	9.7	24	9.3	53	9.5	110.4	
Cheviot, 47.....	22	9.4	22	8.2	2	8.0	7	7.9	24	9.3	29	8.1	53	8.7	112.7	
Leicester, 49.....	25	8.4	20	8.1	6	8.7	6	6.9	31	8.5	26	7.8	57	8.2	116.3	
Corriedale, 33.....	13	8.1	20	7.5	2	6.2	1	7.0	15	7.8	21	7.5	36	7.6	109.0	
Shropshire, 62.....	32	8.4	29	8.4	2	9.5	2	8.5	34	8.4	31	8.4	65	8.4	104.8	
Shropshire and Leicester, 37.....	16	7.5	22	7.9					16	7.5	22	7.9	38	7.7	102.7	
Total Shropshire, 99.....	48	8.1	51	8.3	2	9.5	2	8.5	50	8.1	53	8.2	103	8.2	104.0	
Totals, 321.....	154	8.7	161	8.5	19	8.8	23	7.9	173	8.7	184	8.1	357	8.5	111.2	

SWINE

No other branch of live stock at the Lacombe Station has prospered as well as the swine in 1922. It has been a good year for hogs; prices have remained comparatively steady throughout the year, and there has been a keen demand at all times for breeding stock and commercial hogs, and particularly the select bacon hog. The establishing of a grading system has focussed attention upon the bacon hog, and consequently the Yorkshire breed has come to the fore more this year than at any other time previously at the Experimental Station.

In 1922, a total of 80 litters have been farrowed, 51 being spring litters farrowed before July 1 and 29 fall litters after July 1. The swine herd has been remarkably free from disease or losses from any other cause. A high percentage of the young pigs farrowed has been raised to maturity. About 40 per cent were lost, chiefly because of litters being too large for the sows to raise. One man had charge of the entire herd and some of the little pigs could not get as much attention as might have been given them, but these factors taken into consideration, it has been a very successful year.

Thirteen Yorkshire, thirteen Duroc-Jersey and twenty-five Berkshire brood sows were carried over the winter of 1921. These were as follows:—

BROOD SOWS KEPT OVER THE WINTER OF 1921-22

	Old sows over one year of age	Gilts	Total
Yorkshires.....	8	5	13
Duroc-Jersey.....	9	4	13
Berkshires.....	9	16	25
Total.....	26	25	51

These 51 brood sows farrowed a total of 459 young pigs of which 275, or 59.9 per cent, were raised. The Yorkshires raised an average of 7.3 pigs per sow, the Duroc-Jersey 5.0, and the Berkshires 4.6 per sow. This is not quite a fair comparison in so far as the Berkshires are concerned, because there were 16 gilts the majority of which farrowed only 4, 5 or 6 pigs, though one gilt farrowed 11 and raised 9 of them. Twenty-nine sows were bred to farrow in the fall. From these 29 litters there were a total of 288 pigs farrowed and of these 170, or 59 per cent, were raised. Practically as high a percentage of fall pigs as of spring farrowed pigs has been raised. Altogether, in 1922, 458 pigs have been raised from 80 litters.

Acting on the lesson learned in 1922 with regard to spring and fall litters, the total number of brood sows held over is being reduced slightly and it is planned to raise two litters from all the sows in 1923. If fall litters do as well as spring litters, it will obviously pay to raise two litters a year.

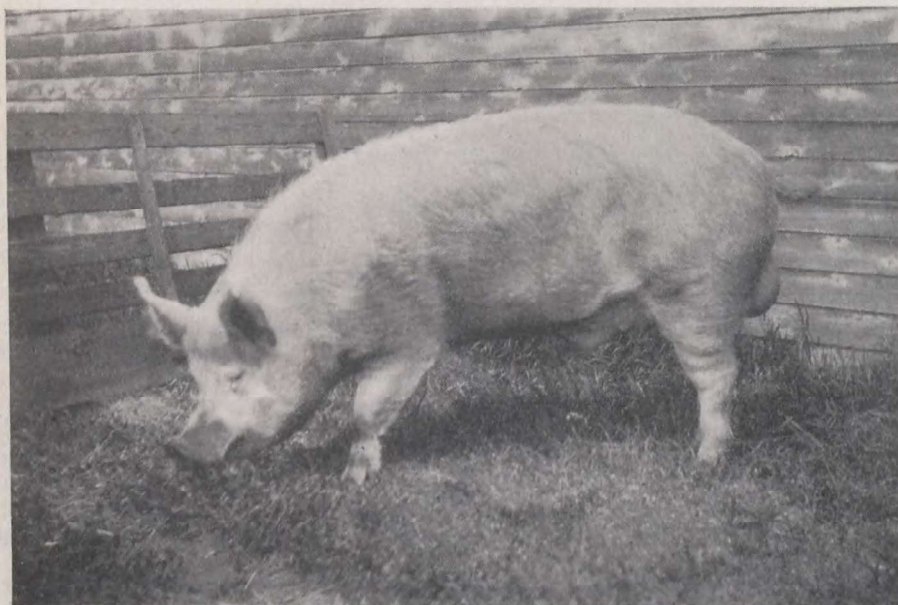
BREEDING STOCK BEING KEPT OVER THE WINTER OF 1922-23

Breed	Boars	Sows			Total sows
		Mature sows	Yearling sows	Gilts	
Yorkshire.....	2	8	6	6	20
Duroc-Jersey.....	1	8	4	3	15
Berkshire.....	2	6	3	3	12
Totals.....	5	22	13	12	47

In the last two years there have been a great number of sows to choose from. The above sows are all selected for their conformation, trueness to breed type, and breeding. The mature sows and yearlings are all tried breeders. Everything that has not bred well has been discarded, and the breeding sows this winter are a very choice and excellent lot. The brood sows of all the breeds are equally good.

BOARS

In passing, it is only fair to pay some tribute to the boars that are in use at present and that have helped in making the breeding stock what it is to-day. In 1920-21-22 a Yorkshire boar, "Sunny Home King 8" No. 66186, bred by J. F. Cooper, of Tugaske, Sask., was used. This boar was not a choice individual himself, but he has left some very good stock. His boars were particularly good, though in fairness it must be said that most of his get were of the thick, smooth order without the length that is in demand to-day. In 1921-22 a young boar, "Oak Lodge Prince 394," No. 73738, was used to follow after the old boar. This boar proved to be just what was needed. He had exceptional length, wonderfully strong bone and vitality in abundance. This boar left an out-



Willow Lodge King—72024— Yorkshire Herd Boar used in the fall of 1922 at the Dominion Experimental Station, Lacombe.

standing lot of females, though his boars were not quite what they might have been. However, he imparted the stretch and vigour which was needed in the herd.

In the summer of 1922, a two-year-old boar was bought from B. Thorlakson, of Markerville, Alberta. This boar has not yet proved himself, but much is hoped of his get. He was a big boar, very smooth, long, of exceptionally good conformation and good strong bone. He had a combination of blood in him of Baring, Bonnie Braes and Paradise breeding which made him a valuable boar in so far as pedigree is concerned. This boar was lost from pneumonia in December, 1922.

As for the Duroc-Jersey boars that have been used since 1920, there have been only two. The aged boar, Senator C No. 16047, bred by William Eyers, of Cochrane, Alta., was a boar of outstanding length for a Duroc-Jersey. He was a great breeder, and left a large number of very fine pigs both boars and sows. The present boar is a spring farrowed boar of a 1922 litter, a very fine youngster, also of great length and good bone. He is, moreover, a better boar as to breed type and conformation than the previous herd boar, Senator C.

The Berkshire herd boar, Tilley Major 6—59760, bought in the fall of 1921, takes his origin mainly from Canlico breeding, going back on his sire's side to Canlico 24'20, in turn sired by that famous boar, Robhood's Champion 2. A young boar bred at this Station is being used as a second herd boar. This young boar is of such excellent type and conformation that it was thought advisable to retain him in the herd. If he breeds as he should, the Berkshires have little to fear for the future.

The immediate predecessor of this boar was bred at this Station. His dam was L.E.S. Lassie and his sire Sunny Brook Rival Heir 2. He was a boar of exceptional length for a Berkshire. He was very compact over the shoulder and of very even width throughout his length. The sire of this boar, Sunny Brook Rival Heir 2, was used in the herd in 1919-20. This boar was from Ames Rival breeding by Ames Rival 148.

PROLIFICACY OF DIFFERENT BREEDS OF SWINE

	Spring Litters			Fall Litters			Total of Spring and Fall Litters			Grand Total
	Spring Litters			Fall Litters			Total of Spring and Fall Litters			
	Yorks.	Duroc-J	Berks.	Yorks.	Duroc-J	Berks.	Yorks.	Duroc-J	Berks.	
Number of litters farrowed in 1922.....	13	13	25	13	10	6	26	23	31	80
Total number of young pigs.....	147	133	179	153	76	59	300	209	288	747
Average number of young pigs per litter.....	11.3	10.2	7.1	11.7	7.6	9.9	11.5	9.08	7.6	9.3
Total number of hairless or semi-hairless pigs farrowed.....	28	.....	4	.....	.....	.....	28	.....	4	32
Average number of hairless or semi-hairless pigs farrowed.....	2.1	.....	0.16	.....	.....	.....	1.07	.....	.12	0.4
Total number of young pigs dead at birth or before weaning.....	52	68	64	80	15	23	132	83	87	302
Average per litter that died.....	4.0	5.2	2.5	6.1	1.5	3.8	5.0	3.6	2.8	3.7
Number of young pigs raised.....	95	65	115	73	61	36	168	126	151	445
Average number of young pigs raised per sow.....	7.3	5.0	4.6	5.6	6.1	6.0	6.4	5.4	4.8	5.5
Percentage of young pigs raised.....	64.6	48.8	64.2	47.7	80.2	61.0	50.0	60.2	63.4	59.4

For the third year in succession the Yorkshires have led in prolificacy, followed by the Durco-Jerseys and Berkshires in that order. Though the Yorkshires have the largest litters this year, they did not raise the highest percentage of the total pigs farrowed. The reason is twofold: The litters in some cases were so large, as many as nineteen in one instance, that the sows could not raise many more than half, and because a number of Yorkshire sows farrowed after October 1 and their pigs suffered a high mortality due to late farrowing. It is seen that, with the spring litters, the Yorkshires lead in numbers farrowed per sow, numbers raised per sow, and percentage of pigs raised, even in face of the complete loss of one litter through hairlessness; 59.4 per cent seems a small percentage of the total pigs farrowed to be raised, but it should be considered that with a total of eighty sows farrowing, the chances for loss are much greater than with a smaller herd. Again, one man cared for all the swine, and it was impossible for him to do justice to all the pigs, particularly in the spring, when as many as eighteen sows farrowed within ten days.

LIVE STOCK EXHIBITS

It is planned to feature one branch of live stock every year at this Station. This year hogs have been featured, and with this end in view, herds were shown at a number of exhibitions. Breeding stock was exhibited at two Class A fairs, Calgary and Edmonton, and at one Class B fair, Red Deer, which followed directly after the Edmonton fair. In breeding classes at all these fairs the Experimental Station stock stood up well against very strong competition in practically all of the classes. At Calgary and Edmonton, one Berkshire, five Duroc-Jerseys and fourteen Yorkshires, with a sow and litter of eleven in addition, were shown. The following prizes were won:—

<i>At Calgary—</i>	<i>At Edmonton—</i>	<i>At Red Deer—</i>
2 Championships	1 Reserve championship	5 First prizes
3 Reserve championships	5 First prizes	4 Second prizes
7 First prizes	2 Second prizes	1 Third prize.
8 Second prizes	3 Third prizes	
4 Third prizes	1 Fourth prize.	
3 Fourth prizes		
1 Fifth prize		
2 Sixth prizes.		

Competition at Edmonton was even keener than at Calgary. As many as twelve or fourteen hogs were entered in some of the classes at Edmonton. No championships were awarded at Red Deer.

At the Calgary Winter Fair in November, seventy-six head of finished market hogs were shown in the bacon and thick-smooth classes, including carload lots of twenty Yorkshires and twenty Berkshires entered in the bacon class, and a carload lot of twenty Duroc-Jerseys entered in the thick, smooth class. The success that attended the breeding classes shown earlier in the year was even greater with the classes of finished hogs shown at this Fat Stock Fair.

A summary of the prizes won is as follows:—

1 Reserve championship (bacon barrow)	3 Third prizes
10 First prizes	4 Fourth prizes
1 Second prize	1 Fifth prize.

The Yorkshires won in every bacon class in which they were shown, including first in the carload lot of select bacon hogs, pen of three select bacon hogs,

and the Dominion Government Special for a pen of five select bacon hogs to be shown alive and dressed. A pen of three Berkshire gilts were placed fourth in a very strong class entered for pen of three select bacon hogs. Durco-Jerseys won the carload lot of twenty thick-smooth hogs.

FEEDING EXPERIMENTS WITH SWINE
FIVE PER CENT VS. TEN PER CENT TANKAGE FOR GROWING HOGS ON PASTURE

		Five per cent tankage	Ten per cent tankage
Number of swine in each lot.....	No.	5	5
Number of days on test.....	Days	85	85
Age of hogs.....	Weeks	9	9
Weight commencing test June 26.....	Lbs.	100	104
Average weight.....	"	20.0	20.8
Weight ending test Sept. 19.....	"	466	483
Average weight Sept. 19.....	"	93.2	96.6
Total gain in 85 days.....	"	366	379
Average gain per hog.....	"	73.2	75.8
Average daily gain per hog.....	"	0.861	0.891
Barley at 40c. a bushel.....	Lbs.	452	452
Oats at 34c. a bushel.....	"	452	452
Shorts at \$15 a ton.....	"	180	180
Tankage at \$60 a ton.....	"	54	108
Total cost of feed.....	\$	11.25	12.87
Cost per pound of gain.....	cts.	3.07	3.39
Meal required per pound of gain.....	Lbs.	3.10	3.14
Average cost of meal per 100 pounds.....	\$	0.99	1.08
Value of meal per 100 pounds when sold as pork at \$9.40 per hundred.....	\$	3.02	2.98

The value of tankage for the growing hog is an established fact, but the amount which it pays to feed is still debatable. Tankage equal to 10 per cent of the total grain ration has usually been recommended. However, tankage is an expensive feed, and even when feeding 10 per cent it mounts up into money quickly. The above experiment was tried to find out if a lesser percentage of tankage for young pigs in pasture would be sufficient to supply the required mineral matter for growing pigs.

Five pigs were fed in each group. They were very evenly matched in size, age, breeding and conformation. Two Yorkshires, two Berkshires and one Duroc-Jersey were put into each group, and one group was fed 5 per cent of tankage, the other group 10 per cent of tankage. For the first six weeks the hogs were fed equal parts of shorts, oat chop and barley chop with tankage, and after that the shorts was eliminated, and they were fed equal parts of oat and barley chop with tankage. They always had a supply of water. The pasture was a mixture of oats and rye, spring seeded, and there was always a very fair supply of good pasture. With the exception of tankage, the meal ration was identically the same for both lots.

The hogs fed 10 per cent tankage gained 13 pounds, or an average of 2.6 pounds each in eighty-five days more than the hogs fed 5 per cent of tankage. It therefore showed a slight advantage, but when cost is considered the 10 per cent tankage fed hogs each cost \$1.62 more, which means that the extra 13 pounds cost 14 cents each. The additional cost was more than the gains warranted; therefore, the conclusion this experiment warrants is that 5 per cent of tankage is more economical than 10 per cent of tankage for growing hogs on pasture.

TANKAGE VS OILCAKE MEAL FOR WEANED HOGS

	Boars, self fed		Sows, slop fed		Combined	
	Lot 1 Oilcake	Lot 2 Tankage	Lot 3 Oilcake	Lot 4 Tankage	Oilcake	Tankage
Number of swine in each lot..... No.	5	5	5	5	10	10
Number of days on test..... Dys.	85	85	85	85	85	85
Average age of hogs..... Weeks	9	9	9	9	9	9
Weight June 26, commencing test. Lbs.	123	137	118	112	241	249
Average weight..... "	24.6	27.4	23.6	22.4	24.1	24.9
Weight Sept. 19, ending test..... "	407	473	451	446	858	919
Average weight..... "	81.4	94.6	90.2	89.2	85.8	91.9
Total gain in 85 days..... "	284	336	333	334	617	667
Average gain per hog..... "	56.8	67.2	66.6	66.8	61.7	66.7
Average daily gain..... "	0.668	0.790	0.783	0.785	0.725	0.784
FEED CONSUMED						
Barley at 40c. a bushel..... Lbs.	555	555	452	452	1,007	1,007
Oats at 34c. a bushel..... "	555	555	452	452	1,007	1,007
Shorts at \$15 a ton..... "	150	150	180	180	330	330
Oilcake meal at \$50 a ton..... "	140		108		248	
Tankage at \$60 a ton..... "		140		108		248
Total cost of feed..... \$	14.75	15.45	12.43	12.95	27.18	28.42
Cost per pound of gain..... cts.	5.19	4.59	3.73	3.87	4.40	4.26
Average value of meal per 100 pounds..... \$	1.05	1.10	1.04	1.08	1.045	1.09
Value of meal per 100 pounds when sold as pork worth \$9.40 per hundred..... \$	1.90	2.25	2.62	2.63	2.25	2.42

In this experiment four lots of five hogs each were used, namely, two lots of boars which were fed on self feeders, and two lots of sows which were fed slop three times daily. The meal ration fed was equal parts shorts, oat chop and barley chop for the first twenty-eight days. This was then changed to equal parts oat and barley chop. Ten per cent of the meal ration of either oilcake meal or tankage was fed throughout the test. Water was constantly available from a trough in the feed lot. The pasture was a mixture of rye and oats, spring seeded, but for the last few weeks of the test there was very little pasture for the two lots fed oilcake meal. Lot No. 1 had no pasture for at least two weeks. The hogs were very evenly divided, the boars consisting of three Berkshires, one Duroc-Jersey and one Yorkshire in each group, and the sows of three Berkshires and two Yorkshires in each group.

The results are not very conclusive. While the results both from point of gains made and costs are slightly in favour of tankage, the hogs fed oilcake meal were at a disadvantage. Their pasture was not as good, and one Yorkshire in each lot got very badly sun scalded. They became blistered and hid under the cabins, escaping notice for several days. When found they were in a bad condition. Even the ears were crisp, and later came off close to the head. Had conditions been equal, the hogs fed oilcake meal might have done better. The difference is so small that it is not very definite as to which is the better, and more experimental work will have to be carried on along these lines. Were these hogs not fed on pasture, the chances are that the results would be more striking.

The Yorkshires in this experiment which became blistered with the sun are a good example of the bad effect of severe sunburn. They were turned outside after being housed for at least eight weeks without having been outside at all. The change all at once was too severe. Had they been put out a few hours a day for a time, and given one or two applications of oil, they would

not have become blistered. When Yorkshires become hardened to climatic conditions gradually, and where they have shade, there is little difficulty from sun scalding.

COMPARISON OF CROSSBRED HOGS USING A LONG YORKSHIRE BOAR ON DUROC-JERSEY AND BERKSHIRE SOWS

	York X Duroc J	York X Berk.
Number of swine in each lot.....	No. 10	10
Number of days on test.....	Days 85	85
Average age of hogs.....	Weeks 10	7
Initial weight June 26.....	Lbs. 357	210
Average weight.....	" 35.7	21.0
Final weight Sept. 19.....	" 1,386	813
Average weight Sept. 19.....	" 138.6	81.3
Total gain in 85 days.....	" 1,029	603
Average gain per hog.....	" 102.9	60.3
Average daily gain.....	" 1.21	0.709
FEED CONSUMED		
Barley at 40c. a bushel.....	" 1,880	1,415
Oats at 34c. a bushel.....	" 1,350	1,415
Shorts at \$15 a ton.....	" 300	150
Tankage at \$60 a ton.....	" 180	100
Total cost of feed.....	\$ 36.56	30.06
Cost per pound of gain.....	cts. 3.55	4.98
Meal required per pound of gain.....	Lbs. 3.57	5.10
Average value of meal per 100 pounds.....	\$ 0.99	0.97
Value of meal per 100 pounds when sold as pork at \$9.40 per hundred.....	\$ 2.82	1.84

In this experiment ten hogs of each cross were used. They were placed on self-feeders on oat and rye pasture with two small cabins for shade and shelter. Water was supplied constantly in troughs. The Yorkshire-Duroc-Jersey cross-bred hogs had quite a decided advantage in age, being two weeks older and averaging 14.7 pounds heavier than the Yorkshire-Berkshire cross. They were fed the same meal mixture of equal parts shorts, oat chop and barley chop with about 5 per cent of tankage for the first six weeks. The shorts was then taken off and they were fed the same without the shorts until the last three weeks, when the Yorkshire-Duroc-Jersey hogs were fed barley with 3 per cent tankage. They were growing very fast, and were put on barley to finish them off.

The Yorkshire-Duroc-Jersey hogs had the following advantages:—

1. They were two weeks older to start with.
2. They had a more fattening ration for the last three weeks of the test.
3. One Yorkshire-Berkshire hog took sick and died, and had to be replaced.
4. The Yorkshire-Berkshire hogs were troubled with sun-scald to a greater extent than the Yorkshire-Duroc-Jerseys. The latter were not hampered by this trouble at all.

The results of this experiment are very decidedly in favour of the Yorkshire-Duroc-Jersey cross, and rightly so. Even though they had the above advantages, they outstripped the Yorkshire-Berkshire cross decisively in point of gains made, in cost per pound of gain, and amount of meal required. It is only fair to report that the Yorkshire-Duroc-Jersey cross-bred hogs were the earliest maturing hogs fed this season. They, however, were thick, smooth hogs with the exception of possibly two of the ten, which would grade as select bacon. They matured to the 200-pound weight at five months and ten days, which is exceptionally good. The Yorkshire-Berkshire cross-bred hogs were three weeks longer in maturing. They made slower gains and required more meal per pound of gain, costing 1.43 cents more per pound. However, a larger percentage graded as select bacon. A Yorkshire-Berkshire cross-bred sow won

first in the class of select bacon sow over six months of age at the Calgary Winter Fair, and also Reserve Championship select bacon hog. A barrow of the same breeding won the premier honours in the bacon barrow class and also the dressed carcass competition with a dressing percentage of 75.78. The live weight was 190 pounds and the dressed weight 144 pounds.

A fair conclusion from this experiment is that Yorkshire-Duroc-Jersey cross-bred hogs are larger, earlier to mature and more economical. They are excellent grazers, and are not subject to sun scalding to any appreciable extent. The Yorkshire-Berkshire cross-breeds, on the other hand, are a more compact type of hog. They are smaller and slower-growing hogs, without the same grazing ability, but, nevertheless, a very useful type of hog. They reach 200 pounds weight at about six months of age. They are more subject to sun-scalding because their skin is thinner. Both these crosses give practically a pure white hog, which is more subject to scalding than a coloured hog, but the thicker skin of the Duroc breeding makes them less subject to this trouble. The Yorkshire-Berkshire cross gives a higher percentage of bacon hogs and the carcasses are very choice.

PEAS VS. BARLEY AS A FATTENING MEAL FOR HOGS

	Lot 1 oats and peas	Lot 2 oats and barley
Number of hogs in each lot.....	19	19
Number of days on test.....	26	26
Weight at commencement of test.....	1,623	1,681
Average weight at commencement of test.....	85.4	88.4
Weight at end of test.....	2,393	2,308
Average weight at end of test.....	125.9	121.4
Total gain in 26 days.....	770	627
Average gain per hog.....	40.5	33.0
Average daily gain per hog.....	1.56	1.26
FEED CONSUMED		
Oats at 34c. a bushel..... Lbs.	855	800
Barley at 40c. a bushel..... "		800
Split peas at 75c. a bushel..... "	855	
Whey at 10c. a hundred.....	4,550	4,550
COST OF FEED CONSUMED..... \$	23.75	19.21
Cost per pound of gain..... cts.	3.08	3.06
Value of meal per hundred when sold as pork at 9c.....	4.05	3.52

This does not take the whey into consideration.

In the above experiment, 19 hogs were used in each lot, consisting of nine Yorkshires, nine Berkshires and one Duroc-Jersey. They were fed on self-feeders, and in addition to the meal ration of equal parts of oats and peas and equal parts of oats and barley, they were fed whey at the rate of approximately 9 pounds per head per day. They also had water at all times available. The hogs ate 110 pounds more of the oats and peas and gained 43 pounds more than the hogs fed oats and barley. From the slight difference in gains, it would appear that peas are a better fattening meal than barley; that is, when fed along with oats. The hogs ate more of the pea ration and made better gains on it.

From the standpoint of cost per pound of gain, there is very little difference, though the peas are charged at 75 cents per bushel and barley at 40 cents per bushel. What slight advantage there is lies in favour of the barley. While peas have given better results, it would only pay to feed peas where they are a waste product. It would not pay in this district to grow peas for a commercial hog feed because barley can be grown much more cheaply and gives a much higher yield per acre. The peas used in this experiment were split peas which could not be used for seed, and were charged at a nominal figure of 75 cents per bushel.

SWINE BREED TEST

YORKSHIRES VS. BERKSHIRES VS. DUROC-JERSEYS

	Sows			Boars			Sows and Boars Combined		
	Yorks.	Berks.	D. Jerseys	Yorks.	Berks.	D. Jerseys	Yorks.	Berks.	D. Jerseys
No. of swine on test.....	20	20	20	20	20	15	40	40	35
Total number of days on test.....	84	84	84	84	84	84	84	84	84
Initial weight June 15.....	698	521	703	573	568	581	1,271	1,089	1,284
Average weight June 15.....	34.9	26.0	35.1	28.6	28.4	38.7	31.7	27.2	36.9
Number of swine completing the test.....	20	20	17	20	20	11	40	40	28
Finished weight Sept. 8.....	2,374	1,891	1,949	2,460	2,399	1,602	4,834	4,290	3,551
Average weight Sept. 8.....	118.7	94.5	114.6	123.0	119.9	145.6	120.8	107.2	130.1
Certain hogs had to be taken off test, and it is necessary to reduce the final results to a basis of—									
on test.....	1,680	1,680	1,616	1,680	1,680	1,172	3,360	3,360	2,788
Total weight including hogs taken off test before finishing.....	2,374	1,891	2,206	2,460	2,399	2,108	4,834	4,290	4,314
Total gain including hogs taken off test before finishing.....	1,676	1,370	1,503	1,887	1,831	1,527	3,563	3,201	3,050
Average gain per hog per day.....	.997	.815	.930	1.123	1.089	1.303	1.060	.952	1.116
FEED CONSUMED									
Tankage at \$60 a ton.....	266	246	266	320	310	310	586	556	576
Shorts at \$15 a ton.....	720	566	710	510	480	480	1,230	1,046	1,190
Barley at 40c. a bushel.....	2,120	1,806	2,005	1,905	2,000	1,775	4,025	3,806	3,780
Oats at 34c. a bushel.....	2,100	1,806	2,005	1,905	2,000	1,775	4,025	3,806	3,780
Buttermilk at 20c. per hundred pounds.....	2,100	2,100	2,100	2,100	2,100	1,800	4,200	4,200	3,900
Cost of feed consumed.....	\$ 56.40	\$ 48.93	\$ 54.25	\$ 52.54	\$ 53.76	\$ 49.04	\$ 103.29	\$ 102.69	\$ 103.29
Meal per pound of gain.....	3.34	3.57	3.60	2.78	2.93	3.21	3.06	3.25	3.40
Meal per pound of gain mixed approximately—									
Tankage, 5 p.c.; shorts, 15 p.c.; barley, 40 p.c., and oats, 40 p.c. when fed with buttermilk for first six weeks.....	3.12	3.23	3.31	2.46	2.61	2.84	2.79	2.92	3.07
Average cost of meal per 100 pounds.....	1.08	1.10	1.08	1.13	1.12	1.13	1.10	1.11	1.10
Value of meal per 100 pounds when sold as pork at \$9.40 per hundred (omitting buttermilk).....	2.95	2.91	2.83	3.82	3.59	3.41	3.39	3.26	3.10

During past years when hog grading has been talked of, and now that it is in force, there has been a great deal of controversy between the breeders of the different breeds of pure-bred hogs as to which hog was the best to breed and whether that hog would be the most economical hog, even if the premium of ten per cent were received. With this in view, a breed test was put on with the three breeds at this Station; namely, Yorkshire, Berkshire and Duroc-Jersey. Of these breeds the Berkshire has been the most popular in Alberta for some years. In the other two breeds are the two extremes, the Yorkshire approaching most closely to the bacon type, and the Duroc-Jersey the straight lard type.

In this experiment the best hogs of each breed were selected, and the pigs selected were all very excellent representatives of their breed. Twenty sows of each breed were taken and twenty boars of each breed with the exception of Duroc-Jerseys of which there were only fifteen large enough to be put on test at that time. The sows were hand fed three times daily, what they would clean up at the time they were fed. They were on rye and oat pasture seeded side by side in lots of the same size, and they had small cabins for shelter. The boars were fed on self-feeders on alfalfa pasture, also with small cabins for shelter. Water was always available, and in hot weather it was necessary to fill the troughs at least three times a day. The meal ration for the first six weeks consisted of equal parts of shorts, oat-chop and barley-chop. After that time the shorts was omitted, and they were fed equal parts of oat-chop and barley-chop. Approximately ten per cent of tankage was fed throughout the eighty-four days.

The Duroc-Jerseys averaged ten days older than the other breeds. With the exception of this, the different breeds had equal chances. In point of average daily gains for sows, the Yorkshire sows lead with a daily gain of .997, almost a pound a day, the Duroc-Jerseys came second with .930 pound, and the Berkshire sows third with .815 pound. The differences appear to be small, but taken over an entire feeding period are considerable. Of the boars, the Duroc-Jerseys led with an average daily gain of 1.30 pound per day. The Yorkshire boars were next with a gain of 1.123 pound per day, and the Berkshires last with a gain of 1.089 pound per day. Taking the average for both sows and boars, the Duroc-Jerseys led by a slight difference over the Yorkshires with the Berkshires in third position. Both the Duroc-Jerseys and Yorkshires averaged a gain of over a pound a day throughout the feeding test, and the Berkshires slightly under a pound a day. The Duroc-Jerseys were older hogs, and would naturally gain faster than younger pigs would. Had they been of the same age as the Yorkshires, their position might have been reversed.

From the standpoint of economy, which is the important factor, both sows and boars are consistent in that, in both cases, the Yorkshires led followed by the Berkshires, with the Duroc-Jerseys last. The fact that this order is taken with both the sows and boars is significant. Averaging both sows and boars, the Yorkshires cost 3.06 cents per pound of gain, the Berkshires 3.25 cents and the Duroc-Jerseys 3.40 cents (feed cost). At the time these hogs were taken off test they were about 4½ months old. Unfortunately, these were breeding stock and the test could not be carried on until the hogs were slaughtered. The next annual report will contain the results of an experiment in which hogs of each breed will be fed from weaning to killing, and will include the grades of the carcasses as well.

SUMMARY OF BREED COMPARISONS

The following comparisons deal not with breed type but rather with the feeding abilities, economy of the breeds and comparison of results when slaughtered. Of the three breeds at this Station, namely, Yorkshires, Berkshires and

Duroc-Jerseys, the Berkshires have been the most popular breed in this province. The farmer has preferred a coloured hog capable of economical gain. The Berkshire met these two requirements admirably. Because of their dark colour, they do not sun-scald. They are easy keepers. They always fill the eye and do not suffer appreciably if they miss a few meals. They are always fit to kill. On the other hand of the three breeds they are slowest to mature. They stand forced feeding badly, and are easily overfed, becoming thick and short if fed too heavily. For indoor feeding they demand light feeding and dry quarters; otherwise crippling is certain. For outdoor feeding they are well adapted. They are good grazers and are not given to much unnecessary running about. Mature brood sows winter in excellent condition on $3\frac{1}{2}$ to 4 pounds of meal daily. The lengthy type of Berkshire has been bred at this Station for some years, and now the herd is practically entirely of this type. If fed carefully and not overfed at the finish, quite a proportion meet the requirements laid down for select bacon hogs. Of twenty-seven shown at the Calgary Winter Fair eight graded as select bacon hogs, and a pen of three were placed fourth in a very strong class of select bacon hogs shown in pens of three.

The Duroc-Jerseys are quite different in many respects. They are a larger, heavier breed, which mature very early. They have been very popular in this province because of their colour, hardiness and rustling or foraging ability, and these points have not been over exploited. They are the best rustlers of the three breeds kept. With regard to rustling, an excellent comparison was brought out this summer where the three groups of twenty sows from each breed were fed on oat and rye pasture side by side. At one time the Duroc-Jerseys had their pasture cropped close to the ground fully half way down the paddock, the Berkshires in the lot adjoining had theirs eaten about half as far and cropped quite closely, while the Yorkshires next in order appeared to have very little eaten. What was eaten was taken out of the pasture here and there all over it, showing that the Yorkshire was of a more restless nature and spent a greater amount of energy in investigation. Duroc-Jerseys are the earliest to mature, they also have that tendency to keep in a finished condition throughout their growth, and when put in the feed lot they fatten very quickly. They will mature in five and a half months to the 210-pound weight. Though they are ready for market early, they require heavy feeding, and are not as economical feeders as either the Yorkshires or Berkshires, requiring more meal per pound of gain. They have plenty of bone and stand up well under forced or pen feeding, very few becoming stunted or crippled. They are coarse boned, coarse haired, thick skinned hogs, which do not dress out into very choice carcasses. Of twenty-one hogs exhibited at the Calgary Winter Fair, not one graded as a select bacon hog, and among the Duroc-Jerseys fed at this Station this year, not one would fill the requirements of the ideal bacon hog.

The Yorkshires have been an unpopular breed among Western farmers because the Yorkshire hog apparently looks hungry and lean when growing, whether such is actually the case or not. Again, if not handled properly and quietly, a Yorkshire will develop into a renegade and cause trouble as well as worry. Lastly and most important, the Yorkshire is a white hog and will sun-scald if exposed to the sun and wind. This, however, is easily avoided by a few applications of oil to the skin and ears when the pig is young and until it becomes hardened to the sun and wind. Apart from this, which is easily guarded against, the Yorkshire belies his appearance. He is a very fast growing hog and in the first few months of his growth develops a large frame. There are Yorkshires of unduly varying types varying from that of extreme length and narrowness to that which describes the ideal thick-smooth hog. The Yorkshires fed at this Station this year went to neither extreme. They had length but, with

that, they were easy hogs to finish. These Yorkshires were the most economical hogs fed this year. They did not make as big daily gains as the Duroc-Jerseys, but they took less meal per pound of gain than the other two breeds. As a grazer the Yorkshire does not excel. He makes use, however, of every pound of meal given him, and grows very quickly, making the 210-pound weight in less than six months if no setbacks are received. For indoor or winter feeding, the Yorkshire is particularly adapted because he has the frame and strength of bone to carry him through a feeding period where he does not get exercise or much mineral matter. They stand more feed and gain much more rapidly than the other breeds under close feeding conditions. A mature brood sow required 5 pounds of meal daily to carry her over winter in good condition.

A good Yorkshire furnishes the carcass that the packer wants. It has the length of side and quality required, and has the advantage of being a white carcass. Of twenty-nine Yorkshires shown at the Calgary Winter Fair this year, every one graded a select bacon hog, which is an achievement to be proud of in view of the severity of the requirements laid down for the ideal select bacon hog.

SUMMER PASTURE FOR HOGS

Hog pastures play an important rôle in the Alberta hog industry. For central Alberta, the rye and oat pasture is proving to be the most reliable year-in and year-out pasture. Two bushels of oats mixed with one and a half bushels of fall rye, spring seeded, has proven the most satisfactory and particularly during dry seasons. The rate of seeding should vary from 3 to 4 bushels per acre, with the lighter seeding in dry years. Fall seeding of rye is not recommended because it is liable to winter kill, and where it does come through the winter, it gives a rapid growth early in the spring before the spring litters are old enough to keep it eaten off. It heads out early and, once in this stage, the hogs eat very little of it. Three lots fall seeded at this Station headed out, and had to be cut with the mower toward the end of July, and there was very little growth afterwards. By the middle of August these pastures were dead, because there were not enough hogs to keep them eaten back in the spring. Fall rye and oats can be seeded as soon as the ground is ready, and will give a good healthy growth early enough for the pigs. The oats grow more quickly and can be pastured when about 6 inches high. By the time the oats are eaten off, the rye will have formed a good, vigorous mat which, if not pastured too heavily, will give pasture until after freeze-up in November. In the past dry summer, the best pastures were seeded early in June or about ten days before the first good rain on June 19. The pasture seeded at this time gave the best growth late into the fall. Rye without oats is practically as good, but takes longer to get a start.

Rape takes second place as an annual pasture for hogs. Seeding at the rate of 3 to 4 pounds per acre in rows 30 inches apart is most satisfactory, as it gives an opportunity for controlling weeds and the hogs do not tramp it down as they do when it is seeded broadcast. Rape gives a heavier growth per acre, but is supposed to be objectionable from the standpoint of palatability. This objection has not been recorded at this Station. Hogs were turned in when it was 8 inches or 10 inches high, and they took to it at once and with relish. The rape never got beyond the hogs, and it gave a good pasture late into the fall.

Alfalfa is undoubtedly the best pasture for hogs. It has the greatest food value and the hogs prefer it. It is, however, more difficult to obtain a good stand, and it is not a good annual pasture. Alfalfa gives better results when seeded in drills 30 inches apart at the rate of 3 to 4 pounds per acre. By seed-

ing in drills an opportunity is given to control weeds which is more important with alfalfa than with rape, as the former covers at least two seasons. Alfalfa can be seeded in the spring and will give sufficient growth to be pastured that same fall. It should not be pastured too severely, as this would lessen its chance to carry through the winter. If it is not required for fall pasture, the land can be summerfallowed in the early part of the season, and the alfalfa seeded before the 15th of August. If a good, healthy stand is obtained, the alfalfa will stand pasturing throughout the second summer. It is not advisable to continue longer than two seasons because of the weed growth.

Sweet clover is handled in a similar manner to alfalfa, and is best when seeded in drills at the rate of 3 to 4 pounds per acre. Sweet clover gives a ranker growth than alfalfa, and will stand more severe pasturing. On the other hand, it is unpalatable, and not relished by hogs. If it gets beyond a foot high, they do not care for it and dig up the roots rather than eat the sweet clover.

Oats, barley and wheat are sometimes used for pasture, and rank in the above order as pasture crops. Oats are palatable, give a good growth and stand more pasturing than barley or wheat. Barley grows early to start with, but is not as palatable as oats and kills out more easily, being a shallower-rooted plant. Wheat grows slowly, is not as palatable as oats, and is more expensive to seed.

FALL VS. SPRING LITTERS

PART I.—FALL LITTERS OF 1921

Four brood sows on pasture June, July and August at 50c. per head.....	\$	2 00
Four brood sows fed for two weeks previous to farrowing, 5 pounds of meal each per day at 1 cent per pound.....	\$	2 80
Four brood sows fed for 8 weeks after farrowing, 8 pounds of meal per day each at 1 cent a pound.....	\$	17 92
Service fees \$1 each.....	\$	4 00
Cost per brood sow for fall litters.....	\$	6 68
Feed consumed by 19 young pigs from Nov. 15 to April 4—		
Shorts at \$14 a ton.....	Lbs.	1,915
Oilcake meal at \$50 a ton.....	"	750
Barley at 80c. per hundred.....	"	3,070
Oats at \$1 per hundred.....	"	2,460
Green feed at \$10 a ton.....	"	600
Alfalfa at \$21 a ton.....	"	200
Buttermilk at 17c. per hundred.....	"	15,000
Total cost of feed for young pigs.....	\$	111 91
Total cost including expenses of 4 sows.....	\$	138 63
Total weight of 19 select hogs April 4.....	Lbs.	3,134
Value sold as pork at \$11 a hundred.....	\$	345 73
Profit from four litters of 19 hogs.....	\$	207 10
Profit per hog raised.....	\$	10 90
Profit per brood sow.....	\$	51 77
Feed cost to produce 100 pounds of pork.....	\$	4 41
Meal consumed by sows and pigs per pound of pork produced.....	Lbs.	3.27

Four fall litters of 1921 were used in this experiment. These pigs were put into two small cabins November 15 in quite severe weather. The cabins were banked round with about two feet of straw. They were well bedded inside and had sacking hanging over the doors to prevent winds from blowing in. These hogs were fed slop three times daily, and were watered twice a day through-out the winter. They were fed oat greenfeed and alfalfa, as much as they would clean up. The meal ration consisted of equal parts of shorts, oats and barley, with about 15 per cent of oilcake meal for the first fourteen weeks, then the shorts and oilcake meal were taken off, and they got equal parts of oats and barley for two weeks, and for the last two weeks they were fed straight barley. Housed and fed in this manner, these hogs were a very thrifty lot and suffered very little from cold. Being fed slop they were always dirty and the

cabins were hard to keep clean. One sow had her ears frozen off, but apart from this they wintered in good condition. This lot consisted of a litter of three pure-bred Yorkshires, a litter of six cross-bred Yorkshire and Duroc-Jersey hogs, and 2 litters of pure-bred Duroc-Jerseys, ten altogether, making a total of 19 hogs.

FALL VS. SPRING LITTERS

PART 2.—SPRING LITTERS OF 1922

Cost of carrying brood sow from Nov. 1 to April 16. Five pounds of meal daily at 1 cent a pound.....	\$	8 35
Brood sow fed 8 weeks after farrowing 8 pounds meal per day at 1 cent a pound.....	\$	4 48
Service fee.....	\$	1 00
Feed consumed by 10 young pigs from date of weaning June 15 to date of selling Sept. 30—		
Barley at 80c. a hundred.....	Lbs.	2,710
Oats at \$1 a hundred.....		1,400
Shorts at \$14 a ton.....	\$	300
Tankage at \$60 a ton.....	\$	180
Whey at 10c. a hundred.....	\$	2,000
Pasture at \$10 an acre.....	Acres	↓
Total cost of feed for 10 pigs.....	\$	47 18
Total cost including expenses of sows.....	\$	16 01
Total weight of 10 pigs when sold Sept. 30.....	Lbs.	1,825
Value when sold as pork at \$9.40 per hundred.....	\$	171 55
Total profit from litter of 10 pigs.....	\$	110 54
Profit per hog raised.....	\$	11 05
Profit for 1 brood sow.....	\$	110 54
Feed cost to produce 100 pounds of pork.....	\$	3 34
Meal consumed by sows and pigs per pound of pork produced.....	Lbs.	3.21

The ten pigs used in this experiment were a complete litter out of a Duroc-Jersey sow and a Yorkshire boar. The sow was an extra good mother, and all the pigs were strong and healthy when weaned at a little over eight weeks of age. A complete record of this litter is given in the above table from date of farrowing, April 16, to date shipped to market, September 30, when the litter was five and a half months old. They were some of the very best hogs turned off to market this season, and have the advantage in this respect in comparison with the fall litters of 1921. These pigs were weaned June 22 and fed in a small pasture lot on rye and oat pasture. They were fed from a self-feeder and had water twice daily, along with whey from time to time, when available. They had a small cabin in the lot for shelter. They ran in this lot until September 19, when they were moved into a pen and forced for market on barley. The meal ration consisted of shorts, oats and barley in equal parts with 10 per cent of tankage for the first six weeks, then equal parts of oats and barley with tankage 10 per cent for four weeks, and for the remaining four weeks straight barley well ground.

The comparison does not bring out any very great differences but the fall litters were not quite as profitable as the spring litters. This spring litter was an exceptionally good one. They matured very early and went to market fully a month earlier than the fall litter. Again, they were early enough to catch the late summer high prices, and the price of \$9.40 per hundred was higher than subsequent prices in the year of 1922. This spring litter, therefore, did much better than the average of spring litters this year. It gave a greater profit per pig raised of fifteen cents which is a very small advantage. One hundred pounds of gain cost \$3.34 as compared with \$4.41 for the fall litters, and it required .06 pounds of meal less to produce 1 pound of pork with the spring litter. This would indicate that under certain conditions fall litters may be made practically as profitable as spring litters. In this connection, it should be stated that fall pigs should be farrowed before September 15; otherwise, they are not old enough to withstand the cold weather.

Spring litters would have to be farrowed in late March or early April, and this would give the pigs time to be ready for market before prices dropped in the fall. Early spring litters and early fall litters catch the market best. By raising two litters a year, the income from a brood sow is doubled. Profitable work is provided for winter when there is the most spare time and, lastly, hairlessness is not found in fall litters.

The ability to raise fall pigs is the final test of the successful hog feeder. Too late farrowing in the fall, over-crowding and over-feeding, damp quarters and lack of exercise, are the usual causes of failure with fall litters. This particular phase of swine rearing should be thoroughly understood and experimented with in a small way, before being attempted on any large scale.

FIELD HUSBANDRY

The Lacombe district has always been considered one of the surest crop districts in the West, but 1922 came the nearest to being a crop failure of any year in the memory of the oldest inhabitants. Although some fair crops were harvested, yields averaged even lower than were expected.

The yields obtained during the last few years have been so low that farmers are turning more and more to the experiments for advice concerning their soil problems. Unfortunately, practically all information on cultural methods in central Alberta has been compiled during years with a more liberal rainfall, and these data were of limited value to farmers during the recent abnormally dry years, when climatic conditions were such that farming methods that give profitable crops in normal years meant crop failure; hence, many farmers have been very discouraged and are open to any suggestions along cultural lines that may mean an increase in the crop yields.

CROP YIELDS

The yields of the different field crops obtained in 1922 were very disappointing. Hay was a failure, while early pasture, both from tame and cultivated grasses, was practically nil. August showers stimulated a second growth in the stubble which provided abundant fall pasture, and relieved a very serious feed and pasture situation. Grain graded high, but the yields were lower than prospects indicated and are the lowest on record at this Station. One field of 37.81 acres yielded 6.6 bushels barley per acre; oats yielded 13.6, 26.4 and 35.3 bushels per acre, while wheat gave returns of 22.3, 20, 23.7 and 19 bushels per acre. Corn yielded at the rate of slightly over 10 tons on one field and barely 5 tons on another field. Sunflowers gave 11 tons 561 pounds per acre green weight. Greenfeed produced an estimated yield of 1.8 tons per acre. Yields for the surrounding districts have been estimated at: wheat 12, oats 23, and barley 16 bushels per acre. The yields of the forage crops produced at the Station are representative of the district.

ENSILAGE CROPS

COMPARISON OF ENSILAGE CROPS

In 1922, 18 acres of sunflowers, 10 acres of corn, and 70 acres of greenfeed, oats and peas and oats, were grown. In 1921 the sunflowers were put into the silo immediately after cutting. The long green bundles were very heavy to handle, and the juices ran from the silo for over three weeks. This year the

sunflowers were much better matured and also the bundles were allowed to lie for several days after cutting. One load of sheaves was weighed when cut, and then spread out on the ground and allowed to lie for eight days and again weighed. The shrinkage on this load was over 50 per cent, and the shrinkage on the whole field was probably 30 per cent and there was still sufficient moisture to run from the silo and to make first class, moist ensilage. The wilting of the sunflowers saves the handling and hauling of many tons of surplus moisture, and also much more feed can be put into the silo at cutting time. Another method which will make use of this surplus moisture and make perhaps a better silage than sunflowers alone is to cut into the silo one load of almost matured oats to every three or four loads of sunflowers.



Greenfeed, the standard fodder of the West.

The 10 acres of corn was produced on two separate fields. One field of 3.5 acres produced slightly over 10 tons per acre while the larger field produced barely 5 tons per acre. The difference in yield on the two fields was due to the difference in soil preparation. The field in Rotation "K" that produced the heavier yield was sod ploughed immediately after harvest the previous year, and kept well cultivated the balance of the season. This treatment usually gives excellent results for any hoed crop. In the second field, corn was used as a catch crop where seeding had not taken. The stubble was ploughed on May 15th and the corn seeded on the 24th. Owing to the lack of moisture in the soil and there being no precipitation for some time after seeding, the corn made a very uneven germination and slow growth, and the resulting crop was very light.

The oats for silage were grown on a number of blocks and angles around the experimental fields. It was impossible to take yields from these that were representative of field conditions. However, a 70-acre field of greenfeed produced an estimated yield of 125 tons of oat bundles.

As the results of the chemical analysis of silages produced from 1922 grown crops are not yet available, the analyses of the three silages produced from the 1921 grown crops are presented in the following table:—

SUNFLOWER SILAGE

Greenish brown, fairly fine, mixture of stem and leaf, rather pleasant aromatic odour, sound and in good condition:—

	As received	Water free
Moisture.....	77.84	.....
Crude protein.....	2.64	11.95
“ fat.....	0.34	1.57
Carbohydrates.....	10.63	47.94
Fibre.....	5.33	24.96
Ash.....	3.01	13.58
	<u>100.00</u>	<u>100.00</u>
Acidity.....	2.38	

OAT SILAGE

Greenish brown, pleasant odour, kernels fairly well filled, sound and in good condition:—

Moisture.....	68.75	.....
Crude protein.....	3.18	10.20
“ fat.....	0.87	2.78
Carbohydrates.....	14.09	45.09
Fibre.....	10.74	34.36
Ash.....	2.37	7.57
	<u>100.00</u>	<u>100.00</u>
Acidity.....	2.74	

CORN SILAGE

Rather light in colour, finely cut, consisting essentially of leaf and stalk, with traces of cob only; odour, mild.

Moisture.....	78.65	.....
Crude protein.....	2.63	12.30
“ fat.....	0.29	1.33
Carbohydrates.....	9.82	46.83
Fibre.....	6.81	31.86
Ash.....	1.80	8.48
	<u>100.00</u>	<u>100.00</u>
Acidity.....	2.68	

This sample appears to be slightly higher in water content than silage from corn which has reached the glazing stage before cutting. It has an average protein content and its percentage of fibre is in fair accord with good corn silage. While not equal to the best samples from sufficiently matured corn, it undoubtedly may be regarded as of good quality, in respect both to composition and preservation.

The above analysis and comments were made under the supervision of the Dominion Chemist. Further data on the quality of silages produced at the different Farms and Stations of the Experimental Farm System is given in the report of the Dominion Chemist for 1921.

CROP ROTATIONS

COMPARISON OF DIFFERENT CROP ROTATIONS

These rotations were started in 1914 and have reached the point where some valuable information may be drawn from the data compiled. The following are the rotations being compared at this Station:—

ROTATION "L" OR MAIN FARM ROTATION

First year.—Hay.

Second year.—Pasture, manure, 12 tons per acre.

Third year.—Pasture. Broken in July 6 inches deep and cultivated for balance of season.

Fourth year.—Oats, or oats and peas for silage.

Fifth year.—Oats.

Sixth year.—Barley seeded down with different grass mixtures.

This rotation covers approximately 240 acres of land, and has a distinct advantage for localities where the precipitation is such that too heavy a growth of straw results from summer-fallowing. With plenty of available moisture, the fall cultivation given with the summer-ploughed sod is sufficient to produce an excellent crop without rendering so much plant food available that lodging in the succeeding crop is a serious consideration. However, this rotation has produced very unsatisfactory results in the past dry years. The chief objection has been that it was impossible to obtain good stands of grass with this rotation during the dry years, and it has been necessary to reseed these fields with oats for greenfeed and pasture which caused additional work and expense. The returns from this rotation have steadily decreased since 1919 until 1922, when it returned a loss of \$6.73 per acre. This clearly indicated that this rotation is not suitable for districts with a limited precipitation.

ROTATION "K"

First year.—Hoed crop.

Second year.—Wheat.

Third year.—Barley seeded down.

Fourth year.—Hay, manure 12 tons per acre.

Fifth year.—Pasture.

Sixth year.—Pasture. Broken in July 6 inches deep and cultivated for balance of season.

This rotation produced an average profit of \$4.54 per acre for the past eight years, and a profit of \$1.59 per acre for 1922. In looking over the summary of the rotations, it is found that it stands third in the amount of profit produced per acre.

The table which presents data on the profit or loss per acre from the different farm crops as grown in the different rotations suggests improvements in this rotation. The second year in pasture might well be eliminated. It has produced an average loss per acre of \$3.78. The amount of root fibre in the soil would not be seriously lowered if this year were eliminated, as there are already two years in sod.

A second improvement suggests itself in substituting wheat for barley in the third year. Wheat after wheat produced an average profit of \$9.78 per acre, while barley after wheat produced an average profit per acre of \$5.84, or \$3.94 less than wheat after wheat; also, it has been found throughout the prairie Experimental Farms that wheat is superior to barley as a nurse crop.

The reasons why wheat is superior to barley as a nurse crop are quite apparent when one stops to consider these two crops. All grasses and clovers should be seeded as early in the spring as possible; wheat is always the first crop seeded, and barley seeding is usually delayed until the middle or latter part of May. The leaf development is much greater on barley than on wheat; hence,

wheat would not shade the ground as much as barley. The more sunlight the small grass and clover seedlings receive, the more vigorous growth they will make and will thus be better able to stand adverse conditions.

Wheat is also one of our first crops harvested; hence, the young grass and clover seedlings have a better chance to regain a normal growth after the wheat crop is harvested and before all growth is checked by the fall frosts.

While objection might be taken to the year in hoed crops by some, this is not a serious drawback. With the introduction of corn and sunflowers for silage, and the use of oats, or peas and oats for winter greenfeed or silage, the land allotted to hoed crops might be utilized and produce a crop that almost any farmer could make profitable use of, while the land, would be left in good condition for the succeeding wheat crop.

ROTATION "O"

First year.—Hoed crop.

Second year.—Wheat.

Third year.—Oats.

Fourth year.—Summer-fallow.

Fifth year.—Barley, seeded down.

Sixth year.—Pasture. Broken in July 6 inches deep and cultivated for balance of season.

Rotation "O" is essentially a mixed farming rotation. The only improvement in this rotation that suggests itself is the substitution of wheat for barley in the fifth year. This would make this rotation one that could be recommended for any mixed farming district with climatic conditions similar to Lacombe. With this modification, this rotation would be very similar to rotation "H" which has given such excellent results at the Dominion Experimental Farm at Brandon.

ROTATION "C"

First year.—Summer-fallow.

Second year.—Wheat.

Third year.—Wheat.

This rotation is a straight wheat growing rotation, and while it has been fairly profitable, it has demonstrated that such a rotation is not a durable one for this district.

It must be borne in mind that the land, when this rotation was started, was almost virgin soil; on older land the results might have been less favourable. As it was, although the land was thoroughly summer-fallowed every third year, the weeds have not been held completely in check, and the root fibre in the soil has been rapidly depleted. In fact, the land comprising this rotation was in such condition that it was deemed advisable to produce a hoed crop on it in 1921 and thus avert some of the impending soil troubles. However, this rotation was again started in 1922, and will be continued indefinitely.

Rotation "C" has been the second most profitable rotation. Since it is the most profitable grain rotation, it can be recommended for grain growing districts with only a moderate or light rainfall where the land is new enough that soil drifting and weeds are not the limiting factor in crop production.

In computing the cost of production, the following values have been used. These values are based on prices current in 1922.

RETURN VALUES

Wheat (from the machine).....	per bushel	\$ 0 75
Barley " ".....	" "	0 50
Oats " ".....	" "	0 40
Potatoes.....	" "	0 40
Hay.....	ton	20 00
Green feed.....	" "	10 00
Silage crops.....	" "	4 00
Straw.....	" "	3 00
Pasture.....	" month	1 50

COST VALUES

Rent and manure.....	per acre	4 00
Seed wheat.....	" bushel	1 50
Seed barley.....	" "	1 00
Seed oats.....	" "	0 65
Seed potatoes.....	" "	0 50
Timothy seed.....	" pound	0 18
Alfalfa seed.....	" "	0 50
Western rye seed.....	" "	0 20
Sweet clover.....	" "	0 20
Alsike.....	" "	0 40
Use of machinery.....	acre	0 60
Kerosene.....	gallon	0 28
Gear oil.....	" "	0 85
Twine.....	" pounds	0 13.5
Threshing (covering work from stook to granary)—		
Wheat.....	" bushel	0 12
Barley.....	" "	0 10
Oats.....	" "	0 08
Manual labour.....	hour	0 30
Horse labour (four-horse team).....	" "	0 30

ROTATION "L" OR MAIN FARM ROTATION, 1922

COST VALUES

Rotation Year	Area	Rent and manure	Seed, twine, use of machinery, oils and grease	Cost of manual labour	Value of horse labour	Cost of threshing	Total cost	Cost of one acre	Cost for one bushel	Cost of one ton	Grain	Straw	Hay or hoed crop	Total value	Value of crop per acre	Loss per acre
	Acres	\$ c.	\$ c.	\$ c.	\$ c.	\$ c.	\$ c.	\$ c.	\$ c.	\$ c.	Lbs.	Lbs.	Lbs.	\$ c.	\$ c.	\$ c.
1	Hay	29-69	118 76	228 97	32 70	29 85	410 28	13 82	47 08	47 08	17,430	17,430	174 30	174 30	5 87	-7 95
2	Greenfeed and hay	41-97	167 88	111 47	72 90	29 55	381 80	9 10	25-24	25-24	30,250	30,250	151 25	151 25	3 60	-5 50
3	Pasture	35-4	141 60	171 92	56 40	30 60	400 52	11 32			1,085 days pasture		52 50	52 50	1 48	-9 84
4	Oats	31-57	126 28	119 78	54 60	36 30	403 76	12 79	0 48	0 48	28,390 days pasture	25,920 days pasture	372 00	372 00	11 78	-1 01
5	Oats and pasture	39-16	156 64	136 24	58 95	28 05	390 88	9 87			4,550	4,280	105 04	105 04	2 68	-7 29
6	Barley	37-81	151 24	135 48	74 25	33 75	419 72	11 10	1 68	1 68	12,000	11,100	141 65	141 65	3 75	-7 85

RETURN VALUES

Year	First year hay	Second year pasture	Third year pasture	Fourth year oats and green feed	Fifth year oats	Sixth year barley	Average profit per acre
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
1914	5 75	0 05	-4 24	15 27	11 04	3 76	5 27
1915	13 55	-2 72	-1 44	16 93	12 71	6 75	7 63
1916	11 10	-4 87	-5 02	21 70	12 82	6 14	6 98
1917	7 27	-1 94	-0 99	9 13	10 54	4 62	4 77
1918	-1 75	-0 53	1 09	7 87	-0 41	0 61	1 15
1919	7 39	-5 13	-0 95	19 35	19 78	30 02	11 74
1920	5 90	0 28	-0 74	17 05	2 83	14 58	6 65
1921	-5 61	8 57	4 18	4 03	-0 30	5 75	2 77
1922	-7 95	-5 50	-9 84	-1 01	-7 27	-7 35	-6 49
Average	3 96	-1 31	-1 99	12 26	6 86	7 21	4 50

Average profit per acre per year for entire Rotation, \$4.50.

ROTATION "K", 1922

COST VALUES

Rotation Year	Crop	Acres	Rent and manure	Seed, twine, use of machinery, oils and grease	Cost of manual labour	Value of horse labour	Cost of threshing	Total cost	Cost for one acre	Cost for one bushel	Cost of one ton	Grain	Straw	Hay or hoed crop	Total value	Value of crop per acre	Profit or loss per acre
			\$ c.	\$ c.	\$ c.	\$ c.	\$ c.	\$ c.	\$ c.	\$ c.	\$ c.	Lbs.	Lbs.	Lbs.	\$ c.	\$ c.	\$ c.
1	Hoed crop, corn	3-56	14 24	8 14	18 54	8 36	49 28	13 84	1 28	.....	.....	.....	77,219	154 44	43 38	23 54
2	Wheat	3-5	14 00	14 19	3 83	8 25	9 42	14 20	63	.....	.....	4,715	6,705	69 01	19 72	5 52
3	Barley	3-41	13 64	9 96	5 85	4 50	39 35	11 54	0 73	.....	.....	2,600	2,820	31 33	9 19	-2 35
4	HAY	3-53	14 12	6 67	3 23	2 55	26 57	7 52	.....	.....	20 85	.....	2,520	25 20	7 14	-0 38
5	Greenfeed for pasture	3-63	14 52	10 84	7 59	2 60	35 55	9 79	8 61	.....	.....	.....	8,242	41 21	11 35	1 56
6	Pasture (broken)	3-6	14 40	5 25	11 40	4 65	35 70	9 91	.....	.....	.....	.....	.....	.....	.....	-9 91

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 95	23 10	4 35	14 70	-3 29	-4 98	7 97
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	-668	4 90	6 63	3 23
1921	10 60	20 13	1 08	-3 21	-2 75	-2 51	3 39
1922	29 54	5 52	-2 35	-0 50	1 67	-9 83	4 01
Average	8 98	15 19	6 00	5 67	-3 17	-3 78	4 82

Average profit per acre per year for entire rotation, \$4.82.

ROTATION "O", 1922
Cost Values

Rotation Year	Crop	Area Acres	Rent and manure \$ c.	Seed, twine, use of machinery, oils and grease \$ c.	Cost of manual labour \$ c.	Value of horse labour \$ c.	Cost of threshing \$ c.	Total cost \$ c.	Cost of one acre \$ c.	Cost for one bushel \$ c.	Cost of one ton \$ c.	Grain Lbs.	Straw Lbs.	Hay or hoed crop Lbs.	Total value \$ c.	Value of crop per acre \$ c.	Profit or loss per acre \$ c.
1	Potatoes	2.42	9 68	26 11	69 00	14 85	.....	119 64	49 44	0 33	.....	.....	.....	21,720	144 80	59 82	10 38
2	Wheat	2.42	9 68	9 52	1 95	1 50	5 82	28 47	11 77	0 58	.....	2,900	3,580	.....	41 62	17 20	5 43
3	Oats	2.42	9 68	5 04	4 20	3 90	2 64	25 46	10 52	0 77	.....	1,130	1,080	.....	14 90	6 16	-4 36
4	Summer-fallow	2.42	9 68	1 45	3 83	3 83	.....	18 80	7 76	.....	.....	.....	.....	.....	.....	.....	-7 76
5	Barley	2.42	9 68	6 85	2 03	2 03	3 55	24 14	9 98	0 68	.....	1,710	2,630	.....	21 75	8 99	-0 99
6	Hay	2.42	9 68	11 91	2 10	1 35	.....	25 05	10 35	.....	33 30	.....	.....	1,540	15 40	6 34	-4 01
7	Pasture	2.42	9 68	3 63	6 00	1 61	.....	20 92	8 64	.....	.....	Pasture 6 weeks	.....	.....	2 25	0 83	-7 71

RETURN VALUES

Year	First year hoed crop \$ cts.	Second year wheat \$ cts.	Third year oats \$ cts.	Fourth year summer- fallow \$ cts.	Fifth year barley \$ cts.	Sixth year hay \$ cts.	Seventh year pasture \$ cts.	Average profit per acre \$ 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 79	28 91	-16 24	39 05	-9 30	-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
Average	10 75	23 64	13 83	-9 31	12 39	3 33	-3 14	7 28

Average profit per acre for entire rotation, \$7.28.

RETURN VALUES

Year	First year summer- fallow	Second year wheat	Third year wheat	Average profit per acre
	\$ cts.	\$ cts.	\$ cts.	\$ 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
Average.....	-8 27	17 85	9 71	6 43

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	9	23 64	
Wheat.....	Summer-fallow.....	C	8	17 85	
Wheat.....	Hoed crop.....	K	9	15 19	
Oats.....	Wheat.....	O	9	13 33	
Barley.....	Summer-fallow.....	O	9	12 39	
Oats-green feed.....	Pasture.....	L	9	12 26	
Hoed crop.....	Pasture.....	O	9	10 75	
Wheat.....	Wheat.....	C	8	9 71	
Hoed crop.....	Pasture.....	K	9	8 98	
Barley.....	Oats.....	L	9	7 21	
Oats.....	Oats for green feed.....	L	9	6 86	
Barley.....	Wheat.....	K	9	6 00	
Hay.....	Barley.....	K	9	5 67	
Hay.....	Barley.....	L	9	3 96	
Hay.....	Barley.....	O	9	3 33	
Pasture.....	Hay.....	L	9		1 31
Pasture.....	Pasture.....	L	9		1 99
Pasture.....	Hay.....	K	9		3 17
Pasture.....	Hay.....	O	9		3 14
Pasture.....	Pasture.....	K	9		3 78

AVERAGE PROFIT PER ACRE PER YEAR PRODUCED BY THE DIFFERENT ROTATIONS

Rotation	Profit per year
	\$ cts.
"O".....	7 28
"C".....	6 43
"K".....	4 81
"L".....	4 50

The tables presenting the data of the average profit or loss per acre from the different field crops as grown at this Station bring out the point that the cereals are the most profitable crops for this district. Of these, wheat stands above all others in the profit per acre produced, and emphasizes the point that in planning the rotation for a system of diversified farming, wheat should be featured as the main cash crop, while other crops should be so arranged that they serve as preparatory crops for the wheat.

It will be noticed that the profitableness of the wheat crop depends to a large extent on the previous treatment of the land or the crop grown. The largest yields have been from wheat produced after a bare fallow, but the largest profits have been from wheat following hoed crops of potatoes, roots or corn. The cost of raising these crops is about the same as the cost of cultivating a bare fallow. The yield of wheat after the hoed crop, except after corn, is usually somewhat lower than after bare fallow, but the value of the hoed crops increases the net returns from the two years' operations. Hoed crops, particularly corn, may to some extent take the place of the bare fallow, but the hoed crops must be well hoed and cultivated and kept free from weeds.

It will also be seen that the pasture years have always produced a loss, and that the year in hay has not been a very profitable one; also, that the crop of green feed has been much more profitable than either the crop of hay or the year in pasture. This would indicate that a suitable annual forage crop might be profitably substituted for the cultivated grasses during the years that the land was in sod.

In summarizing the data compiled in these rotation experiments, it might be well to point out that there is no best rotation for all farms and localities. Each individual farm has its own peculiar conditions. The soil, the degree of weed infestation, the distance from markets, the amount of rainfall and the ability and experience of the farmer will all vary. For these reasons, the table showing the profit and loss produced by the different crops and the apparent influence of the preceding crop on the one following should be of material value in assisting each farmer to outline a rotation that would be most suitable for his own particular conditions. To those who are farming in central and northern Alberta, rotation "O" is recommended as a standard that covers the essential points in a good rotation for a diversified type of farming.

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 1922, and are representative for the district.

Crop	Acre Area	Cost	
		\$	cts.
Wheat (Marquis).....	2.42	0 58	per bushel
Wheat (Ruby).....	3.5	0 63	"
Barley (O.A.C. No. 21).....	2.42	0 68	"
Barley (O.A.C. No. 21).....	3.41	0 73	"
Barley (O.A.C. No. 2).....	37.81	1 68	"
Oats (Banner).....	31.87	0 48	"
Oats (Victory).....	2.42	0 77	"
Potatoes (different varieties).....	2.42	0 33	"
Hay (mixed).....	29.69	47 08	per ton
Hay (seeded in with oats).....	3.53	21 40	"
Hay (mixed).....	2.42	33 30	"
Green feed (oats).....	3.63	8 52	"
Corn (Northwestern Dent).....	3.56	1 28	" green weight
Sunflowers (Mammoth Russian).....	18.5	1 97	"
Swedes (mixed).....	5	2 11	"

When the cost of production is compared with the return values, it will be noticed that wheat, greenfeed and the different hoed crops, are the only crops that were produced at a profit in 1922, while barley, oats and hay were produced at a decided loss.

During recent years, the attention of live stock men has been turned to the cultivation of sunflowers and roots. As these crops are not included in the farm rotations, the cost of production and the yield per acre is given in the following table:—

COST OF PRODUCING ONE ACRE OF SUNFLOWERS

Manual labour, 38.7 hours at 30c.....	\$11 60
Horse labour (four-horse team), 11.1 hours at 30c.....	3 33
Seed, 11 pounds at 12c.....	1 32
Rent and manure—1 acre at \$4.....	4 00
Use of machinery—1 acre at 60c.....	0 60
Kerosene for tractor—2.6 gals. at 28c.....	0 73
Gear oil for tractor—0.16 gal. at 85c.....	0 14
Total cost.....	\$21 72

Wilted Weight

Yield per acre—7 tons 1,440 pounds.	
7 tons 1,440 pounds cost.....	\$21 72
1 ton cost.....	2 81

Green Weight Estimated on 50 per cent Shrinkage

Yield per acre—11 tons 1,160 pounds.	
11 tons 1,160 pounds cost.....	\$21 72
1 ton cost.....	1 88

COST OF PRODUCING ONE ACRE OF TURNIPS

Manual labour—46.5 hours at 30c.....	\$13 95
Horse labour (four-horse team)—4.7 hours at 30c.....	1 41
Seed—1.6 pounds at \$1.....	1 60
Rent and manure—1 acre at \$4.....	4 00
Use of machinery—1 acre at 60c.....	0 60
Total cost.....	\$21 56

Yield per acre—10 tons 484 pounds.	
10 tons 484 pounds of turnips cost.....	\$21 56
1 ton of turnips cost.....	2 11

The cost per ton of growing the above crops is fairly low and below what one would expect. The figures indicate that these two crops may be given a place in our live stock rations, and return a reasonable profit to the grower.

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 idea throughout has been to anticipate any new problems that may result from adopting the new cultural practices. The new cultural experiments consist of eleven separate projects and utilize 471 plots.

The field devoted to cultural work was heavily manured and cropped with sunflowers in 1921. As sunflowers utilize a large amount of soil fertility and moisture in their growth, it was thought they would leave the field more uniform in fertility than any other crop; also, the intertillage given the sunflowers would clean the land of some of the weeds which had become too numerous. As the first year is mainly a preparatory one, and as the shortage of moisture

in the soil exerted such an influence that comparative yields in the few experiments where they were possible were practically without value, they have been omitted and a summary only of the important points embodied in these projects is presented in this report.

In the summer-fallow treatment experiment, the newer methods of cultivating and discing the summer-fallow without ploughing are compared with ploughing the summer-fallow at different seasons. An experiment with summer-fallow substitutes is also included in the same range. In this experiment corn, sunflowers and oats, seeded in different ways, are compared with the bare fallow. The oats are seeded three bushels per acre, one and one-half bushels per acre, and in two, three, four and five drills alternating with thirty-six inch intertilled spaces.

Fall rye is gaining popularity as a grain and forage crop. Seeding at different dates and seeding in different places in different rotations are being tested. In this experiment, it is seeded in the spring with wheat, oats, barley and greenfeed, and is also seeded in the stubble after these crops are removed in the fall. Where the fall rye was seeded with the spring grain in the spring, the crop appeared to be considerably reduced. Apparently the moisture and plant food utilized by the small rye plants could have been used to advantage by the cereal with which it was growing.

As the rate and method of seeding grasses and clovers which will produce most satisfactory results in Central Alberta have never been definitely established, further investigational work in this connection is under way. These experiments cover seeding without a nurse crop and with nurse crops of wheat, barley and oats.

Experiments with barnyard and green manure are receiving further attention. Different dates and methods of application are being tested for wheat, oats, sunflowers and potatoes.

Thinning experiments with sunflowers and mangels, dates of seeding experiments with fall rye, sunflowers and corn are being conducted. In the date of seeding experiment, last season's results indicate that sunflowers should be seeded early in May, while corn seeding should be delayed until the latter part of May or the first week in June.

It is hoped that the results of the experiments now under way may prove of value to farmers in solving some of their difficulties connected with moisture conservation, weed control, forage crop production, conservation or increase of soil fertility, and soil cultivation preparatory to crop production.

HORTICULTURE

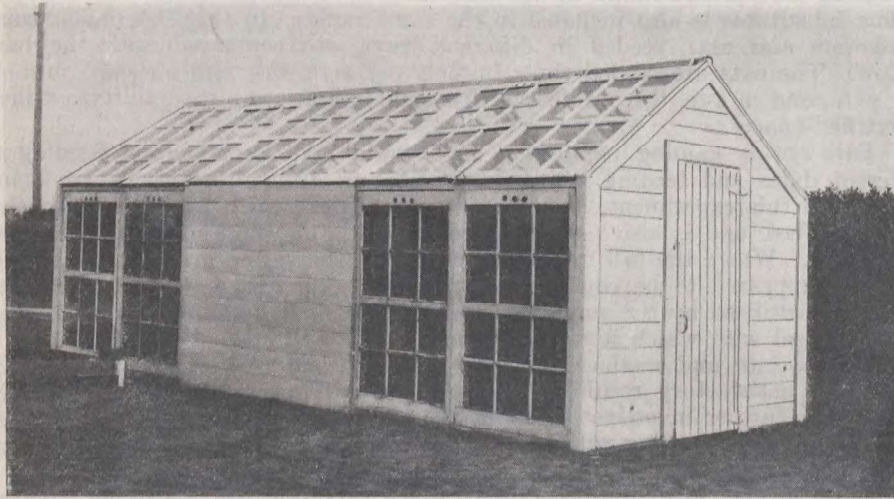
THE SEASON

The season of 1922 was unusually hot and dry. The effect of this dry weather was accentuated by the absence of soil moisture usually carried over from the previous year. The light snowfall during the winter provided enough moisture for spring germination, but was inadequate for the crop during the very dry period which followed. On June 19 a severe hail storm visited the district and did severe damage to all young, tender plants and to the bush fruits, many of which were just setting fruit.

While the spring and summer were far from ideal, the autumn was better than could be expected. Showers which came late in August were of great benefit to the late vegetables, while the mild weather and the absence of killing frosts permitted them, as well as the fruits and flowers, to make a fuller development. The annual flowers were quite the best in the history of the Station.

EXHIBITS

Considering the very dry season and the hail storm of June 19, a very creditable showing was made at the Calgary Floral Show, and the Lacombe and Ponoka Fairs. At these different exhibitions the officer in charge received much favourable comment on the quality of the vegetables, fruits and flowers



Greenhouse constructed of storm sash.

displayed. At the Calgary Horticultural Exhibition on August 22 to 24, the Station exhibit won first prize for vegetables, fruit, flowers and shrubs, shown in competition with produce grown on irrigated land.

SEEDS

The seed used in the different experiments was procured from different sources. Some of it was from selected and improved strains grown at the Central Experimental Farm, Ottawa. This seed was superior in germination and produced vegetables, etc., that were superior in uniformity of type to the produce from commercial seed. This suggests great possibilities in the development of a strain of the different varieties of garden crops that would be more suitable for special climatic conditions than those commercial varieties now in the seed trade.

VEGETABLES

VARIETY AND STRAIN TESTS OF ASPARAGUS

Eclipse and Palmetto, the two varieties under test, show little difference in hardiness, quality and productivity. This vegetable is very easily grown, is most palatable, is the first vegetable of the season, and is one worthy of more attention.

VARIETY AND STRAIN TEST WITH BEANS

Twenty-one varieties of beans were tested in 1922. The seed was sown on May 28 in rows 30 inches apart, with the seeds approximately 2 inches apart in the row. The results obtained were as follows:—

VARIETY TESTS WITH BEANS

Variety	Date ready for use	Yield from 30 foot row	
		Lbs.	Oz.
Plentiful French O. 1639.....	Aug. 5	22	3
Round Pod Kidney Wax O. 1630.....	" 5	19	11
Extra Early Valentine O. 1634.....	" 5	18	1
Wardwell Kidney Wax O. 1634.....	" 5	14	9
Davis White Wax O. 1636.....	" 5	11	15
Masterpiece O. 1916.....	" 5	10	6
Fordhook Favourite O. 1641.....	" 5	10	3
Stringless Green Pod O. 1630.....	" 5	10	2
Bountiful Green Bush O. 1633.....	" 5	5	14
Grenell's Rustless O. 1928.....	" 5	5	8
Pencil Pod Black Wax O. 1642.....	" 5	5	7
Yellow Eye O. 1643.....	" 5	5	1
Curries Rustless.....	" 5	4	12
Grant Stringless Green.....	" 5	2	9
Refugee 1000 to 1—O. 1469.....	" 5	2	20
Challenger Black Wax O. 1915.....	" 5	2	4
Pilot Navy.....	" 24	2	1
Canadian Wonder.....	" 24	1	19
Hidatsa Red.....	" 24	1	..
Hodson Long Pod O. 1635.....	" 24	-	8
Kentucky Wonder Wax Pole O.....	" 24	..	3

The season was too dry for best results with this crop, and the yields were not up to standard. Plentiful French, Extra Early Valentine, Round Pod Kidney Wax and Davis White Wax stood the dry weather the best.

LATE AND EARLY VARIETIES VS. DIFFERENT DATES OF SEEDING FOR A CONTINUOUS SUPPLY OF GREEN BEANS

Variety	Sown	Ready for use	Yield from 25 foot row	
			Lbs.	Ozs.
Round Pod Kidney Wax.....	May 28	Aug. 5	19	0
Extra Early Valentine.....	" 28	" 5	14	2
Stringless Green Pod.....	" 28	" 5	14	12
Stringless Green Pod.....	June 7	" 5	6	3
Stringless Green Pod.....	" 14	None		

The above table indicates that it is advisable to seed an early maturing variety as early as possible for best results, and that seeding early and late maturing varieties is preferable to seeding an early variety at different dates

VARIETY AND STRAIN TESTS WITH GARDEN BEETS

Nine varieties of beets were sown on May 5th in rows 30 inches apart. They were thinned to 3 inches apart in the row. The results obtained are presented in the following table:—

Variety	Yield from 30-foot row
Eclipse.....	68
Cardinal.....	60
Detroit Dark Red.....	58
Early Wonder.....	54
Early Model.....	42
Crimson Globe.....	38
Extra Early.....	38
Crosby Egyptian.....	36
Black Red Ball.....	29

The beets were all of fine texture and excellent quality. The two varieties which appeared to be best for all round purposes were Crosby Egyptian and Eclipse.

COMPARISON OF DISTANCES APART AT WHICH TO THIN BEETS

These beets were sown on May 5, in the same manner as the varieties. Two sorts were used. The results obtained were as follows:—

Variety	Yield from 30-foot Rows		
	Two inches apart	Three inches apart	Four inches apart
Early Wonder.....	55	50	50
Extra Early.....	62	60	61

Thinning to two inches apart in the row usually produces slightly larger yields and roots of a superior quality.

VARIETY AND STRAIN TESTS OF BRUSSELS SPROUTS

Two varieties were tested last season. They were seeded in the hotbeds on April 6, transplanted to the cold frames early in May and into the open during the latter part of the month. The results obtained were as follows:—

Variety	Yield from 10 plants
Dalkeith.....	lbs 143
Paris Market.....	128

Unless it is a very favourable season, this vegetable does not grow to perfection in this district. Last season the buds opened a great deal and the vegetable was inferior in quality.

VARIETY AND STRAIN TESTS OF CABBAGE

Seventeen varieties of cabbage were tested in 1922. The seed was sown April 20th in the hotbed, transplanted to the cold frames early in May where they developed into strong, sturdy plants, and were again transplanted into the open on May 23. The results obtained were as follows:—

VARIETY TESTS WITH CABBAGE

Variety	Weight of 10 heads
	Lbs.
Fottlers Improved Brunswick.....	120
Flat Swedish.....	95
Perfection Drumhead Savoy.....	95
Extra Amager Danish Ballhead O. 934-2-3.....	93
Danish Round Head.....	90
Danish Ball Head.....	84
Enkhuizen Glory.....	82
Marble Head Mammoth.....	82
Succession.....	81
Delicatesse Red.....	80
Red Danish Stonehead.....	79
Mammoth Red Drumhead.....	75
Ear y Winnngstadt.....	72
Volga.....	65
Autumn King.....	62
Farly Paris Market.....	60
Early Summer.....	59

Fottler's Improved Brunswick was the highest yielding variety. However, the Copenhagen Market can always be recommended as one of the best on the market.

Two varieties of Chinese cabbage were planted, but, owing to the hot, dry weather, they ran to seed early. These varieties were Wong Bok and Pe Tsai. This type of cabbage is apparently not suited to this climate.

Control of Root Maggot in Cabbage

Two varieties were used in this experiment. The preventatives used were tar paper discs and cheesecloth. The results were as indicated in the following table:—

YIELDS FROM TWENTY-FIVE PLANTS

Variety	Protected by tar paper discs	Protected by cheesecloth	No protection
	Lbs.	Lbs.	Lbs.
Fottler's Improved.....	125	115	105
Danish Round Head.....	90	82	79

The root maggot was very plentiful on some field turnips but did not do so much injury to the cabbage crop. The tar paper discs usually give the best protection.

Control of Root Maggot in Cauliflower

This experiment is similar in every respect to the one conducted with cabbage. The results obtained were decidedly in favour of tar paper discs.

VARIETY AND STRAIN TESTS OF CAULIFLOWER

Three varieties of cauliflower were grown; Snowcap, Veitch's Autumn Giant and Early Dwarf Erfurt. They were seeded and transplanted on the same dates as the main cabbage crop. The results obtained were as follows:—

Variety	Date ready for use	Weight of 10 heads
		Lbs.
Veitch's Autumn Giant.....	Late	58
Snowcap.....	July 24	43
Early Dwarf Erfurt.....	July 30	40

Veitch's Autumn Giant is a late variety, and has very large heads. It does not have the tendency to bolt to seed like the earlier varieties.

VARIETY AND STRAIN TESTS WITH GARDEN CARROTS

Nine varieties were tested last season. They were seeded on May 5 in rows 30 inches apart. The plants were later thinned to 2 inches apart in the row. The results obtained were as follows:—

VARIETY TESTS WITH CARROTS

Variety	Yield from 30 foot row
	Lbs.
Early Scarlet Horn.....	82
Garden Gem.....	77
Chantenay O. 206-9.....	74
Improved Danvers.....	70
Hatchison.....	69
Oxheart.....	59
Intermediate.....	50
Nantes Half Long.....	49
Danvers.....	46

Early Scarlet Horn can be especially recommended. It matures early and has the record yield for the past two seasons. Chantenay, Oxheart and Garden Gem are good, standard, main crop varieties.

COMPARISON OF DIFFERENT DISTANCES AT WHICH TO THIN CARROTS

This crop was sown at the same time, in the same manner and under similar conditions as the variety tests. Ottawa Seed of the Chantenay variety was used. The results obtained were as follows:—

Distance Apart	Yield from 30-foot row
	lbs.
1 inch apart.....	78
1½ ".....	70
2 ".....	84

The results obtained indicate that two inches apart is the best. In a year with more moisture available, closer spacing might give better results.

VARIETIES AND STRAIN TESTS OF CELERY

Eight varieties of celery were under test this year. The seed was sown in the hotbed on April 6, was transplanted in cold frame May 6 and planted into the open June 8. It was planted in rows 3 feet apart and the plants spaced 6 inches apart in the row. The results obtained were as follows:—

VARIETY TESTS WITH CELERY

Variety	Ready for use	Yield from 25 foot row
		lbs.
Evans's Triumph.....	Oct. 13.....	60
White Blanching.....	" 13.....	54
Easy Blanching.....	" 13.....	48
White Queen.....	" 13.....	42
Golden Self Blanching.....	" 17.....	30
Golden Yellow.....	" 17.....	26
French Success.....	" 17.....	26
Giant Pascal.....	" 17.....	24

When the dry season is considered, the above yields are quite remarkable. The following varieties are recommended: White Blanching is fine-grained and easily blanched. Easy Blanching is very crisp and has a pleasant, nutty flavour. Golden Self Blanching is a strong grower and is crisp and tender.

COMPARISON OF METHODS OF BLANCHING CELERY

Setting the plants on the level and blanching with 12-inch boards was compared with setting the plants in a trench and blanching by hilling the soil up around the plant as it developed. The trenching method gave slightly higher yields and superior quality and crispness.

VARIETY AND STRAIN TESTS OF SWEET CORN

Twenty varieties of garden corn were tested in 1922. The seed was sown in hills 3 feet apart each way. Two rows of each variety were seeded. The suckers were removed from one row and the other row was left untouched. The results obtained are presented in the two following tables:—

VARIETY TESTS WITH CORN—SUCKERS REMOVED

Variety	Date ready for use	Weight of cobs on 10 hills	
		Lbs.	Oz.
Sweet Squaw 0-631-36.....	Sept. 6.....	29	14
Early Red Fife.....	Aug. 31.....	27	7
Assiniboine.....	" 31.....	25	15
Indian Sweet.....	" 31.....	24	14
Pickaninny 0-54-20.....	" 31.....	24	10
Nuetta.....	Sept. 5.....	22	10
Gehu.....	" 6.....	19	17
Early Malcolm 0-846-58.....	" 5.....	17	10
Improved Early Dakota.....	" 6.....	16	11
Early Mayflower.....	" 11.....	14	15
Early June.....	" 5.....	13	.....
Howes Flint.....	Aug. 31.....	10	4
Extra Early Cory.....	Sept. 25.....	9	15
Early Fordhook.....	Sept. 11.....	6	14
Tom Thumb Pop.....	Oct. 2.....	5	10
Golden Bantam.....	Sept. 5.....	5	5
Howling Mob.....	Oct. 2.....	5	5
Early Dawn.....	.....	.....	.....
Evergreen Bantam.....	.....	.....	.....
Earliest Catawba.....	.....	.....	.....

VARIETY TESTS WITH CORN—SUCKERS NOT REMOVED

Variety	Date ready for use	Weight of cobs on 10 hills	
		Lbs.	Ozs.
Indian Sweet.....	Sept. 5.....	25	14
Nuetta.....	" 5.....	21	14
Early Malcolm 0-846-58.....	" 5.....	18	8
Improved Early Dakota.....	" 11.....	16	.....
Assiniboine.....	" 5.....	15	3
Sweet Squaw 0-631-36.....	" 11.....	14	9
Gehu.....	" 11.....	14	2
Early Mayflower.....	" 11.....	12	8
Early June.....	" 5.....	12	1
Pickaninny 0-54-20.....	" 5.....	4	6
Early Red Fife.....	" 5.....	3	9
Extra Early Cory.....	" 25.....	3	.....
Early Fordhook.....	" 25.....	1	10
Evergreen Bantam.....			
Golden Bantam.....			
Howling Mob.....			
Earliest Catawba.....			
Howes Flint.....			
Early Dawn.....			
Tom Thumb Pop.....			
Total weight.....		201	4

The difference in yield in favour of the varieties from which the suckers were removed amounted to 73 pounds. In addition to this, maturity was hastened five or six days in nearly all cases by removing the suckers. Four varieties produced ears that were edible when the suckers were removed that did not mature their ears enough for table use when the suckers were left untouched.

VARIETY OF STRAIN TESTS OF CITRON

Two varieties were tested. The seed was sown in hotbeds May 1 and the plants were transplanted into the open June 5. Some seeds were sown in the open ground on June 1. Those sown directly into the open produced the most mature fruit as those transplanted were badly hailed on June 19, and those seeded in the open did not come up until after this date. One variety, Red Citron, produced 42 pounds fruit from one hill.

VARIETY AND STRAIN TESTS OF CUCUMBERS

Seven varieties of cucumbers were tested. Seed was sown both in the open and in the hotbeds. They were seeded in the hotbed May 10 and transplanted into the open June 6. Those seeded directly into the open were sown June 1. Those transplanted May 10 were hailed out on June 19, and the following results are from those seeded directly into the open on June 1.

VARIETY TESTS WITH CUCUMBERS

Variety	Date ready for use	Yield from three hills	
		Lbs.	Ozs.
Improved Long Green.....	Aug. 20.....	18	.....
Giant Pera.....	" 28.....	13	6
Davis Perfect.....	" 30.....	11	3
Early Russian.....	" 20.....	10	7
West Indian Gherkin.....	" 28.....	8	1
Danish Pickling.....	" 30.....	6	2
Prize Pickle.....	" 30.....	3	.....

The three best varieties are Improved Long Green, Giant Pera and Davis Perfect.

VARIETY AND STRAIN TESTS OF KOHL RABI

Two varieties were sown on May 1 in rows 30 inches apart and were later thinned to 4 inches apart in the row.

Variety	Yield from 30 foot row
Large White Vienna.....	Lbs. 62
Early Purple.....	58

This vegetable was ready for use by August 1, and stood the drought better than the ordinary turnip.

VARIETY AND STRAIN TESTS OF LETTUCE

Nine varieties of lettuce were tested in 1922. They were sown on April 29 in rows 15 inches apart and were later thinned to 6 inches apart in the rows. The results obtained were as follows:—

VARIETY TESTS WITH LETTUCE

Variety	Type	Ready for use	Weight of 10 heads	
			Lbs.	Ozs.
Black Seeded Simpson.....	Loose Leaf...	July 16.....	10	1
Iceberg.....	Cabbage.....	" 16.....	9	7
Cos Trianon.....	Cos.....	" 22.....	8	10
Improved Hanson.....	Loose leaf...	" 20.....	8	3
Grand Rapids.....	Loose leaf...	" 6.....	8	3
Salamander.....	Cabbage.....	" 20.....	7	12
Earliest Wayahead.....	Loose leaf...	" 7.....	7	8
Crisp as Ice.....	Cabbage.....	" 14.....	7	8
Paris Market.....			Ran to seed	

Iceberg, Crisp as Ice and Improved Hanson stood the drought well, while Earliest Wayahead and Paris Market ran to seed very early. Grand Rapids is a useful variety and is excellent for garnishing.

VARIETY AND STRAIN TESTS OF ONIONS

Ten varieties of onions were tested in 1922. They were seeded April 28 in rows 30 inches apart and thinned to 2 inches apart in the row. The results obtained were as follows:—

VARIETY TESTS WITH ONIONS

Variety	Yield from 100 foot row
Extra Early Flat Red.....	Lbs. 31
Large Red Wethersfield 0-988.....	21
Australian Brown.....	20
Yellow Globe Danvers 0-931-2.....	19
White Barletta.....	16
Ailsa Craig.....	15
Southport Red Globe.....	11
Southport White.....	10
Giant Yellow Prizetaker.....	8
Yellow Globe Danver.....	2

The onion crop in 1922 was very light. The crop suffered severely from hail injury on June 19. This, together with the hot dry weather and the ravages of the onion maggot, left the stand uneven and the crop was one of the lightest in the history of the Station.

COMPARISON OF METHODS OF GROWING ONIONS FROM SEED

In this experiment, seeding in the hot bed and transplanting into the open is compared with seeding directly into the open. This experiment suffered so from hail injury that the yields were not worth recording.

COMPARISON OF DIFFERENT SIZES OF ONION SETS

The object of this experiment is to ascertain which size of onion set will produce the largest crop of marketable onions. The results obtained were as follows:—

Size of set	Yield from 30 foot row
	Lbs.
Quarter-inch set.....	10
Half-inch set.....	8
Three-quarter-inch set.....	6

The small sets produced the largest yield of onions, the larger sets run to seed to a greater extent than the smaller ones.

VARIETY AND STRAIN TESTS OF PARSLEY

Three varieties, Triple Curled, Double Curled and Moss Curled, were sown in open ground on May 1, and were ready for use June 30. The Moss Curled was most satisfactory.

VARIETY AND STRAIN TESTS OF PARSNIPS

Only one variety, Hollow Crown, was grown the past season. It was seeded April 28, and was ready for use September 1. The yield from a 30-foot row was 35 pounds.

COMPARISON OF SOME DISTANCES AT WHICH TO THIN PARSNIPS

Hollow Crown was the variety used in this experiment. The seed was sown on May 1 in rows 30 inches apart and the plants were thinned to 2, 3, and 4 inches apart in the row. The results obtained were as follows:—

Distance apart	Yield from 30 foot row
	Lbs.
2 inches.....	45
3 inches.....	40
4 inches.....	37

The closest planting usually produces the best quality roots.

VARIETY AND STRAIN TESTS OF GARDEN PEAS

Sixteen varieties of peas were grown in 1922. They were sown in rows 3 feet apart and were seeded on April 29. The results obtained were as follows:—

VARIETY TEST WITH PEAS

Variety	Length of vine		Date ready for use	Yield from 30 foot row	
	Ft.	In.		Lbs.	Ozs.
McLean Advance.....	2	6	Aug. 7.....	16	3
Stratagem.....	2	3	" 7.....	15	4
Gradus.....	3	10	" 3.....	14	6
Lincoln O.....	3	2	" 7.....	14	1
Pioneer.....	2	3	" 7.....	13	7
Suttons Excelsior.....	2	7	" 3.....	12	9
Thomas Laxton.....	3	1	" 7.....	12	3
Laxtonian.....	1	5	" 7.....	11	4
Eight Weeks.....	1	5	July 20.....	11	1
Harrison Glory.....	2	8	Aug. 5.....	10	8
Sherwood.....	2	4	" 7.....	10	0
Early Morn.....	3	3	" 3.....	10	0
American Wonder.....	1	9	July 20.....	9	3
Gregory Surprise.....	2	3	Aug. 3.....	8	6
Little Marvel.....	1	10	July 20.....	7	6
English Wonder O.....	2	2	July 20.....	6	5

Garden peas are one of the most easily grown vegetables in Western Canada. The following varieties are recommended for early production: Little Marvel, Eight Weeks, English Wonder and American Wonder; for large pods and heavy croppers, Laxtonian, Thos. Laxton and Stratagem.

Late and Early Maturing Varieties vs. Different Dates of Seeding for a Continuous Supply of Green Peas

Four standard varieties, which include both late and early maturing, were compared with different dates of sowing a good standard variety. The results obtained were as follows:—

VARIETY VS. DIFFERENT DATES OF SEEDING

Variety	Date of sowing	Date ready for use	Yield of green peas 50 ft. row		Yield of ripe peas 50 ft. row	
			Lbs.	Oss.	Lbs.	Oss.
Gradus.....	April 29.....	July 20.....	16	3	3	4
Advancer.....	" 29.....	" 20.....	15	0	4	.....
Dauby Stratagem.....	" 29.....	" 22.....	14	9	3	10
Thos. Laxton.....	" 29.....	" 24.....	13	2	3	12
Thos. Laxton.....	May 5.....	Aug. 3.....	13	8	4	0
Thos. Laxton.....	" 12.....	" 16.....	12	4	3	1
Thos. Laxton.....	" 18.....	" 20.....	10	0	2	10

The results for the past two years have been that sowing one variety at different dates produced a larger and more continuous supply of green peas for table use. The seed saved was of excellent quality.

VARIETY AND STRAIN TESTS OF PEPPERS

Four varieties were tested, Small Red Chili, Long Red Cayenne, Harris Earliest, and Neopolitan. They were sown in hotbeds on April 15, transplanted into the garden on June 4, but were hailed out on June 19. This is a rather doubtful crop for the district, as it is usually killed by frost before much of the fruit matures.

VARIETY AND STRAIN TESTS OF POTATOES

Twenty-nine varieties of potatoes were tested in 1922. They were planted on May 26 and harvested on October 7. 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 2 ounces in weight. The results obtained were as follows:—

VARIETY TESTS WITH POTATOES

Variety	Per cent marketable	Yield per acre	
		Bush.	Lbs.
Early Norther.....	80	47	.....
Empire State.....	95	45	.....
American Wonder.....	83	40	20
Early Bovee.....	85	38	40
Ashleaf Kidney.....	95	37	20
Early Hebron.....	85	37	.....
Country Gentleman.....	85	35	40
Gold Nugget.....	90	35	.....
Early Vermont.....	78	34	.....
Houlton Rose.....	90	32	.....
Everitt.....	75	30	20
Extra Early Eureka.....	90	30	.....
Epicure.....	70	29	20
Carters Early Favourite.....	83	27	.....
Duke of York.....	65	26	20
Pioneer Pride.....	85	26	20
Cole.....	75	25	40
Irish Cobbler.....	75	25	20
King George V.....	40	25	20
Gold Coin.....	95	24	40
Green Mountain.....	93	24	40
Early Ohio.....	75	24	20
Duchess of Norfolk.....	73	23	40
Wee McGregor.....	80	22	20
Table Talk.....	50	21	.....
King Edward VII.....	55	19	.....
McDonalds Russet.....	50	13	20
Dominion.....	65	7	.....
Blue MacIntyre.....	40	6	40

The abnormally low yields will be noticed in the above table. While some doubt was felt concerning the advisability of presenting these yields, it was thought that they would furnish some information concerning the relative worth of the different varieties when grown under very adverse conditions.

The limiting factor in the development of this crop was moisture. The variety tests with potatoes are usually planted on land which was summer-fallowed the previous year. As none of this land was available last season, they were planted on spring-ploughed stubble land. The moisture from the previous year's precipitation had apparently been exhausted by the preceding crops, and the rains in 1922 were wholly inadequate for the normal development of the crop.

Six varieties, Dalmeny Regent O. 7181, Dalmeny Regent O. 8320, Dalmeny Hero O. 7198, Dalmeny Hero O. 8347, Moreton O. 8349, and Brydon were

dropped from the varieties under test. They had been under trial for a number of years, and were found to be unsuited to the soil and climate here. Seven other varieties were added, namely, early Bovee, Early Vermont, Pioneer Pride, Everitt, Cole, Blue McIntyre and McDonald's Russet. These new varieties have been grown in various districts throughout the province, and as they are different in type from the standard varieties, they suggest possibilities in potato improvement.

Cultural Experiments with Potatoes.

A number of experiments covering different cultural methods were started last season. These experiments cover many of the debatable points in potato culture, and no doubt will eventually be of great value to potato growers. Unfortunately, climatic conditions were such that 1922 results do not give as much information as would be obtained in a year with abundant rainfall. Irish Cobbler was the variety used throughout.

Unless otherwise stated, the potatoes in these experiments were planted on May 26 and harvested on October 7. They were planted in drills 30 inches apart and the sets were spaced 12 inches in the row. Two ounces was taken as the standard potato set, and this weight was used throughout unless otherwise stated. The drills were 4 to 5 inches deep.

Planting at Different Dates

In this experiment the potatoes were planted on four different dates with seven-day intervals. They were all harvested on October 7. The results obtained were as follows:—

Date planted	Per cent marketable	Yield per acre	
		Bush.	Lbs.
May 22.....	85	46	40
May 29.....	80	48	..
June 5.....	85	32	20
June 12.....	90	15	..

The results of this experiment indicate that early planting will produce the most satisfactory results. It is usually a good policy to plant the potatoes so that the main crop will come up about the 10th of June, and thus miss the late spring frosts.

PLANTING WHOLE OR CUT POTATOES

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

Description of set	Distance apart in row	Amount of seed require per acre		Per cent marketable	Yield per acre	
		Bush.	Lbs.		Bush.	Lbs.
Large whole.....	1 foot.....	45	20	78	34	40
Large whole.....	2 feet.....	25	40	90	25	20
Large whole.....	3 feet.....	14	40	90	23	20
Medium whole.....	1 foot.....	32	..	92	42	..
Medium whole.....	2 feet.....	16	..	82	31	20
Small marketable.....	1 foot.....	22	40	90	36	40
Medium cut in two.....	1 foot.....	15	20	92	37	20
Medium with two eyes without seed ends.....	1 foot.....	12	..	82	34	40
Medium with one eye without seed ends.....	1 foot.....	10	40	92	27	20
Medium seed ends.....	1 foot.....	6	..	95	35	20

In this experiment the yields are so low that it would not be wise to draw conclusions from them. In the column which gives the amount of seed required to plant one acre, some interesting and authentic information is presented. It will be noticed that some of the sets are far heavier than the average potato grower would care to plant. It will also be noticed that the heavier sets tend to increase the yields. This suggests the possibility that, when seed potatoes are very cheap, growers might find it profitable to increase the size of their potato sets.

Planting 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 yields of the following crop. The sets were cut to different weights, and only one normal eye was left on each set. The yields, size of set and the amount of seed required to seed an acre 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.....	3	40	97	28	40
1 ounce.....	6	20	97	36	.....
2 ounce.....	10	.....	95	32	40
3 ounce.....	16	.....	90	44	.....

It will be noticed that the size of the set exerted an influence on the yield per acre. While more seed per acre is required when the larger sets are used, the increased yield has compensated for this difference.

Planting 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, 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 1 acre		Per cent Marketable	Yield per acre	
		Bush.	Lbs.		Bush.	Lbs.
Ounces	Inches					
1.....	12	5	20	88	28	.....
1.....	18	4	15	92	37	20
1.....	24	3	20	90	28	40
2.....	12	10	.....	80	41	20
2.....	18	6	20	85	28	40
2.....	24	4	40	75	32	40
3.....	12	17	40	90	38	.....
3.....	18	12	40	85	28	.....
3.....	24	8	40	90	42	40

The yields produced in this experiment are rather contradictory. However, they are slightly in favour of the large sets. When the amount of seed per acre is considered, the 2-ounce sets produced the most economical yields.

Planting Sets of Equal Size but 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 used were uniform in every respect other than in 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.....	92	32	.....
2 eyes.....	90	44	.....
3 eyes.....	85	38	.....
4 eyes.....	80	43	20

While no very conclusive results may be drawn from this table, the results indicate that at least two eyes should be left on a set, and that there is little advantage in leaving more than two eyes.

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 the potato set was taken from	Per cent marketable	Yield per acre	
		Bush.	Lbs.
From stem end.....	90	20	.....
From seed end.....	92	40	.....
From middle portion.....	87	25	20

The yields produced in this experiment do not agree with those produced at other Stations in more favourable climates. Hence, the above experiment must be repeated before they can be taken as authentic.

Planting One, Two and Four 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	Per cent marketable	Yield per acre	
		Bush.	Lbs.
One whole potato.....	92	44	.....
Two half potatoes.....	82	36	.....
Four quarter potatoes.....	85	42	.....

The results obtained in this experiment indicate that cutting the seed has little influence on the yield of tubers. However, this experiment must be repeated a number of times during the years with a normal rainfall before definite conclusion can be drawn.

Freshly Cut Sets vs. Sets which have been Cut for Seven Days

The object of this experiment was to determine whether cutting the potatoes and letting them stand for a number of days before planting has any influence on the yield. The results are presented in the following table:—

Description of set	Per cent marketable	Yield per acre	
		Bush.	Lbs.
Cut and planted on the same day.....	82	62	..
Cut and planted seven days after cutting.....	85	76	..

The results indicate that it is an advantage to cut the potatoes a few days ahead of planting time, and allow the freshly cut surface to dry up and partially heal over before planting the set.

Planting Potatoes at Different Depths

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

Depth of planting	Per cent marketable	Yield per acre	
		Bush.	Lbs.
3 inches deep.....	85	34	..
5 ".....	87	36	..
7 ".....	92	36	40

The results of this experiment indicate that 5 inches is the most suitable depth at which to plant potatoes. In a year with an excessive rainfall, the shallower planting might be advisable.

Hilled vs. Level Cultivation

The object of this experiment is to determine the influence of hilled and level cultivation on the yield of potatoes. The results obtained are presented in the following table:—

Cultivation given	Per cent marketable	Yield per acre	
		Bush.	Lbs.
Hilled.....	92	33	20
Level.....	87	36	40

Last season was exceptionally dry and the level cultivation gave the larger yield. The reverse would be the case in a year with an excessive rainfall. In dry seasons it is not advisable to hill up the potatoes unless necessary to prevent injury from sunburning.

Conclusion

The precipitation last season was so low that the yields were influenced to such an extent that these experiments must be duplicated in a year with a normal rainfall before any conclusive results can be drawn.

Medium-sized whole potatoes or large sets with at least two good eyes have tended to increase the yield per acre.

VARIETY AND STRAIN TESTS WITH PUMPKINS

Three varieties of pumpkins were seeded in 1922. They were seeded in the hotbed on May 15, and were transplanted into the field on June 4 in hills 9 feet apart each way. These suffered severely from hail injury, and did not produce any yields worth recording. Some seeds were planted in the open ground the latter part of May. Some of these young plants escaped severe hail injury on June 19 and produced excellent yields. The results obtained are presented in the following table:—

VARIETY TESTS WITH PUMPKINS		
Variety	Date of blooming	Yield from three hills
		Lbs.
Hundred Weight.....	July 28.....	114
Kentucky.....	" 30.....	111
Small Sugar.....	Aug. 1.....	110

It would seem as though the best method of growing pumpkins would be to sow the seed directly into the ground early in the season and protect the young plants from early frosts.

The largest pumpkin produced weighed 33 pounds. It was of the Kentucky Field variety.

VARIETY AND STRAIN TESTS OF RADISHES

Five varieties were tested. No yields were taken but notes were taken concerning their quality and when ready for use. The seed was sown as soon as there was any growth in the soil, and a number of successive seedings were made at intervals of three weeks. This provided a continuous supply of radishes from May 18 until all growth was destroyed by fall frosts. The following varieties were tested:—

Variety	Quality
French Breakfast.....	Good.
Scarlet Turnip White Tip.....	Fair.
White Icicle.....	Excellent.
Scarlet Olive.....	Fair.
Scarlet Turnip.....	Fair.

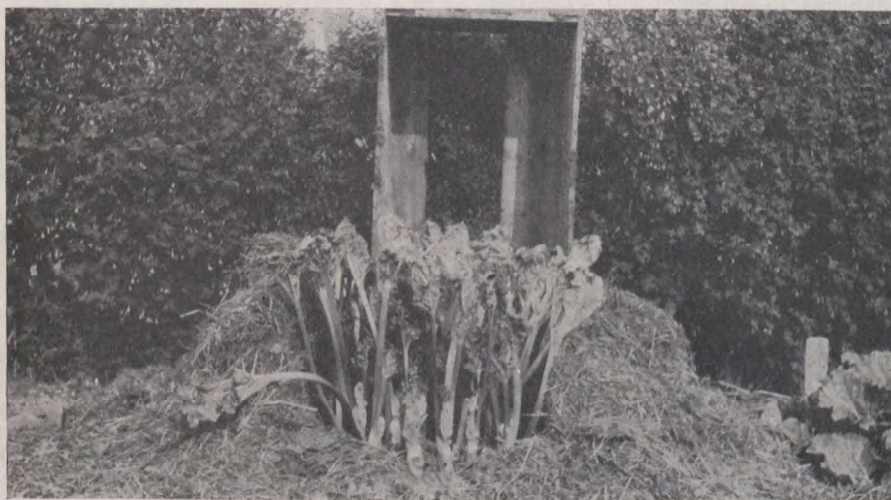
White Icicle and French Breakfast kept their good eating qualities longer than the other varieties.

VARIETY AND STRAIN TESTS OF RHUBARB

Ten varieties of rhubarb were under test in 1922. The results obtained were as follows:—

Variety	Year planted	Date ready for use	Yield from 1 hill	
			Lbs.	Ozs.
Daws Champion.....	1911	May 22.....	19	6
Early Raspberry.....	1911	" 20.....	13	..
Hobday Giant.....	1911	" 19.....	18	2
Linnaene.....	1911	" 23.....	11	3
Monarque.....	1911	" 19.....	16	4
Paragon.....	1911	" 22.....	12	0
Prima Donna.....	1911	" 19.....	15	10
Early Scarlet.....	1911	" 19.....	19	2
Prince Albert.....	1911	" 18.....	20	0
Victoria.....	1912	" 20.....	23	7

Among the best varieties are Victoria, Daws Champion, Early Raspberry and Early Scarlet. The yields produced by this plantation are rather low. This is the result of the hot, dry season; also, the plantation has been down so long that it is past its greatest usefulness. A new plantation was started this year, from which larger yields are expected.



Rhubarb forcing. Note the box used, the arrangement of the manure, and the comparative size of the two plants.

A number of hills were forced before the regular season opened. The accompanying photograph will illustrate the method followed in covering the hill to be forced. A box high enough to permit the full development of the stalks is placed over the hill. This is covered with fresh horse manure, which will generate a certain amount of heat in the process of rotting, and stimulate an early growth in the root. When forced in this way, the stalks are very tender and brittle, and have an excellent, though mild, flavour. Rhubarb was produced at least three weeks ahead of the regular crop without any apparent injury to the root.

VARIETY AND STRAIN TESTS OF SALSIFY OR OYSTER PLANT

Two varieties were tested last season. They were seeded May 2 and were ready for use by August 30. Mammoth Sandwich Island produced 13 pounds from a 30-foot row, while Long White produced 10 pounds. This plant is commonly known as the oyster plant, and is used for soup.

VARIETY AND STRAIN TESTS OF SPINACH

Two varieties were tested last season. They were seeded May 3. Victoria was ready for use June 1 and produced 7 pounds from a 30-foot row. New Zealand was ready for use June 10 and produced 20 pounds per row, after which there was a large, continuous growth until the plants were cut down by frost. The New Zealand is unhesitatingly recommended, as it is a very prolific grower and does not have the tendency to bolt to seed like the Victoria.

VARIETY AND STRAIN TESTS OF SQUASH

Five varieties of squash were tested in 1922. The seed was sown in the hotbed on May 15. They were transplanted into the open in hills 9 feet apart each way on June 4 but were haled out on June 19. Seed was also sown directly into the open ground the latter part of May, and it was the plants from this seeding that produced the crop from which the yields were taken. The results obtained were as follows:—

VARIETY TESTS WITH SQUASH

Variety	Date ready for use	Yield from 3 hills	
		Lbs.	Oss.
English Vegetable Marrow.....	Aug. 18.....	162	
Hubbard.....	Sept. 2.....	115	
Long White Bush Marrow.....	Aug. 21.....	110	
Golden Hubbard.....	Sept. 2.....	90	
Delicious.....	" 6.....	63	

The Vegetable Marrow is the most reliable for this district. The largest squash produced, a White Bush Marrow, weighed 13 pounds.

VARIETY AND STRAIN TESTS WITH TURNIPS

Four varieties of turnips were tested in 1922. They were seeded on May 3 in rows 30 inches apart, and were later thinned to 4 inches apart in the row. The results obtained were as follows:—

VARIETY TESTS WITH TURNIPS

Variety	Date ready for use	Yield from 30-foot row	
		Lbs.	Oss.
Golden Ball.....	July 8.....	43	2
Red Top Strap Leaf.....	" 1.....	40	6
Early Snowball.....	" 1.....	37	3
Early Purple Milan.....	June 30.....	30	..

Early Purple Milan was ready for use before any of the others. Early Snowball and Red Top Strap Leaf are much larger, but do not keep as well.

VARIETY AND STRAIN TESTS OF TOMATOES

Eleven varieties of tomatoes were tested in 1922. They were sown in the hotbed April 15, were transplanted again into hotbeds May 10 and were transplanted into the open on June 7. The results obtained were as follows:—

VARIETY TESTS WITH TOMATOES

Variety	Weight of green tomatoes from 5 plants
Bonny Best.....	Lbs. 25
Alacrity 0-18-15-29.....	24
Crimson Canner 0-707.....	21
Danish Export 0-1862-73.....	20
Earliana.....	19
Chalks Jewel.....	19
Red Head.....	18
Burbank Early 0-1717.....	16
Prosperity.....	16
John Baer.....	15
Earlibell.....	15

Alacrity had 2 pounds and Bonny Best had 1 pound of ripe fruit when picked, while many of them were just on the turn. Alacrity is our earliest variety. Bonny Best is a little later, but its fruit is of an excellent quality and appearance.

More of these tomatoes would have ripened if the vines had not been seriously injured by hail on June 19. It took the vines some time to recover from this injury.

Comparison of Methods of Training Tomatoes

Seventy-five plants each of Alacrity and Bonny Best were planted in the following manner:—

No. 1.—Twenty-five plants of each variety were pruned to one stem and had all lateral shoots removed and the plants pinched back to three bunches of fruit.

No. 2.—Twenty-five plants were pruned to two stems, had lateral shoots removed and were pinched back to three bunches of fruit per plant.

No. 3.—Twenty-five plants were allowed to make their natural growth.

Nos. 1 and 2 were tied up to wires and No. 3 was permitted to lie on the ground. None of the foliage was removed from any of the plants. The green fruit was all picked on September 13. The results obtained were as follows:—

COMPARISON OF METHODS OF TRAINING
ALACRITY

Method of training	Date of 1st picking	Yield of ripe fruit	Yield of green fruit
		Lbs.	Lbs.
No. 1.....	Sept. 2.....	4	90
No. 2.....	" 2.....	2	110
No. 3.....	None ripe.....		75

Total yield, 281 lbs.

BONNY BEST

Method of training	Date of 1st picking	Yield of ripe fruit	Yield of green fruit
		Lbs.	Lbs.
No. 1.....	Sept. 5.....	2	65
No. 2.....	" 9.....	1	90
No. 3.....	None ripe.....		75

Total yield, 208 lbs

The result of this experiment indicates that No. 2 will give the best results. No. 1 is slightly earlier, while No. 3 is considerably later. It has been found that a large amount of fruit will ripen on the vines if the vine is pulled and hung up inside by the root. When handled in this manner it was found that there was a greater percentage of spoiled fruit in No. 3 than in No. 1 or No. 2.

FARMERS' GREENHOUSE

Almost all houses in the West are equipped with storm windows. It is a common custom to use some of these storm sash for covering hot-beds. This suggested a further use in constructing a temporary greenhouse. A framework was constructed, as shown in the photo, to hold storm windows in place for walls and roof. The frame is 19 feet long, 8 feet wide and 6 feet high at the eaves. The eight posts of the frame are sunk three feet in the ground. Leaving a 2-foot wide passage in the middle, the soil on either side was excavated to a depth of three feet and filled in with fresh horse manure. This was covered with a layer of soil one foot deep. The rotting of the manure furnishes a large amount of heat.

Tomatoes and cucumbers were planted in the greenhouse on June 6. The first cucumbers were picked on August 1 and the first tomatoes were ripe on August 16; 155 pounds 4 ounces of cucumbers and 92 pounds 11 ounces of ripe tomatoes were picked. There was also room for the starting of a large number of house plants in boxes and pots. Many farmers and others who saw this temporary greenhouse this summer expressed their intention of trying something similar next spring. By using the storm sash in this way, it is possible to have green cucumbers and ripe tomatoes for six weeks or more in districts where it is impossible to produce either in the open.

FLOWERS

Although the weather was not all that could be desired, it was clearly demonstrated that, even under adverse seasonal conditions, flowers will make a creditable showing. The flower display at Lacombe during the past season was a source of wonder to all visitors.

VARIETY AND STRAIN TESTS OF ANNUAL AND PERENNIAL FLOWERING PLANTS

The abnormal weather conditions which prevailed during the past season made the work with flowers very discouraging at times. The early part of the season was very hot and dry. This forced many of the perennials into an early bloom, and considerably shortened the number of days in bloom of the different flower-perennials and shrubs. Owing to this dry weather, the seed of some of the annuals sown in the open did not germinate until too late in the season for the plants to develop much bloom; also, it was very difficult to get annuals, which were transplanted to the open from the hotbed, to live and make much growth during this period. In addition to this, a severe hail storm on June 19 did much damage to young plants that were freshly set out. Late August showers alleviated this situation and made possible an excellent floral display. An open fall, free from killing frosts, permitted the more hardy annuals to bloom much longer than usual.

The following table gives the different annuals tested and further information that may prove valuable to those not familiar with the cultivation of these plants in Alberta. Those most suitable for central Alberta are marked with an asterisk (*).

ANNUAL FLOWERS AT LACOMBE, 1922

Kind of Flowers	Where seeded	Date seeded	Where trans- planted	Date trans- planted	Date of first blooming	Length of blooming season	Recommended variety or strains	Remarks
Alonsoa.....	Hotbed.....	April 25.....	Open ground..	May 19.....	July 6.....	Until frost..	Comparta.....	Very pretty foliage, rather tender. Not easily grown.
*Alyssum.....	Open ground..	May 2.....	Open ground..	May 29.....	June 1.....	Until frost..	Sweet scented Carpet of Snow.	Very hardy, continuous bloomers, mostly white. Easily grown.
Anemone.....	Hotbed.....	April 25.....	Open ground..	May 29.....	June 28.....	Until frost..	Tricolor Solandens.....	Beautiful ornamental foliage, rather tender.
*Antirrhinum—Snap Dragon.....	Hotbed.....	April 10.....	Open ground..	May 29.....	June 28.....	Until frost..	Any variety.....	Lovely shade of color. Lasts a long time for table decorations.
*Asters.....	Cold frame..	May 10.....	Open ground..	June 1.....	Aug. 15.....	Until frost..	Victoria and Comet.....	Late blooming. One of the best for decorative purposes.
Balsam.....	Hotbed.....	May 2.....	Cold frame..	June 1.....	Harled out.....	Until frost..	Camelia Flowered.....	Very tender, liable to damp off.
*Baroness.....	Open ground..	April 18.....	Open ground..	May 28.....	July 15.....	Until frost..	Chires.....	Very early, free flowering, continuous bloomer.
*Catalpa—Pot Marigold.....	Open ground..	April 18.....	Open ground..	May 28.....	July 15.....	Until frost..	Onionals.....	Very hardy, will grow in any soil, color yellow and orange.
*Candytuft.....	Open ground..	April 28.....	Open ground..	June 2.....	June 2.....	Until frost..	White Spinal Sweet scented and fern foliage.	Very hardy, free flowering, well recommended.
Carnation.....	Hotbed.....	April 10.....	Open ground..	June 1.....	Aug. 30.....	Until frost..	Imp. Marguerite.....	Season too short, not recommended.
Catosa.....	Hotbed.....	April 25.....	Open ground..	May 2.....	Aug. 15.....	Until frost..	Haled out.....	Very pretty, but very tender.
Chrysanthemum.....	Open ground..	May 2.....	Open ground..	May 2.....	Aug. 15.....	Until frost..	Morning Star.....	Rather late flowering. It takes a long time to germinate.
Clarkia.....	Open ground..	May 2.....	Open ground..	May 2.....	Aug. 5.....	Until frost..	Elegans.....	Different shades of pink. Very effective for bouquets. Requires staking. Easily broken with the wind.
Coenoc—Cosmos.....	Open ground..	April 29.....	Open ground..	April 29.....	Aug. 1.....	Until frost..	Early Giant.....	Strong growing annual, very much like a single Dahlia, but has fern-like foliage. Shades of pink and white. Height 3 feet.
Dianthus.....	Hotbed.....	April 10.....	Open ground..	April 10.....	Aug. 5.....	Until frost..	Supberb.....	Well recommended, most of them have a lovely perfume and are graceful for vases.
*Dimorphotheca—South African Daisy.....	Cold frame..	May 15.....	Open ground..	May 15.....	July 14.....	Until frost..	.....	One of the best annuals for Western Canada. Profuse bloomer. Will grow in almost any soil. Beautiful colours.
Dahlia.....	Hotbed.....	April 10.....	Open ground..	May 29.....	Aug. 30.....	Until frost..	Paeony flowered Collurette.....	Not suitable for this district. Flowers late and easily frozen.
*Datura—Angel's Trumpet.....	Hotbed.....	April 18.....	Open ground..	June 1.....	July 22.....	Until frost..	Wrightii (Meteloides).....	Shape of a trumpet, white, rather heavy. Used mostly as a dot flower.
*Echeverria—Californian Poppy.....	Open ground..	May 2.....	Open ground..	June 1.....	July 12.....	Until frost..	Ruby Ring Queen of the Buffs.....	Free flowering, well recommended, grown in any soil blooms early and remains until freeze up.
*Gedleria—Blanket Flower.....	Hotbed.....	April 25.....	Open ground..	April 25.....	July 20.....	Until frost..	Picta.....	Makes a nice variety, very unusual colors, does not live long after cutting.
Goldeis—Satin Flower.....	Open ground..	May 2.....	Open ground..	June 1.....	July 26.....	Until frost..	Extra Choice Dwarf.....	Pretty flower, inclined to rust.
*Hatchers—Everlasting Flower.....	Hotbed.....	April 25.....	Open ground..	June 1.....	Aug. 1.....	Until frost..	Sutton's Mixed.....	Very useful for winter decoration, should be used more than they are.
Jacobs.....	Hotbed.....	April 18.....	Open ground..	May 28.....	July 12.....	Until frost..	Dwarf Mixed.....	Rather delicate.
*Larkspur.....	Open ground..	May 2.....	Open ground..	May 2.....	Aug. 3.....	Until frost..	Stock Flowered.....	Very fine for decorative purposes, has a greater variety of colour than the perennial Larkspur.
*Linaria.....	Open ground..	May 2.....	Open ground..	May 2.....	July 1.....	Until frost..	Sutton's Mixed.....	A small delicate flower with many delicate shades of colour. Well recommended.
Lobelia.....	Hotbed.....	April 10.....	In France.....	June 4.....	July 3.....	Until frost..	.....	Very slow growing; has a dark blue colour. The dwarf makes a fine edging plant and does well in Alberta.

<i>M. alpe</i>	Open ground...	May 2..	...	...	...	Until frost...	Sutton's Chimed.....	Rather inclined to rust. Germination not very good. Showy border annuals.
<i>*Marigold</i>	Hotbed.....	May 3..	Cold frame...	June 1..	July 26.	Until frost...	African French.....	These have been greatly improved on the last few years. Many varieties in colour and beautifully shaded.
<i>*Mignonette</i>	Open ground...	May 2..	...	...	July 20.	Until frost...	Machet and Miles Spiral.....	Beautiful perfume, nice for bouquets.
<i>*Nasturtium</i>	Open ground...	May 26.	...	...	July 10.	Until frost...	Hybrids of Madame Gunther.....	Remarkable for wide range of colours; useful for small vases; very free blooming; easily frozen.
Nemesia.....	Cold frame...	April 28.	Open ground...	...	July 15.	Until frost...	Suttori.....	A comparatively new annual; one of the most beautiful; has brilliant colouring.
<i>*Nicotiana—Tobacco Plant</i>	Hotbed.....	April 15.	Open ground...	May 28.	July 12.	Until frost...	Affinis and Landeria.....	The common white one has a beautiful perfume and should, for this reason alone, find a place in every garden.
<i>*Pansy</i>	Hotbed.....	April 10.	Open ground...	May 25.	July 6.	Until frost...	Bugnot's Giant Madame Perret.....	Especially adapted to Alberta; will grow in almost any soil, very hardy.
<i>*Petunia</i>	Hotbed.....	April 15.	Open ground...	May 29.	July 21.	Until frost...	Giant Fringed Superbassins.....	Unequalled for outdoor decorations. They flower early, and continue a mass of flowers throughout the whole season; requires a sunny situation.
<i>*Pentstemon</i>	Hotbed.....	April 10.	Open ground...	June 1..	Did not flower.	Hailed.....	Sutton's Large Flowering.....	Will not stand the Winters of the West, although very effective and useful for decorative plant.
<i>*Phlox</i>	Hotbed.....	April 25.	Open ground...	May 28.	June 16.	Until frost...	Drummond and Grandiflora Splendens.....	A beautiful combination of colour; very hardy; especially recommended; one of the last to remain in flower.
<i>*Poppy</i>	Open ground...	April 23.	...	...	June 25.	Until frost...	Giant Shirley and Eldorado.....	They do not readily transplant; a gorgeous display in the flower garden; very effective for bulk decoration. Will easily.
<i>*Portulaca—Ground Rose</i>	Open ground...	April 23.	...	...	July 2.	Until frost...	Sutton's Imp. 6.....	Grows very close to the ground; many shades of colour; tender, easily frozen.
<i>*Salpiglossis</i>	Hotbed.....	April 25.	Open ground...	June 3.	July 20.	Until frost...	Sutton's large flowering.....	Highly ornamental with large veined funnel-shaped flowers; much prized for cutting; very showy in beds of borders.
<i>Sida—Flowering Sage</i>	Hotbed.....	April 15.	Open ground...	June 30.	Did not flower.	...	Splendens and Bonfire.....	Brilliant seaside flowers, but rather late flowering for this country.
<i>Schizanthus—Butterfly Flower</i>	Hotbed.....	April 18.	Open ground...	May 3.	July 20.	Until frost...	Wisetonensis and Retwsus.....	They require supplying; remind one of a miniature Orchid; free delicate colours; very free flowering; fine for exhibition.
<i>*Stocks</i>	Cold frame...	May 10.	Open ground...	May 27.	July 8.	Until frost...	Ten Weeks and Intermediata.....	For diversity of colour and duration of blooming; have a beautiful perfume.
<i>Sunflower Helianthus</i>	Hotbed.....	April 25.	Cold frame...	June 2.	July 24.	Until frost...	Stella and Orion.....	Grow 3 or 4 feet high. They are valuable for grouping amongst shrubberies; different shades of yellow.
<i>Sweet Sultan</i>	Hotbed.....	April 28.	Open ground...	June 2.	July 20.	Until frost...	Sutton's Giant.....	Does not transplant very well; flowers fringed; retain freshness in water for a long period.
<i>Tagetta</i>	Hotbed.....	April 25.	Open ground...	June 16.	July 6.	Until frost...	Signata Purilla.....	A profuse bloomer, very useful for edging, light colour.
<i>*Verbena</i>	Hotbed.....	April 28.	Open ground...	June 2.	July 20.	Until frost...	Vermosa.....	Makes an attractive decoration for vases; retains freshness in water for a long period.
<i>Viola Tufted Pansy</i>	Hotbed.....	April 15.	Open ground...	June 1..	July 26.	Until frost...	Sutton's Gem.....	Most of the violas are solid coloured, and for that reason show up very effectively. The flowers are not as large as pansies.
<i>Virginia Stock</i>	Open ground...	May 10.	...	...	Aug. 2.	Until frost...	Mixed.....	Used as an edging plant; it is only useful for that purpose.
<i>Zinnia</i>	Hotbed.....	April 25.	Cold frame...	May 29.	July 10.	Until frost...	Mammoth Flowering.....	They make a gorgeous display; rather delicate. The reds, scarlets and crimson are especially fine.

SWEET PEAS

Sweet peas are one of our most beautiful flowers; very few have such delicate colouring and rich fragrance. For this reason sweet peas have been given more attention than any other annual at this Station. The dry weather during the past season retarded the development of the sweet peas. Nevertheless, a favourable showing was made during the season. The names, colour and general remarks concerning the outstanding varieties are presented in the following table:—

VARIETY TEST WITH SWEET PEAS

Variety	Colour	Remarks
Queen Alexander.....	Rich crimson scarlet.....	Large blooms.
Mrs. Tom Jones.....	Light blue.....	Vigorous grower.
Floradale Fairy.....	Rich deep cream.....	Very fragrant.
Orchid.....	Deep lavender, suffused pink.....	Beautiful colouring.
Sparkler.....	Rich rosy pink, wings deep rose.....	Tree flowering.
Helen Pierce.....	Marbled blue.....	Very distinct.
Hercules.....	Large rose pink.....	Large flower of fine form.
Beryl.....	Soft salmon pink, shaded buff.....	Very beautiful.
Lilian.....	Pale pink, flushed buff.....	Beautiful colouring and free flowering.
Dobbies Cream.....	Waved primrose.....	Very distinct.
Blue Monarch.....	New dark blue buff.....	Strong grower with long stems.
Mrs. Walter Wright.....	Rich rose.....	Beautiful shade.
Daisybud.....	Soft rose pink.....	Distinctive colouring.
King Manoel.....	Rich deep maroon.....	Long stems.
Prince of Wales.....	Rich rosy crimson.....	Very pretty.
Maud Holmes.....	Crimson.....	Large and fine form.
Robert Sydenham.....	Glowing orange salmon.....	Excellent form.
Mrs. G. W. Bishop.....	Soft rich salmon.....	Very beautiful.
George Herbert.....	Bright rosy carmine.....	Very free bloomer.
Mrs. Townsend.....	Picot edge variety.....	Very distinct.
Annie Bouness.....	Bright pink suffused salmon.....	Excellent variety.
Mrs. Tom Jones.....	Medium blue.....	Vigorous grower and fine form.
Mrs. A. Hitchcock.....	Pale pink flushed salmon.....	Very fragrant.
Irish Belle.....	Rich lilac.....	Long stems and large blooms.
Helen Lewis.....	Orange rose wings.....	Beautiful flower.
Jean Ireland.....	Creamy buff edged carmine rose.....	Very pretty.
Jack Cornwell.....	Violet blue.....	Strong grower, large bloom.
John Ingram.....	Rich rosy carmine.....	Very beautiful.
Brocade.....	Rose pink.....	Large beautiful bloom.
Sincerity.....	Bright glowing cerise.....	Very free flowering.
Margaret Athe.....	Glowing pink on cream ground.....	Very fragrant.
King Edward.....	Deep scarlet with glossy effect.....	Enormous flower.
Haulmark Pink.....	Bright rosy pink, shaded salmon.....	Very free bloomer.
Cherub.....	Cream pink edged.....	Gigantic flower, scalloped edge.
Hope Light.....	Bright cerise.....	Very free flowering.
Mrs. J. Balmer.....	Suffused pink.....	Magnificent flower.
Royal Purple.....	Rich rosy purple.....	Long stems.
Mrs. A. G. Gentle.....	White edged scarlet pink.....	Very fragrant.
Mrs. G. W. Bishop.....	Salmon cerised suffused orange.....	Distinctive colouring.
King White.....	White.....	Sweet perfume.
Rosabelle.....	Rose.....	Very vigorous.
White Spencer.....	Pure white.....	Very large flowers.
Warrior.....	Rich reddish maroon.....	Free flowering.
Barbara.....	Salmon.....	Fine exhibition blooms.
Mrs. C. P. Tomlin.....	Glowing crimson scarlet.....	Large beautiful blooms.
The President.....	Glowing scarlet.....	Very distinct colouring.
Burpee's Elegance.....	Pink shaded bottom.....	Very free bloomer.
Rosina.....	Bright rosy heliotrope.....	Very fragrant.
Constance Hinton.....	Large waved white.....	Free flowering.
Boltons Pink.....	Bright rosy pink.....	Beautiful shade.
Elsie Herbert.....	White, pink edge.....	Very delicate colouring.
Miss Wilcott.....	Salmon red.....	Large flower of fine form.
Alfred Watkins.....	Pale lavender waved type.....	Beautiful shade.
Charity.....	Brilliant crimson.....	Strong grower, large bloom.
Dorothy Eckford.....	White.....	Large and sweet scented.
Florence Nightingale.....	Lavender.....	Very vigorous grower.
Mrs. Collie.....	Crimson.....	Very delicate.
Doris Usher.....	Coral pink on cream.....	Distinctive shade.
Princess Mary.....	Medium blue.....	Strong grower.
Lady Grisel Hamilton.....	Lavender.....	Very free bloomer.
Prima Donna.....	Blush pink.....	Very fragrant.

PERENNIALS

The past season was very trying on the perennials. Owing to the hot dry weather, the flowering period was considerably shortened, and the blooms lacked their usual size and freshness. However, the results obtained under trying weather conditions would justify any one, who wishes continual bloom from early in the spring until late in the fall with a minimum amount of attention, to plant some of the most vigorous and hardy kinds. In the following table the most suitable kinds are marked with an asterisk:—

VARIETY TESTS WITH PERENNIAL FLOWERS

Variety	Height	Began to bloom	Full bloom	Bloom over	Hardiness	Remarks
* <i>Aquilegia</i> —Columbine.....	20 inches.....	June 6.....	June 20.....	July 30.....	Very hardy.....	The long spurred varieties are very desirable. Many colours are available.
* <i>Aconitum napellus</i> —Monk's Hood.....	30 inches.....	July 26.....	Aug. 15.....	Aug. 28.....	Very hardy.....	Lasts a long time as cut flowers, fine for decorating.
* <i>Anchusa italica grandiflora</i>	24 inches.....	July 6.....	July 7.....	Aug. 3.....	Hardy.....	Flowers, deep blue, slow growing.
* <i>Campanula latifolia macrantha</i> —Bell Flowers.....	15 inches.....	July 9.....	July 23.....	Aug. 23.....	Hardy.....	Flowers bell shaped, very pretty.
* <i>Delphinium</i> —Larkspur.....	3 feet.....	June 26.....	July 7.....	Sept. 5.....	Very hardy.....	One of our best perennials, variety of shades and colours, valuable for decorative purposes.
* <i>Dianthus deltoides</i> —Maiden Pink.....	5 inches.....	June 20.....	July 7.....	Aug. 2.....	Very hardy.....	Flowers bright pink, valuable for edging.
* <i>Dicentra spectabilis</i> —Bleeding Heart.....	25 inches.....	Aug. 3.....	Aug. 26.....	Aug. 30.....	Hardy.....	Flowers are pink and white and resemble a miniature heart.
<i>Dictamnus fragranella</i> —Gas Plant.....	19 inches.....	July 3.....	July 13.....	Aug. 29.....	Hardy.....	Flower exudes a peculiar perfume like gas. Foliage has a fine gloss on it.
* <i>Gypsophila paniculata</i> —Baby's Breath.....	2 feet.....	July 17.....	Aug. 30.....	Sept. 10.....	Very hardy.....	No flower garden should be without this plant. Valuable for bouquets and table decorations.
* <i>Gaillardia</i> —Blanket Flower.....	2 feet.....	July 3.....	Aug. 12.....	Sept. 19.....	Very hardy.....	Beautiful colouring.
* <i>Hibiscus</i> —Sunflower.....	20 inches.....	Aug. 26.....	Sept. 7.....	Sept. 28.....	Very hardy.....	Flowers bright yellow, very showy. Good for mixed borders.
* <i>Helenium Hoopesii</i> —Sneezewort.....	21 inches.....	June 33.....	July 1.....	Sept. 2.....	Very hardy.....	Splendid for cut flowers. Requires sunny location.
* <i>Hemerocallis middendorfi</i> —Day Lily.....	18 inches.....	June 20.....	July 5.....	July 9.....	Hardy.....	Very fine for cut flowers.
* <i>Iris sibirica</i> —Flag.....	25 inches.....	June 12.....	June 22.....	July 7.....	Hardy.....	A variety of colours. A valuable acquisition to any garden.
* <i>Lilium tigrinum</i> —Tiger Lily.....	3 feet.....	July 16.....	Aug. 1.....	Aug. 25.....	Hardy.....	A beautiful lily, very fine for cut flowers.
* <i>Lychnis</i> —Jerusalem Cross.....	3 feet.....	July 4.....	July 18.....	Aug. 25.....	Very hardy.....	Bright scarlet flowers, excellent for borders. Keep in bloom for a long time.
* <i>Paeonia</i> —Paeony.....	3 feet.....	July 8.....	July 17.....	July 17.....	Very hardy.....	Beautiful colours, very effective for decorating.
* <i>Papaver orientalis</i> —Oriental Poppy.....	24 inches.....	July 7.....	July 19.....	July 25.....	Hardy.....	Large brilliant flowers, valuable acquisition to flower garden, not suitable for cut flowers.
<i>Platycodon grandiflorum</i> —Chinese Bell Flower.....	20 inches.....	July 23.....	Aug. 29.....	Sept. 1.....	Hardy.....	Flower a sky blue colour.
<i>Polemonium richardsonii</i> —Jacob's Ladder.....	16 inches.....	July 7.....	July 18.....	Aug. 12.....	Hardy.....	Creeping habit. Blue flower.
* <i>Pyrethrum</i>	22 inches.....	June 25.....	July 10.....	July 30.....	Hardy.....	Flowers pink and white shades. Fine for cut flowers.
* <i>Spiraea astilboides</i>	28 inches.....	July 14.....	July 22.....	Aug. 10.....	Hardy.....	Pink white flower. Good for ornamental purposes.
* <i>Thalictrum adianthifolium</i> —Meadow Rue.....	3 feet.....	July 8.....	July 25.....	Aug. 23.....	Hardy.....	Foliage resembles hair fern. Excellent for bouquets and border mixtures.
* <i>Veronica spicata</i> —Speedwell.....	2 feet.....	July 24.....	Aug. 23.....	Sept. 9.....	Very hardy.....	Long spikes of blue flowers. One of the best perennials to flower.

FRUITS

The yield of fruits at this Station was very disappointing last season. The bush fruit plantation suffered slightly from winter injury. There was an abundance of bloom, but a severe frost during the night of June 6-7 severely injured all the bush fruits which were just setting. This was followed by a severe hail storm on June 19, and the result was that a large portion of the fruit dropped while still immature.

The yields were influenced to such an extent that it was deemed advisable to omit them from this report, as they were not representative of the relative value of the different varieties, and thus would be very misleading in this respect. For information concerning the relative value of the different bush fruit varieties, the reader is referred to the 1921 annual report of this Station, which presents the yearly yields from 1917 to 1921 inclusive.

TREES AND SHRUBS

COMPARISON OF TREES AND SHRUBS FOR ORNAMENTAL PURPOSES

The question of suitable trees and shrubs for home planting is receiving considerable attention from the people of the West at the present time. As this was reported in detail in our 1921 report, the reader is referred to that publication for information concerning varieties of trees and shrubs for planting in the home grounds.

CEREALS

The results obtained in the cereal test plots during the past season have been far from satisfactory. Seasonal conditions were such that it is doubtful if the yields obtained in 1922 are a fair indication of the comparative value of the different varieties.

Although seeded on land that had been thoroughly summer-fallowed the previous year, owing to the lack of moisture in the soil the plots did not make a uniform growth. There was often considerable difference in the grain growing on the same plot, some of it being so short that the head barely extended through the sheath, while other portions apparently were more fortunate and made a normal development. The lack of uniformity was apparent to a greater extent in the barleys than in either the wheat or the oats.

As the yields of many of the newly named cross-bred and selected varieties are presented for the first time in this report, no doubt considerable interest will be taken concerning their parentage and relative merits. The reader is referred to the two publications, "The Interim Report of the Dominion Cerealists" for the year 1921, and to the "Best Varieties of Grain," by Dr. Chas. E. Saunders, for additional information on these points. These may be obtained free of charge from the Publications Branch, Department of Agriculture, Ottawa. None of these newly named varieties will be offered for distribution for some time as yet.

VARIETY AND STRAIN TESTS OF SPRING WHEAT

During the past season nineteen varieties and strains of wheat were tested in duplicate plots. The plots were all sown on April 27. The results obtained with the named varieties are presented in the following table:—

VARIETY TESTS WITH SPRING WHEAT

Name of variety	Date of ripening	Number of days maturing	Length of straw	Strength of straw	Yield of grain per acre		Weight per measured bushel
			Inches		Bush. Lbs.	Lbs.	
Kitchener.....	Sept. 7..	133	33	9.5	28	50	62.1
Red Fife, Sask.....	9..	134	34	9.5	26	..	61.8
Marquis, Ottawa 15.....	Aug. 31..	126	30.5	9	24	20	64.0
Red Bobs, Early Triumph.....	Sept. 1..	127	30.5	9.3	24	..	63.8
Red Bobs, Supreme.....	" 2..	128	30	9.3	24	..	62.2
Major, Ottawa 522.....	Aug. 30..	125	35.5	9.3	23	30	61.0
Huron, Ottawa 3.....	" 30..	125	32.5	10	21	30	62.0
Bishop, Ottawa 8.....	Sept. 4..	130	30.5	9	21	..	62.4
Early Red Fife, Ottawa 16.....	" 4..	130	31.5	9.3	20	50	63.6
Marquis D.C.....	Aug. 31..	126	29	9	20	..	64.0
Producer, Ottawa 197.....	" 28..	123	28.5	9	18	40	63.6
Reward, Ottawa 928.....	" 28..	123	31	9	18	40	64.0
Duchess, Ottawa 933.....	" 22..	117	26	8.5	17	40	63.6
Ruby, Ottawa 623.....	" 24..	119	30	9	17	..	63.6
Master, Ottawa 520.....	" 25..	120	27	9	15	..	62.0
Garnet, Ottawa 652.....	" 21..	116	27.5	8.5	13	10	62.5
Crown, Ottawa 353.....	" 22..	117	27	8	12	20	61.5
Prelude, Ottawa 135.....	" 19..	114	24	8	9	40	62.6

The influence of the precipitation which was received early in August was in favour of the later-maturing varieties, the earlier maturing sorts being too far advanced for this moisture to be of any benefit to them. For that reason, 1922 results should not be taken as a true comparison of the merits of the different varieties. In 1922, late maturity was a beneficial characteristic, while in an ordinary season the later-maturing varieties would have been frosted before they attained their full development.

As one year's results do not indicate the true value of a variety, the five, four and three-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—5, 4- AND 3-YEAR AVERAGES

Name of variety	Five-year average, 1918-1922			Four-year average, 1919-1922			Three-year average, 1920-1922		
	Bush. Lbs.	Number of days maturing		Bush. Lbs.	Number of days maturing		Bush. Lbs.	Number of days maturing	
Producer, Ottawa 197.....	48	18	123	49	27	120	46	43	118
Huron, Ottawa 3.....	46	..	124	44	45	122	42	13	120
Bishop, Ottawa 8.....	44	13	125	43	6	122	41	15	121
Marquis, Ottawa 15.....	40	..	126	39	30	124	39	53	122
Crown, Ottawa 353.....	38	48	117	37	..	115	34	20	113
Ruby, Ottawa 623.....	37	8	118	36	15	119	34	..	115
Prelude, Ottawa 135.....	28	12	113	29	5	111	27	..	109
Kitchener.....	..	..	..	42	40	127	43	20	126
Garnet, Ottawa 652.....	..	..	..	42	6	115	40	55	113
Early Red Fife, Ottawa 16.....	..	..	..	41	18	125	37	3	123
Major, Ottawa 522.....	..	..	..	..	..	..	36	2	120

Producer, Ottawa 197, which heads the five-, four- and three-year average has, with the exception of 1922, been a consistently heavy yielding variety. It is similar to Marquis, Ottawa 15, in many respects, and may prove a serious rival to it. Its advantages over that variety appear to be that it produces heavier yields in this district, and also requires approximately three days less to attain maturity.

Huron, Ottawa 3, is gaining popularity in districts with a limited rainfall and light soil. Under such conditions, it appears to make a more vigorous growth than Marquis, Ottawa 15. It is one of the best varieties for the light, sandy districts of central Alberta.

Marquis, Ottawa 15, needs no introduction. This variety can be recommended for the majority of the wheat growing areas of central Alberta on locations not subject to early fall frosts. This variety will be found to give most satisfactory returns under a wide range of conditions.

Ruby, Ottawa 623, ripens approximately one week earlier than Marquis, Ottawa 15, making it a better sort for locations where the latter variety is a risky crop.

Prelude, Ottawa 135, is the earliest maturing sort here, but being the lowest yielder, it can be recommended only for districts not suitable for other varieties.

Garnet, Ottawa 652, is one of our most promising new selections, and indications are that it may prove a serious rival of Ruby, Ottawa 623. Up to date it has matured two to four days earlier, and in the four- and three-year averages produced 6 bushels more per acre than the latter variety.

Kitchener was discovered in a field of Marquis, which it resembles. In the four- and three-year averages, it matured three to four days later than Marquis.

VARIETY AND STRAIN TESTS OF OATS

During the past season sixteen varieties of oats were tested in duplicate plots. The results obtained are presented in the following table. All plots were seeded on April 28:—

VARIETY TESTS WITH OATS

Name of variety	Date of ripening	Number of days maturing	Length of straw	Strength of straw	Yield of grain		Weight per measured bushel
					Bush.	Lbs.	
Victory, Lacombe.....	Aug. 26..	120	30.0	8.5	58	18	50.2
Banner, Ottawa 49.....	" 26..	120	31.5	9.5	58	8	47.2
Leader.....	" 25..	119	30.5	9.5	54	4	46.0
Gold Rain.....	" 23..	117	31.0	8.3	51	26	47.5
Victory, Sask. 146.....	" 26..	120	30.5	9.3	50	20	49.0
Legacy, Ottawa 678.....	" 25..	119	29.0	9.0	49	14	45.5
Irish Victor.....	" 26..	120	29.5	9.0	48	18	47.5
Gerlach, Sask. 104.....	" 25..	119	31.0	9.0	47	22	48.0
Banner, Sask. 144.....	" 25..	119	28.0	9.0	44	4	46.8
Tartar King.....	" 22..	116	31.0	9.5	34	24	49.0
Long Fellow, Ottawa 478.....	" 19..	113	28.5	9.5	30	20	46.5
O. A. C., No. 3.....	" 11..	105	28.0	8.0	27	12	43.0
Daubenev, Ottawa 47.....	" 11..	105	26.0	8.0	26	26	44.0
Laurel, Ottawa 477.....	" 19..	113	27.0	8.0	25	20	58.0
Alaska.....	" 11..	105	28.5	8.0	25	10	47.2
Liberty, Ottawa 480.....	" 18..	112	28.0	9.0	22	32	55.2

The effect of the dry season is shown on the maturity of the above varieties of oats, there being only fifteen days' difference in maturity between the earliest and latest varieties. Normally the spread is considerably more than this. It will be noticed that there is practically no difference in the maturity of the first ten varieties. The light showers that fell during the ripening period, owing to

the high temperatures prevailing, did not have any effect on the maturity of the crop, the later maturing varieties being all forced into ripening on practically the same date.

Since one year's investigations are not a true indication of the merits of the different varieties, the three-, four- and five-year averages are presented in the following table:—

OATS—FIVE-, FOUR- AND THREE-YEAR AVERAGES

Name of Variety	Five-Year Average 1918-1922			Four-Year Average, 1919-1922			Three-Year Average 1920-1922		
	Bush.	Lbs.	Number of days maturing	Bush.	Lbs.	Number of days maturing	Bush.	Lbs.	Number of days maturing
Banner, Ottawa 49.....	100	27	118	93	17	114	86	14	112
Irish Victor.....	94	26	118	88	6	115	87	5	115
Victory.....	88	12	119	81	16	116	80	33	115
Gold Rain.....	83	32	114	78	31	112	80	3	110
Tartar King.....	73	33	115	63	3	112	57	20	110
Long Fellow, Ottawa 478.....							62	7	108
Daubeney, Ottawa 47.....	61		105	54	2	102	49	24	98
Liberty, Ottawa 480.....	46	11	100	37	16	104	38	26	102
Leader.....				86	32	117	83	20	116

It will be noticed that Banner, Ottawa 49, heads the list in the five-, four- and three-year averages. This variety needs no introduction and, for the production of a commercial crop, will be found to produce very satisfactory results.

Irish Victor, which stands second on the list throughout, is a later maturing variety. It usually produced a heavier tonnage of straw per acre than Banner, and for that reason might be superior to it for greenfeed. However, the yield and quality of the grain is usually slightly below Banner, hence the variety could not be recommended over Banner except for greenfeed.

Victory is a variety that has gained popularity throughout the seed trade. Its kernels are slightly shorter and plumper, and the sample usually weighs more than Banner. For these reasons, Victory is usually placed above Banner at the different exhibitions. However, this appears to be the only way in which Victory is superior to Banner.

Gold Rain is a good commercial variety with a fairly plump, yellow-hulled kernel. It does not appear to be superior in any way to Banner.

Tartar King is a short, plump kernelled, thick hulled variety, belonging to the mane or side oat type. It is an undesirable variety and cannot be recommended.

Daubeney, Ottawa 47, is one of the earliest maturing varieties here. It has fine straw of medium strength. The kernels are long, slim and thin hulled, and the seed does not weigh heavily per bushel. This variety can be recommended for localities that are subject to early fall frosts where the heavier yielding, later maturing varieties would be subject to frost injury.

Liberty, Ottawa 480, is a hullless variety. It is one of the earliest maturing varieties here, and can be recommended for districts subject to early fall frosts and where this type of oats is desired.

Leader, a variety that is receiving considerable publicity in the seed trade, belongs to the mane or side oat type. It is one of the best varieties of that type of oat. However, it has the usual characteristics belonging to that type; e.g., coarse, brittle straw that will break instead of bending when the crop lodges; also, the kernels have a rather thick hull. It does not appear to be superior to Banner in any way and cannot be recommended over it.

Victory, Sask. 146, and Banner, Sask. 144, are pure line selections of those varieties, originated by the University of Saskatchewan. They do not appear to have any advantage over the selections made by the Dominion Cerealists.

Gerlach, Sask. 104, was obtained from the University of Saskatchewan. While it has only been tested at this Station for one year, it has not shown any characteristics that make it superior to Banner.

For a description of Legacy, Ottawa 678, Long Fellow, Ottawa 478, and Laurel, Ottawa 477, the reader is referred to the bulletin "The Best Varieties of Grain," by Dr. Saunders. While these varieties have been under test for a number of years, they are not as yet available to the seed trade.

VARIETY AND STRAIN TESTS OF FIELD PEAS

Seven varieties of field peas were tested in duplicate plots in 1922. The results obtained are presented in the following table. All plots were seeded on April 28:—

VARIETY TESTS WITH PEAS

Name of Variety	Date of ripening	Number of days maturing	Length of straw	Yield of grain		Weight per measured bushel
				Bush.	Lbs.	
Early White.....	Aug. 27..	121	28.5	54	50	66.0
Arthur, Ottawa 18.....	Sept. 1..	126	26.0	39	10	65.0
Chancellor, Ottawa 26.....	Aug. 25..	119	20.5	38	20	65.0
Solo.....	Sept. 3..	128	29.5	38	..	63.0
Early White, Sask. 630.....	Aug. 27..	121	25.0	38	..	66.0
Early Feed, Ottawa 30.....	" 28..	122	27.5	32	20	65.2
Cartier, Ottawa 19.....	" 29..	123	29.0	32	..	63.8
Champlain, Ottawa 32.....	" 29..	123	27.5	31	10	65.0

Since the yields of one season do not give an authentic comparison of the different varieties, the five-, four- and three-year average yields are presented in the following table:—

FIELD PEAS—FIVE-, FOUR- AND THREE-YEAR AVERAGES

Name of Variety	Five-Year Average, 1917-1922			Four-Year Average, 1919-1922			Three-Year Average, 1920-1922		
	Bush.	Lbs.	Number of days to mature	Bush.	Lbs.	Number of days to mature	Bush.	Lbs.	Number of days to mature
Chancellor, Ottawa 26.....	*52	55	127	†51	13	128	..	..	..
Arthur, Ottawa 18.....	43	22	122	43	38	123	44	57	121
Solo.....	42	24	121	41	40	121	41	27	118
Early Feed, Ottawa 30.....	..	..	..	..	..	..	43	37	114
Cartier, Ottawa 19.....	..	..	..	..	..	..	41	53	118

* 4-year average. 1918 and 1920 crop destroyed.

† 3-year average. 1920 crop destroyed.

In presenting these averages, the year 1917 was used instead of 1918, as in the latter year there was no growth in the variety tests. In the Chancellor, Ottawa 26, variety, no yields were recorded in the year 1920, hence the three years average yields for that variety are not given.

In summing up this table, it will be noticed that Chancellor, Ottawa 26, heads the list in yield per acre. This is without doubt the best variety for the production of grain tested to date. Its small seeded, early maturing characteristics make it suitable for conditions that prevail in central Alberta. It is early enough maturing to escape injury from early fall frosts in a normal year,

and being a small-seeded variety it can be threshed with a smaller percentage of splitting than can the larger seeded varieties, such as the Arthur, Ottawa 18.

Arthur, Ottawa 18, which comes second on the list, is a good variety for districts with a longer growing season than Lacombe. It is one of the best varieties here for mixing with oats for silage or greenfeed, as it produces a larger amount of straw and is a little later in maturing. However, when grown for the seed or grain, it splits badly in threshing and is rather too late maturing.

Early White and Early White, Sask. 630, which are the same variety, are serious rivals of Chancellor, Ottawa 26. They are very similar to this variety, but as yet have been tested at this Station for only two years. During that time they have produced excellent results, but do not appear to be superior to Chancellor.

The other varieties mentioned in the above table have no features to commend them to growers over the three above-mentioned sorts.

VARIETY AND STRAIN TESTS WITH BARLEY

During the past season twenty varieties and strains of barley were tested in duplicate plots. The plots were all sown April 30. Three of these strains were then unnamed and are not listed in the following table:—

VARIETY TESTS WITH BARLEY

Name of Variety	Date of ripening	Number of days to mature	Average length of straw including heads	Strength of straw on scale of 10 points	Yield of grain per acre		Weight of measured bushel
					Bush.	Lbs.	
Hannchen Sask. 229.....	Aug. 28	120	22.0	8.0	41	32	56.0
Keystone Sask. 228.....	" 29	121	30.5	9.5	37	4	63.2
Gold.....	Sept. 3	126	23.0	8.3	35	20	56.0
O.A.C. 21.....	Aug. 28	120	30.0	9.3	34	8	54.5
Trebi.....	" 22	114	27.0	10.0	34	8	50.0
Bearer, Ottawa 475.....	Sept. 7	130	30.0	10.0	38	16	53.4
Junior, Ottawa 471.....	Aug. 20	112	26.0	9.5	33	16	64.0
Canadian Thorpe (Wheeler).....	Sept. 7	130	26.5	8.5	32	44	56.2
Chinese, Ottawa 60.....	Aug. 26	118	32.0	9.7	32	24	54.8
Barks' Excelsior.....	" 31	123	28.5	10.0	31	32	53.2
Himalayan, Ottawa 59.....	" 17	109	24.5	9.5	29	28	64.8
Feeder, Ottawa 561.....	" 29	121	33.5	10.0	25	20	56.0
Stella, Ottawa 58.....	" 27	119	30.5	10.0	22	14	52.0
Success.....	" 12	104	28.0	10.0	19	18	53.0
Duckbill, Ottawa 57.....	Sept. 6	129	24.5	9.3	19	16	55.6
Manchurian, Ottawa 50.....	" 3	126	27.5	9.5	18	6	54.2
Alberta, Ottawa 54.....	Aug. 17	109	26.0	8.7	14	43	53.0

The effect of the unusual season will be noticed in this experiment. Manchurian, Ottawa 50, one of the best varieties tried here, stands below sorts that, in an ordinary year, would not yield nearly as much per acre. This is quite typical of the whole experiment, and indicates that the above table does not give the different varieties and strain their true value.

Nine of these varieties have been grown for five years, one for four years and three for three years. The average yields for these periods are presented in the following table:—

BARLEY—FIVE-, FOUR- AND THREE-YEAR AVERAGES

Name of Variety	Five-Year Average 1918-1922			Four-Year Average 1919-1922			Three-Year Average 1920-1922		
	Bush.	Lbs.	Number of days maturing	Bush.	Lbs.	Number of days maturing	Bush.	Lbs.	Number of days maturing
Barks' Excelsior.....	75	43	122	67	03	119	63	38	117
Bearer, Ottawa 475.....	70	32	121	63	01	117	65	3	117
Gold.....	70	16	119	60	30	114	58	23	115
O.A.C. No. 21.....	64	42	113	58	08	109	57	01	108
Manchurian, Ottawa 50.....	54	39	115	46	01	111	45	25	111
Duckbill, Ottawa 57.....	53	36	119	42	19	117	37	27	117
Stella, Ottawa 58.....	55	17	114	47	20	110	46	47	109
Alberta, Ottawa 54.....	38	41	101	33	47	98	32	32	98
Junior, Ottawa 471.....				50	39	104	53	4	103
Trebi.....							64	35	107
Feeder, Ottawa 561.....							40	40	106

While Barks Excelsior heads the list in yield per acre, it cannot be recommended for all Alberta conditions. It is the latest maturing variety under test. It is one of our shortest and weakest strawed varieties, and it appears to be more susceptible to disease than the standard varieties. For districts where early fall frosts are not the limiting factor in barley production, Bearer, Ottawa 475, can be recommended. It is a heavy producing, later maturing six-rowed variety with long, strong straw. This variety is not available for distribution as yet.

Gold, a two-rowed variety, while a heavy yielder, cannot be recommended because of its short, fine, weak straw.

O.A.C. No. 21 and Manchurian, Ottawa 50, need no introduction. They are dependable standard varieties, and while they have been slightly outyielded by other varieties, farmers who are at all in doubt as to which variety to grow should make use of one of these varieties.

Duckbill, Ottawa 57, Stella, Ottawa 58, and Albert, Ottawa 54, appear to have no characteristics that make them specially commendable for this district.

Junior, Ottawa 471, one of our new varieties, is a good sort. However, it does not appear to be superior to either O.A.C. No. 21 or Manchurian, Ottawa 50, for this district.

Trebi, a new introduction which is being grown by some seed growers in the West, appears to have nothing to recommend it other than its high yielding qualities when grown under favourable conditions. If grown under adverse conditions, it is possible this variety would not compare so favourably with the standard varieties.

Himalayan, Ottawa 59, is a selection from Guymalaye. It is one of the highest yielding hulless varieties tried here, and can be recommended where this type of barley is required.

Feeder, Ottawa 561, is a strong growing, hulless variety. It has not as yet shown any characteristics to commend it above the other similar sorts.

For a further description of these varieties, the reader is referred to "The Best Varieties of Grain".

VARIETY AND STRAIN TESTS WITH SPRING RYE

Three varieties of spring rye were tested in duplicate plots last season. They were all seeded on April 27.

VARIETY TESTS WITH SPRING RYE

Name of Variety	Date of ripening	Number of days maturing	Length of straw	Strength of straw	Yield per acre		Weight per bushel
					Bush.	Lbs.	
Petkuser.....	Aug. 31	126	46.5	9.7	27	8	58
Common.....	" 31	126	42.0	9.5	24	36	56
O.A.C. No. 62.....	" 31	126	44.0	9.5	19	36	55

It will be noticed that the Petkuser variety has produced the heaviest yields. This is a large, plump-kernelled variety, and appears to do well in this district.

The O.A.C. No. 62 variety did not stand up well in the test, but this condition might be modified in a year with a normal rainfall.

The reader's attention is drawn to the yields and number of days required to mature as compared with the wheats. Many farmers are considering substituting wheat with spring rye. These crops were grown on land that is as similar as it is possible to have it under field conditions. While the spring rye produced considerably more straw, it will be noticed that it required considerably longer to mature than some of the early wheats; and, when the price of the product is considered, the grain produced would not be as profitable.

VARIETY AND STRAIN TESTS OF WINTER RYE

Four varieties of winter rye were seeded in the fall of 1921. They made an excellent growth and were in excellent condition when winter set in. The winter of 1921-22 was, however, extremely hard on all winter crops and, of the four varieties seeded; namely, North Dakota No. 959, Rosen, Courland and Common, all were completely killed out with the exception of the North Dakota No. 959. In this variety 30 per cent of the plants were not killed, and produced a fairly good sample of grain.

VARIETY AND STRAIN TESTS OF FLAX

Three varieties of flax were tested in 1922. They were all seeded on May 30 and cut after the first killing fall frosts on September 9.

VARIETY TESTS WITH FLAX

Name of Variety	Length of straw	Per cent ripe	Yield per acre	
			Bush.	Lbs.
Primost.....	26	60	16	24
Common.....	24	50	16	4
North Dakota Resistant No. 52.....	25	50	13	32

These varieties of flax produced reasonably good yields. While the crop was not fully mature, there was a large enough percentage ripened to justify a farmer seeding a small acreage for feed. It is the general belief among farmers that the growing season here is so short that flax is too risky a crop. However, it is grown with reasonable success at the Dominion Experimental Station at Beaverlodge, Alberta. This, when considered with the experimental evidence here, leads us to believe that this crop, when grown on high land that has been broken for a number of years, can be seeded with reasonable assurance of the crop attaining full maturity.

VARIETY AND STRAIN TESTS OF BUCKWHEAT

Four varieties of buckwheat were tested in 1922. While it has always been considered that this crop could not be successfully produced in central Alberta, no real experimental evidence is available to justify such a supposition. The crop was seeded on May 30 and harvested after the first killing frost on September 6. The drill was set to sow at the rate of one bushel per acre. The results obtained are presented in the following table:—

VARIETY TESTS WITH BUCKWHEAT

Name of Variety	Per cent ripe	Length of straw	Yield per Acre—Lbs.	
			Total	Grain
Rye or rough.....	65	36	7,840	1,200
Silverhulled.....	85	34	7,680	1,000
Japanese.....	60	37	8,200	960
Common.....	60	36	6,340	600

The crop made a very vigorous and rapid growth. However, the crop is very susceptible to frost injury, and the bloom and immature grain were blasted by the first frost in September, which considerably lowered what would otherwise have been a heavy crop of grain. While the grain produced would not justify one in using this crop for grain production, the total yield per acre suggests the possibility that this crop might be used to advantage in districts where difficulty is experienced in producing enough rough forage to carry stock over the winter, or as a silage crop. Its rapid and vigorous growth makes it an ideal cleaning crop, as it will choke out most of the noxious weeds if sown on a well prepared seed bed.

FORAGE CROPS

From the feeders' standpoint, the question of suitable forage crops during the past dry years has been vital. As this Station serves a district devoted to mixed farming where high grade live stock is featured, the question of suitable forage crops has been given considerable attention.

The past dry years have demonstrated that crops which gave satisfactory results in years with a reasonable amount of precipitation will not pay land rental in years with a more limited rainfall. For that reason, crops such as sunflowers, sweet clover and millets, which up to a few years ago were never given serious consideration, have suddenly sprung into prominence, resulting in a broader field for experimental work with forage crops. The importance of suitable varieties and strains within the different classes of forage crops, as well as the cultural methods necessary for their propagation, have been emphasized.

VARIETY AND STRAIN TESTS WITH INDIAN CORN

Fifteen varieties of corn were seeded in 1922. They were planted on spring ploughed land on May 27 with a Planet Jr. garden drill. Unfortunately this drill did not place the seed into the moist soil, and enough rain was not received to moisten the seed bed until too late in the season for the crop to make enough growth to permit of any comparisons being made.

For information concerning dates of seeding corn, the reader is referred to cultural experiment 14.

VARIETY AND STRAIN TESTS WITH SUNFLOWERS

Twelve varieties or strains of sunflowers were tested in 1922. While an uneven germination was obtained, there was enough development in the crop

to permit of a comparison being drawn. However, the yields produced do not do many of the varieties justice. They were seeded on May 27 and harvested on September 8.

SUNFLOWERS—TEST OF VARIETIES

Variety	Source	Average height	Per cent bloom	Yield per acre	
				Tons	Lbs.
Early Ottawa.....	C.E.F.....	48	75	6	960
Mammoth Russian.....	Commercial..	50	30	6	1,460
Mammoth Russian.....	McDonald....	48	.....	7	.....
Mammoth Russian.....	Dakota Imp. Seed Co.	39	.....	6	80
Mammoth Russian.....	Steele Briggs.	48	.....	7	1,000
Mammoth Russian (dark).....	McKenzie....	36	80	4	1,600
Mammoth Russian (light).....	McKenzie....	49	.....	7	.....
Mixed Friesland.....	Scott.....	38	90	3	720
Friesland No. 1.....	Scott.....	42	50	7	1,260
Friesland No. 2.....	Scott.....	56	70	6	1,440
Friesland No. 3.....	Scott.....	42	100	3	1,680
Lacombe No. 1.....	Lacombe....	30	100	3	720

It will be noted that the yields in all cases are low. The lack of available moisture in the soil is responsible for this condition. On other parts of the Station, under more favourable conditions, yields as high as 15 tons per acre were obtained.



Sunflowers are rapidly establishing their suitability as a silage crop.

In this experiment, the early maturing character of the different varieties is indicated by the per cent bloom. The early varieties were lower yielders in all cases, and it would seem that, until more definite information is available, the light seeded Mammoth Russian would be the best variety for general use for silage production.

Up to date, none of the varieties under test appears to be entirely satisfactory for silage purposes. The heavy yielding varieties do not mature enough to make the best silage, while the early maturing varieties do not produce enough tonnage. For this reason, an attempt has been made to isolate a strain

that will be more suitable for this district. However, considerable time will elapse before very definite results can be expected.

For information concerning the date of seeding and the distance at which to thin sunflowers, the reader is referred to cultural experiments 11 and 13.

FIELD ROOTS

Extensive experiments were started with field roots. Twenty-three varieties of Swedes, eight varieties of turnips, nine varieties of field carrots, thirteen varieties of mangels and six varieties of sugar beets, were seeded in duplicate plots. Seasonal conditions were such that the seed bed was so very dry that there was a very poor germination, and the stand was so uneven that it was considered any yields which might be obtained would be of no value as they would not give a fair indication of the comparative value of the different varieties.

Five acres of mangels were seeded on May 19 under field conditions on land that was partially summer-fallowed the previous year. A fair germination was obtained, but the young plants were killed by an early June frost. The field was reseeded with turnips on June 10. A fair crop amounting to 51 tons 320 pounds was harvested.

GRASSES AND CLOVERS

The winter of 1921-22 was very severe, and none of the biennials or perennials came through the winter in a condition good enough to permit of comparative results being drawn. In the large fields on the farm proper, alfalfa suffered less from winter killing than any of the clovers or grasses.



Western Rye Grass has never been considered as an annual. Seeded June 1st on summer fallowed land and harvested September 1st. Yielding 1 ton 1,800 lbs. cured hay per acre.

On June 1, twenty-five strains of western rye grass, fifteen varieties and strains of red clover, five varieties of white dutch clover, five varieties of sweet clover, and eight varieties of alfalfa were seeded on land which had been thoroughly summer-fallowed the previous year. In all cases a perfect stand was obtained. The plots made such a growth that it was deemed necessary to

clip them back to prevent the possibility of their being injured by smothering during the following winter. They were all cut on September 1. As many of the plots had made a considerable growth, it was thought advisable to take the weight of cured hay produced by each variety. The yields were so high in some cases that they suggested the possibility of these different varieties being used as annuals for hay production. For that reason, the yields from these plots are presented in the following pages:—

VARIETY AND STRAIN TESTS WITH WESTERN RYE

Variety	Yield per acre	
	Tons	Lbs.
Ottawa No. 2		1,200
Ottawa No. 3	1	240
Ottawa No. 4	1	1,300
Ottawa No. 5	1	1,400
Ottawa No. 6	1	1,120
Ottawa No. 7	1	1,600
Ottawa No. 8	1	1,320
Ottawa No. 9	1	1,120
Ottawa No. 11		1,960
Ottawa No. 14	1	520
Ottawa No. 15	1	1,280
Ottawa No. 17	1	1,000
Ottawa No. 18	1	1,240
Ottawa No. 19	1	1,160
Ottawa No. 20	1	960
Ottawa No. 29		1,880
Ottawa No. 47		720
Ottawa No. 78	1	800
Ottawa No. 81	1	360
Ottawa No. 85	1	680
Ottawa No. 89	1	1,200
Ottawa No. 91	1	800
Ottawa No. 93	1	920
Ottawa No. 98	1	1,160
Ottawa No. 118	1	120

The above strains of western rye grass are selections developed by the Division of Forage Crops, Central Experimental Farm, Ottawa. Many of them are very promising.

It will be noticed that the yields produced by some of the selections are considerably over a ton per acre. These high yields are above that obtained from old meadows throughout the district. If these plots had been seeded earlier in the spring so that the crop could have made its full development, considerably larger yields would probably have been harvested. It also suggests the possibility of seeding Western rye grass on well prepared land without a nurse crop, and obtaining a heavy cutting of hay the same season.

VARIETY AND STRAIN TESTS OF SWEET CLOVER

In this experiment five varieties and strains were used.

Variety	Source	Yield per Acre	
		Tons	Lbs.
White Blossomed, Biennial	Steele Briggs	2	
Yellow Blossomed, Biennial	Steele Briggs	1	520
Hubam (Annual Sweet Clover)	Michigan State Farm Bureau	2	200
Artie, Biennial	University of Saskatchewan	1	
Southworths Biennial	Manitoba Agr. College	1	1,720

It will be noticed that there is little difference in the Hubam and the White Blossomed biennial, while the Yellow Blossomed and the Arctic biennials are the lowest in yield. The difference in yield was, no doubt, due to the difference in the tendency of the different strains to set seed. Up to the time of cutting, there was little difference in the Hubam and the White Blossomed biennial.

In another section of the field where the Hubam and the White Blossomed biennial were seeded in rows on May 5, there was little difference in the growth of these two crops until August 10, after which the Hubam shot into bloom while the White Blossomed biennial showed only a trace of bloom.

The Yellow Blossomed biennial and the Arctic biennial made a thick-matted, low growth.

VARIETY AND STRAIN TESTS OF ALFALFA

Variety	Source	Yield per Acre	
		Tons	Lbs.
Grimm.....	J. J. Murray.....	1	280
Grimm.....	C.P.R. Brooks, Alta.....		1,960
Baltic.....	Steele Briggs.....		1,960
Turkestan.....	Steele Briggs.....		1,960
Canadian Variegated.....	Steele Briggs.....	1	120
Liscomb.....	A. E. McKenzie.....	1	160
Southworths' Mixed F.I.....	Manitoba Agr. College.....		1,840
Southworths' H.S.....	Manitoba Agr. College.....		1,600
6.2			

In this experiment, the Grimm alfalfa from seed produced at Belvedere, about 60 miles northwest of Edmonton, produced the strongest growth. The Liscomb variety, from Montana-grown seed, was a close second.

The above table is not a safe criterion of the comparative value of these different alfalfas, as they have not gone through a winter; hence, those that produce the smallest amount of growth the first season may eventually prove the hardiest strains.

VARIETY AND STRAIN TESTS OF RED CLOVER

Variety	Source	Yield per Acre	
		Tons	Lbs.
Common Red.....	St. Clet, Quebec.....	1	1,880
Late Swedish.....	Sweden.....		1,640
Early Swedish.....	Sweden.....		1,320
Medium Late Swedish.....	Sweden.....	1	
Common Red.....	C.E.F. Ottawa.....		1,840
Common Red.....	C.E.F. Ottawa 1916-20.....	1	80
Common Red.....	C.E.F. Ottawa 1917-20.....	1	40
Common Red.....	C.E.F. Ottawa L.R.-21.....		1,520
Common Red.....	St. Casimer, Quebec.....		1,520
Common Red.....	Kenora, Ont.....		1,040
Altaswede.....	University of Alberta.....		640
Mammoth Red.....	C.P.R., Brooks, Alta.....		1,440
537 Italy.....	Italy.....		1,400
534 France.....	France.....		1,400
500 France.....	France.....		1,240

In this experiment, the seed was obtained from a wide range of territory; hence, the seed as sown was grown under a wide range of climatic condi-

tions. As yet the only outstanding feature of the experiment is the remarkable growth made by the Common Red obtained from St. Clet, Quebec. This plot made approximately twice as much growth as any of the others, and suggests that it might have possibilities as an annual hay plant.

VARIETY AND STRAIN TESTS OF WHITE DUTCH CLOVER

Five strains of White Dutch Clover were used in this experiment. While all the plots showed a strong, even germination, none of them produced enough growth to justify harvesting the crop.

ANNUAL HAY CROPS

During the past four years, climatic conditions have been such that the standard grasses and clovers have not given satisfaction as hay producers, and the attention of farmers and experimentalists has been drawn to the merits of the annual forage crops. It was found necessary to modify the system of farming if farmers are to continue carrying large numbers of live stock on their farms. The annual forage crops relieved what would otherwise have been a serious situation.

While oats, or peas and oats, have always been recognized as the standard annual hay crop for central and northern Alberta, very little experimental work has been done to ascertain which variety of these crops would produce the heaviest tonnage and be most suitable in every way for the production of high grade fodder. For the above reason, a number of the standard varieties of oats and peas were seeded alone. Unfortunately, climatic conditions exerted such an influence on the development of this crop that a fair comparison was not possible.

The annual hay crops were seeded on well-prepared summer-fallow that was kept free from weeds during the summer-fallow year. No manurial treatment was given. The very hot, dry weather which prevailed during the growing season affected the comparative yields of the early and late maturing varieties. The lack of available moisture in the soil prematurely ripened the later maturing varieties, and thus prevented them attaining their full development; hence, in a normal year, the later maturing varieties would show a comparatively heavier tonnage per acre than that reported in the following table:—

OATS AND PEAS

Variety	Date seeded	Date cut	Yield per acre	
			Tons	Lbs.
Liberty oats.....	May 3..	Aug. 3..	1	1,780
Alaska oats.....	" 3..	" 8..	1	1,740
Daubeney oats.....	" 3..	" 8..	1	1,840
Banner oats.....	" 3..	" 11..	2	140
Victory oats.....	" 3..	" 11..	2	180
Gold Rain oats.....	" 3..	" 11..	2	120
Irish Victor oats.....	" 3..	" 11..	2	540
Banner oats and Arthur peas.....	" 3..	" 11..	2	180
Early White peas.....	" 3..	" 8..	2	.....
Arthur peas.....	" 3..	" 3..	1	1,600
Chancellor peas.....	" 3..	" 3..	1	1,840
Golden Vine peas.....	" 3..	" 3..	1	1,600
Bangolia peas.....	" 3..	" 3..	1	1,200

In this experiment, climatic conditions were such that the early maturing oat varieties, the Liberty, Alaska and Daubeney, made a fairly normal growth, while the other later maturing varieties were all scorched with the sun to such an extent that it was necessary to cut them all on the same date if good green-feed was to be obtained.

It will be noticed that the oat and pea mixture did not produce a larger tonnage per acre than the oats alone. The peas in the mixture made very little growth. The result obtained in this experiment is borne out in farm practice at this station. During a year with a shortage of moisture during the growing season, the peas in the mixture make very little growth, and, when the high price of seed is considered, it is doubtful if it is advisable to seed the peas with the oats for greenfeed or silage when there is an apparent shortage of moisture.

Where the pea varieties are seeded alone, it will be noticed that in nearly all cases the yields are below those of the oat varieties. It was noticed in the growing crop that such a quantity of weeds grew with the crop that this factor alone would eliminate field peas from the crops suitable for annual hay. The quality of the hay was seriously lowered by the admixture of weeds.

VARIETIES AND TESTS OF MILLETS AND SUDAN GRASS

In this experiment seven varieties of millet were tested. They were all seeded on May 27 and harvested on September 4, after they had been seriously frosted. The results are presented in the following table:—

VARIETY TESTS OF MILLETS AND SUDAN GRASS

Variety	Lenth of straw	Per cent in head	Yield per Acre			
			Green weight		Dry weight	
			Tons	Lbs.	Tons	Lbs.
Siberian.....	30	10	6	1,200	2	880
Hungarian.....	28	5	6	680	2	280
Hog.....	30	40	5	1,400	1	1,800
Common.....	26	30	5	.....	1	1,360
Golden.....	24	.....	4	1,400	1	1,280
Early Fortune.....	27	40	3	1,800	1	640
Japanese.....	15	.....	3	.....	.....	1,960
Sudan Grass.....	23	5	2	120	.....	1,440

There is a wide range of difference in the yields produced by the different varieties. The reason of this is that late-maturing varieties did not develop as rapidly as the early maturing sorts, and all growth was stopped by the frost while they were in the shot blade stage.

The season here is apparently too short for the millets to attain their full development, and it is doubtful if the present varieties will ever find a permanent place in agriculture in this district. Where this crop is grown, an early maturing variety should be used, as upon this will apparently depend the quantity and quality of the feed produced.

BOTANY

Field experiments to determine the effect of stem rust on different varieties of wheat and the biologic forms that develop at this Station were conducted in co-operation with W. P. Fraser, of the Division of Botany, officer in charge of cereal disease investigation on the prairies. Another experiment in which

copper carbonate dust was compared with other substances in controlling smut in wheat and hulless oats was also conducted. In these experiments, all the laboratory work was done under the direction of Mr. Fraser, while the field work was carried out by this Station. The counts for estimating the percentage of infection were made by Mr. Fraser, and the following data form a part of his report.

FIELD EXPERIMENTS TO DETERMINE THE EFFECT OF STEM RUST ON DIFFERENT
VARIETIES OF WHEAT AND EMMER, AND THE BIOLOGIC FORMS THAT
WILL DEVELOP

This experiment was begun in 1920. The varieties selected for seeding were those known to have some rust resistance, or early maturing varieties, and the principal varieties of commercial importance in the United States and Canada, and such varieties as are important differential hosts in determining the different biologic forms of stem rust. The rows were examined and the percentage of rust estimated about the time of ripening. The estimates were made by Mr. Fraser.

The results obtained last season, as well as the two previous years, indicate that farmers in Central Alberta apparently have little to fear from this disease. In 1920 and 1921 only slight traces of stem rust were found, while in 1922 the different varieties showed no trace of this disease.

EXPERIMENTS WITH COPPER CARBONATE DUST AND OTHER SUBSTANCES FOR
SMUT CONTROL.

It has been shown by many experiments in Australia, California and Washington, that dusting with copper carbonate is effective in controlling "bunt" or stinking smut of wheat. It was also found that generally the yield was increased by this treatment. Experiments last year in Minnesota gave perfect control of both bunt of wheat and smut of oats by using 2 ounces of copper carbonate dust per bushel. As the dusting method offers some advantages over the wet treatment by formaldehyde, it was thought advisable to test this method in the prairie provinces of Canada.

The seed for this experiment was treated at the Dominion Laboratory of Plant Pathology at Saskatoon, under the direction of Mr. Fraser, and forwarded to this Station. Seeding, harvesting and threshing were carried out by this Station, while the estimate of smut percentage in the plots was made by the officer in charge of the Dominion Laboratory of Plant Pathology. The outline and results of these experiments are given in tabular form.

SMUT CONTROL EXPERIMENTS

Seed.—Marquis wheat; badly smutted, obtained from the Grain Inspector at Fort William, Ont., and Winnipeg Man.

TREATMENT AND METHOD

No. 1. Formaldehyde solution, 1 to 320; seed dipped 5 minutes and then covered one hour. Formaldehyde tested by Professor Thorvaldson, of the Department of Chemistry, University of Saskatchewan, and the solution was made up to proper strength.

No. 2. Copper carbonate dust, used at the rate of two ounces per bushel, shaken thoroughly by hand in a container with the seed.

No. 3. Dehydrated copper sulphate dust and hydrated lime, equal parts, also used at the rate of 2 ounces per bushel, thoroughly shaken in the container with seed.

No. 4. Check. No treatment.

Germination of seed.—One hundred seeds were tested in each treatment in sand and soil in the greenhouse and in plates with blotting paper.

Size of the plots.—All the plots were one-fortieth of an acre, seeded in duplicate.

Moisture.—The moisture content of the soil at planting time was abundant.

Estimate of Smut.—The amount of smut present was estimated by selecting 100 heads from five different places in each plot, chosen at random, and the percentage based on the amount of smutted heads present in the 500 thus selected.

In the formaldehyde treatment the whole plots were examined carefully, and no trace of smut found.

Smut present.—In the wheat experiments the smut present was mostly *Tilletia tritici* (Bjerk.) Wint. and a small amount of *T. laevis* Kuhn. In the oat experiments it was *Ustilago levis* (K. & S.) Magn.

Yield.—The yield is given in bushels and the decimal of a bushel per acre.

EXPERIMENTS IN SEED TREATMENT FOR CONTROL OF BUNT OF WHEAT

WHEAT (MARQUIS)

Treatment	Germination, p.c.			Date seeded	Date harvested	Smut present	Yield per acre
	Soil	Sand	Plates				
1 Formaldehyde.....	67	90	81	May 1..	Aug. 31..	0	26.33
2 Copper carbonate dust.....	100	82	99	" 1..	" 31..	0.6	25.33
3 Copper sulphate and lime.....	91	90	99	" 1..	" 31..	2.2	25.33
4 No treatment (check).....	98	100	99	" 1..	" 31..	16.9	25.33

It will be seen from the results in all the experiments that the formaldehyde solution gave perfect control. Copper carbonate dust was fairly effective under conditions where the percentage of smut was low. Copper sulphate and lime was not so effective, and does not seem worthy of further trial.

Both in the field and in the germination test in the greenhouse, formalin markedly retarded growth. The percentage of germination averaged about 10 per cent higher with copper carbonate dust than with formalin. It does not seem safe to draw any conclusions from the yields. They are too close to be significant.

It was found in the experiments in Australia that when a machine was used for dusting with the copper carbonate, the grain was free from smut, while hand-treated seed showed a small amount of smut. It may be that machine treatment would have given better results in the experiments described. The seed was, however, shaken thoroughly by hand treatment.

It seems advisable to test out dusting with copper carbonate another year, as the dusting method has many advantages over the wet method.

Grain can be treated in advance of seeding without injury. No seed injury or retarded growth.

The elimination of wetting the seed and danger to germination by freezing before seeding.

Less danger of reinfection from smutty sacks, etc.

On the other hand the cost of the materials for treatment is increased. The materials for copper carbonate treatment would cost about five cents per bushel of seed, while formaldehyde for treatment would cost less than a cent per bushel at present prices.

As formaldehyde solution injures seriously the germination of Liberty oats, even when the troublesome pre-soak method is used, though not as seriously as the ordinary method, so copper carbonate dust and a number of other substances were tested for smut control on Liberty oats.

It will be noticed that though the germination of the Liberty oats was severely injured by the ordinary formalin treatment, yet from the results the grain stood freely, and thus outyielded the other plots. The plot was later in maturing.

The results of these experiments are given in the table that follows:—

EXPERIMENTS IN SEED TREATMENT FOR CONTROL OF SMUT OF LIBERTY OATS

Treatment	Germination, p.c.				Date seeded	Date harvested	Smut present	Yield per acre in lbs.
	Soil	Sand	Plates					
			Average					
Formaldehyde.....	19	16	44	26.33	May 2	Aug. 22..	0	1,260
Pre-soak formaldehyde.....	20	60	79	53.00	" 2	" 12..	1.5	1,040
Copper carbonate.....	52	88	89	76.33	" 2	" 11..	10.0	960
Copper sulphate and lime.....	71	76	85	77.33	" 2	" 11..	20.0	780
No treatment (check).....	32	62	95	63.00	" 2	" 12..	93.0	420

For further information on this subject, the reader is referred to the officer in charge, Dominion Laboratory of Plant Pathology, Cereal Disease Investigations, University of Saskatchewan, Saskatoon, Sask., who has complete data available concerning these experiments which were carried out at many of the Experimental Stations of the Prairie Provinces.

POULTRY

During the past year from the many enquiries on matters pertaining to poultry care and management, there has been a greater interest than previously taken in this very important branch of farm operations. It is gratifying to note that the majority of these enquiries have been from persons who have recently started into poultry or who are contemplating making an early start. Many inquiries as to sources of foundation stock have been received. While a number of cockerels have been sold during the past year, it has been impossible to supply any females.

Turkeys are becoming a very important item of production and have come in for more than their usual share of interest during the year. Ducks and geese have also been given a great deal of consideration.

Prices have been low throughout the year for all classes of poultry, but co-operative marketing has helped to give a brighter outlook.

THE PLANT

The poultry plant consists of a total of eight buildings, exclusive of colony houses. Among the buildings are included: the poultryman's cottage with incubating rooms, two brooder houses, two main poultry houses, one 16 feet by 48 feet and one 16 feet by 32 feet, one smaller breeding house, a log house and

a straw house. The plant is now well equipped for work. The main incubator is a 1,200-egg Candee incubator. There is also a very good 240-egg Cyphers incubator. The two brooder houses are equipped with Candee and Buckeye brooders. Two new No. 18 Buckeye brooders were installed this year, thus doubling the brooder capacity. In the laying houses a complete set of new trap-nests have been put in. Six large poultry runs were fenced off during the past summer ready for next year's hatch.

THE STOCK

Three breeds of poultry are kept: namely, White Wyandottes, Barred Rocks and single-combed Rhode Island Reds. White Wyandottes are featured and eventually will be the only breed kept here. Among the breeding stock are strains bred from the Experimental Stations at Summerland, B.C., Sidney, B.C., Scott, Sask., and the original Lacombe stock. Besides poultry, there are African and Toulouse geese and Pekin ducks. The following table gives the numbers and classification as to ages and sexes of the stock kept at the Station.

CLASSIFICATION OF POULTRY AND FOWL AT THE LACOMBE EXPERIMENTAL STATION

Breed	Males	Hens	Pullets	Totals
White Wyandotte.....	16	113	70	199
Barred Rock.....	3	34	14	51
Single-combed Rhode Island Red.....	6	45	45	96
African geese.....	1	1	.....	2
Toulouse geese.....	1	4	.....	5
Cross-bred geese.....	.....	.....	.....	14
Pekin ducks.....	2	8	.....	10
Totals.....	29	205	129	377

RECORD OF PERFORMANCE A A

In October, 1921, a pen of ten White Wyandotte pullets were entered in the Provincial Egg Laying Contest conducted at the Lethbridge Experimental Station. This pen stood seventeenth out of a total of twenty-nine pens entered. While some of the birds made very poor records, a number did very well. Five of them qualified for the Record of Performance; that is, they laid 150 eggs or over during the year.

RECORDS OF PULLETS ENTERED IN LETHBRIDGE EGG-LAYING CONTEST

Hen No.	No. of eggs
6.....	188
9.....	163
3.....	161
5.....	152
4.....	151
10.....	144 died
7.....	133
8.....	123
2.....	48 died
1.....	24

In addition to the above contest, a pen of each breed was entered in the Record of Performance "A," conducted by the Dominion Live Stock Branch. Under the regulations of this contest, the owner looks after his poultry on his

own plant, but under supervision of an inspector, who leg-bands the hens entered and calls at intervals to supervise the trap-nesting and handling of the birds. Forty White Wyandotte, twenty Barred Rock and fifteen single-combed Rhode Island Red pullets were entered in this competition. Of these eight White Wyandotte, five Barred Rock and three Rhode Island Red pullets qualified with 150 eggs or better.

PULLETS THAT QUALIFIED IN THE RECORD OF PERFORMANCE "A"

White Wyandottes		Barred Rock		S. S. Rhode Island Red	
Pullet No.	Eggs	Pullet No.	Eggs	Pullet No.	Eggs
11176.....	173	11206.....	172	11225.....	166
11151.....	164	11201.....	166	11214.....	162
11179.....	162	11203.....	154	11221.....	151
11171.....	157	11199.....	153		
11175.....	155	11210.....	151		
11187.....	154				
11185.....	150				
11186.....	150				

EARLY VS. LATE SETTING OF HATCHING EGGS

Time Hatched	Total eggs set	Number fertile	Per cent fertile	Number of chicks	Per cent of total eggs hatched	Number of chicks alive July 1	Per cent of fertile eggs hatched	Per cent of chicks hatched alive July 1	Total eggs required for 1 chick hatched	Total fertile eggs for 1 chick hatched
April.....	1,200	720	p.c. 60	286	p.c. 23.83	215	39.72	75.17	4.19	2.5
May.....	1,320	1,056	p.c. 80	215	p.c. 16.28	102	20.35	47.44	6.1	4.9

While a higher percentage of late eggs were fertile, a much lower percentage of them hatched, and a lower percentage of the total chicks hatched from the late settings survived.

HATCHING RESULTS FROM DIFFERENT MAKES OF INCUBATORS—1,200 Egg CANDEE VS. 240 Egg CYPHERS

Incubator	Total eggs set	Number fertile	Per cent fertile	Number of chicks	Per cent of total eggs hatched	Number of chicks alive July 1	Per cent of fertile eggs hatched	Total eggs required for 1 chick hatched	Total fertile eggs for 1 chick hatched
Candee.....	2,220	1,554	p.c. 70	266	p.c. 16.4	226	23.5	6	4.2
Cyphers.....	300	210	p.c. 70	135	p.c. 45.0	91	64.2	2.2	2.2

The above comparison is hardly fair because of the difference in size of the two incubators. The smaller incubator, being less complicated, should naturally give slightly better results. However, the difference this year has been so much in favour of the Cyphers incubator that the Candee incubator must take second place for this year at least.

HATCHING RESULTS FROM THE VARIOUS BREEDS—BARRED ROCKS VS. WHITE WYANDOTTES VS. SINGLE-COMBED RHODE ISLAND REDS

Breed	Total eggs set	Number fertile	Per cent fertile	Number of chicks	Per cent of total eggs hatched	Per cent of fertile eggs hatched	Number of chicks alive July 1	Per cent of chicks hatched alive July 1	Total eggs required for 1 chick hatched	Total fertile eggs for 1 chick hatched	Total eggs required for 1 chick July 1
White Wyandottes.....	1,650	1,221	74	304	18.4	24.8	190	62.5	5.4	4	8.6
Barrèd Rock.....	310	236	76	78	25.1	33.0	41	52.5	3.9	3	7.5
S.C. Rhode Island Red.....	560	336	60	119	21.2	35.4	86	72.2	4.7	2.8	6.5

In percentage of total eggs hatched, the Barrèd Rocks win, followed by the Rhode Island Reds and White Wyandottes last, but the vitality of the Rock chicks hatched was low, and 47.5 per cent, or almost half of them, died after hatching. The Reds had much more vitality, and 72.2 per cent of the chicks hatched lived. In total eggs set to produce one live chick July 1, the Rhode Island Reds lead, followed by the Barrèd Rocks, and the White Wyandottes in last place. As for the White Wyandottes, a higher percentage of eggs were hatched late and, as the late hatches did poorly this year, this would help to put the White Wyandottes into last position with 8.6 eggs set to produce one live chick July 1.

HENS VS. PULLETS FOR HATCHING EGGS

Ages	Total eggs set	Number fertile	Per cent fertile	Number of chicks	Per cent of total eggs hatched	Per cent of fertile eggs hatched	Number of chicks alive July 1	Per cent of chicks hatched alive July 1	Total eggs required for 1 chick hatched	Total fertile eggs for 1 chick hatched	Total eggs required for 1 chick July 1
Hens.....	1,690	1,352	80	344	20.3	25.4	221	64.2	4.9	3.9	7.6
Pullets.....	880	498	60	157	18.9	31.5	96	61.1	5.2	3.1	8.6

Hen eggs have given better results than pullet eggs for hatching. A higher percentage were fertile, a higher percentage of total eggs set hatched, and it took fewer eggs to produce one live chick July 1. Pullet eggs lead only in percentage of total fertile eggs hatched. As the pullets were forced for laying all winter whereas the hens were not, conditions were more favourable for the hens.

CRATE FEEDING VS. FEEDING IN A PEN WITH A LIMITED RUN

	Lot No. 1 crate fed	Lot No. 2 pen fed
Number of cockerels in each lot.....	20	20
Number of days fed.....	10	10
Weight commencing feeding..... Lbs.	72.5	80
Average weight commencing feeding.....	3.62	4.0
Weight after 10 days feeding.....	91	89.5
Average weight after 10 days feeding.....	4.55	4.47
Total gain in 10 days.....	18.5	9.5
Average gain each in 10 days.....	0.92	0.47
Average daily gain each.....	0.092	0.047
Amount of oat chop at 34c. a bushel.....	112.75	128.5
Amount of buttermilk at 20c. a hundred.....	268.3	310.1
Total cost of feed..... \$	1.65	1.90
Cost to fatten each bird.....	0.082	0.095
Cost per pound of gain.....	0.089	0.20
Value of gains at 25c. a pound.....	4.62	2.37
Profit on gains made above cost of feed..... \$	2.97	0.047

The above cockerels were fed a moist mash of oat chop and buttermilk, and, in addition, they always had access to water. The results of this experiment are very decidedly in favour of crate feeding, which required less feed and the gains practically doubled those made with pen-fed birds. The period these birds were fed (10 days) is not recommended as the best, for three weeks is short enough time to change the texture of the flesh, the 10-day period however is often used and for that reason was adopted.

COST OF RAISING GREEN DUCKS FOR TABLE USE

	First hatch	Second hatch
Date hatched.....	June 10.....	July 1.....
Number of ducks.....	43	41
Weight at end of four weeks..... Lbs.	2.25	2.0
Cost of feed for first four weeks..... Cts.	7.5	7.0
Weight at end of six weeks..... Lbs.	3.5	3.2
Weight at end of eight weeks.....	4.5	4.25
Cost for second four weeks..... Cts.	18.3	18.4
Date sold.....	Aug. 5.....	Sept. 1.....
<i>Feed required</i>		
Oat Chop at 34 c. a bushel..... Lbs.	420	558
Shorts at \$1.35 a hundred.....	420	279
Buttermilk at 20c. a hundred.....	630	550
Total cost of feed..... \$	11.13	10.44
Average cost for each duck.....	0.258	0.254
Average cost per pound.....	0.057	0.059
Total dressed shipping weight..... Lbs.	181	164
Average dressed shipping weight per duck.....	4.2	4.0
Selling price per pound..... Cts.	32	32
Net returns..... \$	57.92	52.48
Net returns per duck.....	1.34	1.27
Total profit.....	46.79	42.04
Profit per duck raised.....	1.08	1.02

The above experiment was carried out in 1921, and very similar results were obtained as to cost per pound of gain. In 1921 the cost was 7.75 cents per pound of gain, and in 1922 the costs are 5.7 and 5.9 cents per pound of gain. The eighty-four ducks fed in the above experiment comprised practically all the ducks raised from a pen of ten Pekins kept over the winter of 1921 and 1922. Besides hatching these ducks, a number of eggs were sold for hatching. The eighty-four ducks fed showed a profit of \$88.83 over and above the cost of

feeding. This does not include the cost of wintering the breeding stock. These ducks have given exceptionally profitable returns. Each duck sold returned a profit of \$1.08 in the case of the first hatch and \$1.02 for the second hatch.

The ducks were penned up in a small run 12 feet by 16 feet throughout the eight or nine weeks they were fed. The first hatch were fed equal parts of shorts and oat chop, while the second hatch received two parts of oat chop and one part of shorts. These mixtures were mixed with sufficient buttermilk to form a stiff mash. Coarse sand was mixed in to provide grit, and water was available from a pan at all times.

These figures indicate that there is profit in feeding green ducks (8 to 12 weeks old) and though they do not show the relative profit between the green and matured duck it is generally recognized that the younger age is the most profitable age at which to market ducks.

SHIPPING DAY-OLD CHICKS vs. HATCHING EGGS

An experiment comparing shipping baby chicks and hatching eggs was carried out in conjunction with the Experimental Station at Saanichton, B.C. On April 4, 100 eggs were put in the incubator at Saanichton, and on April 27, 55 baby chicks arrived at Lacombe. These were all in good condition with the exception of two, which were injured and had to be killed; thus leaving 53 chicks in good condition on arrival.

On April 3, 100 hatching eggs arrived at Lacombe from Saanichton and were put in the Candee incubator April 4. At the first test, April 11, 79 per cent of these eggs were fertile, and out of the second test, April 18, there were 15 dead germs, leaving a total of 64 fertile eggs in the incubator. Of these only 7 weak chicks finally hatched. The majority of the chicks died in the shell about the eighteenth or nineteenth day. The results of this individual experiment are very decidedly in favour of shipping baby chicks and though the disastrous results from this shipment of eggs may have been exceptional it still bears out previous experiments by demonstrating that day old chicks can be shipped with satisfaction from Vancouver Island to Lacombe, a distance of nearly 900 miles occupying about 36 hours in transit.

BEEES

THE SEASON

The season of 1922 was not ideal for the production of a maximum crop of honey. However, a fair crop of well flavoured honey was gathered.

The bees were removed from the cellar on April 21. The weather for the balance of the month was warm and bright, and the bees were able to take a good cleansing flight and clean out their hives.

May had 258.1 hours sunshine and a mean temperature of 1.43 degrees above the average, while precipitation fell on seven different days. This mild weather gave the bees an excellent chance to build up their colonies early in the season.

June was hot and dry. The mean temperature was 1.64 degrees above the average, while the precipitation was 1.792 inches below the average. This weather was not favourable for the development of the natural abundant supply of wild flowers, and the bees did not make the usual progress.

July was also dry and hot, and as there was no surplus moisture in the ground, the vegetative growth was small.

August opened very hot and dry, but the showers during the latter part of the month freshened all vegetation and made this month the best for honey production.

More honey was produced in September than is usually the case. This month was unusually warm and free from frost. The mean temperature for the month was 5.17 degrees above the average. The bees continued to gather honey until the latter part of the month, when all bloom was killed. This late honey flow was considerably augmented by the Hubam annual sweet clover which was in bloom at this season. This crop apparently was able to stand several degrees of frost without injury and lengthened the honey flow at least three weeks. Buckwheat, which gave some promise as a honey crop, was killed on September 6 by 3 degrees of frost. The sweet clover bloom showed little injury from 4-10 degrees on the 9th, and continued to bloom until killed by 6.6 degrees on the 29th.

HONEY YIELDS PER COLONY

Number of colony	Description	Source	Placed in apiary	Frames of bees	Extracted honey produced
1	Wintered Colony.....	Lacombe...	April 21....	Oct. 4 8	74.5
2	".....	".....	" 21....	7	44
3	".....	".....	" 21....	8	.....
4	".....	".....	" 21....	8	.....
5	".....	".....	" 21....	8	159
6-10	".....	".....	" 21....	8	.....
7	1 Fr. Nuclei.....	B.C.....	June 10....	8	94
8	".....	".....	" 10....	7	84
9	".....	".....	" 10....	8	140
11	".....	".....	July 8....	7	.....
12	".....	".....	" 8....	8	.....
13	".....	".....	" 8....	7	.....
14	5 ".....	Lacombe...	Aug. 23....	7	.....
15	".....	".....	" 23....	5	.....

The results shown in the above table are somewhat surprising. It will be noted that the nuclei started on June 10 produced an average yield of 106 pounds honey, while the colonies wintered at the Station produced only 55.5 pounds per colony, while colonies started later in July produced no surplus honey. Colonies 6 and 10 were united and shipped in the hive to the Dominion Experimental Station, Beaverlodge, Alberta, and cannot be considered in this table. The somewhat unfavourable results obtained with the colonies wintered over at the Station as compared with the nuclei started on June 10 was caused by a set-back these colonies received in June, from which they apparently did not recover until too late in the season for them to gather more than enough honey for winter stores. The different nuclei appeared to make a rapid development from the time they were placed in the apiary.

The above table indicates that nuclei can be used as foundation stock for an apiary with a reasonable assurance of success, but that they should be obtained early enough in the season so that the colonies can build up to full strength in time for the main honey flow. The nuclei gathered nearly all their honey from the sweet clover which lengthened the honey season.

SUMMARY OF PROFIT AND LOSS ACCOUNT

By eight colonies increase at \$20.....	\$ 160.00	
595 lbs. honey at 25c.....	148.75	
2 lbs. wax at 50c.....	1.00	
		<hr/>
To two weak colonies united and shipped to Beaverlodge		
Experimental Station.....	\$ 20.00	
60 lbs. sugar fed at 11c.....	6.60	
Value apiary labour, April to November.....	84.90	
3 nuclei and queens, June 10.....	15.00	
3 nuclei and queens, July 8.....	15.00	
1 Queen bee.....	1.75	
No. 5 Light Brood Foundation.....	3.90	
		<hr/>
	\$ 147.15	\$ 147.15
		<hr/>
Profit from Apiary.....	\$ 162.60	
Value of colonies on hand 13 colonies at \$20.....	\$ 260.00	

The above figures are an indication of the points that may be obtained in this business when a man of limited experience is in charge. With an experienced apiarist in charge, these profits would have been considerably increased.

WINTERING

Seven colonies were placed in the bee-cellar in the autumn of 1921 and were removed from the cellar on April 21, 1922. Five of these colonies wintered in good condition, while two were so weakened that they were united later in the season to make one good strong colony.

INCREASE

There was no increase from swarming during the summer. However, six one frame nuclei with queens were brought in from British Columbia and developed into good strong colonies. Also, two nuclei were started from the overwintered colonies at the Station rather late in the season, and developed into reasonably strong colonies.

HONEY PRODUCTION

During the season it was necessary to make a change in the men in charge of the apiary. As both these men were more or less amateurs, this combined with unfavourable climatic conditions had a serious effect on the honey crop produced. The yields, however, while not high, were fairly satisfactory. The total honey produced amounted to 595.5 lbs., the highest production per colony being 159 lbs., while two colonies only made enough honey to develop their brood and provide enough stores to go into winter quarters.

ONE FRAME NUCLEI WITH QUEEN VERSUS WINTERED COLONIES

Great interest is being taken by farmers in the bee industry in this province, and there would no doubt be considerable expansion in this industry were it not for the lack of available stock for sale. This Station, in an endeavour to be in a position to furnish farmers with information concerning the possibilities of starting an apiary from package bees brought in from outside points, started an experiment with bringing in one frame nuclei with queens at different dates during the season, and comparing them with colonies wintered over at the Station. The results of this experiment are clearly shown in the table of honey yields.

EXTENSION AND PUBLICITY

A new exhibit was prepared for this Station by the Division of Extension and Publicity. This exhibit was shown at Lacombe, Killam, Sedgewick, Daysland, Wetaskiwin and Ponoka. Inclement weather seemed to follow this fair circuit and cut down the attendance at the different exhibitions. However, this weather kept the people inside, and the exhibit received more attention as a result.

Special horticultural displays were made at the Calgary Horticultural Show, and at the Lacombe Fair. These displays attracted much favourable comment and were excellent object lessons of what can be done in growing small fruits, vegetables and flowers in Central Alberta without irrigation.

Breeding herds of the three different breeds of swine kept at this Station were shown at Calgary, Edmonton, Red Deer and Lacombe Fairs, where they stood up well against strong competition; thus giving the public an accurate idea of the class of swine kept for breeding purposes at this Station. A car load of bacon and thick smooth hogs were shown at the Calgary Winter Fair where the value for the block of the Lacombe Experimental Station strain of swine was clearly demonstrated. A complete statement of the winnings is given under swine.

Horses, dairy cattle and poultry were also shown at the local Lacombe Fair.

During the season, members of the staff judged at eight different fairs, and addressed numerous U.F.A. Agricultural Society and live stock meetings.

GENERAL FARM NOTES

ALTERATIONS AND IMPROVEMENTS TO BUILDINGS

During the summer the building, 40 feet by 70 feet erected in 1907 for a combined horse and cattle barn, carriage house and workshop, was moved one hundred feet west, turned half way around and placed on a concrete foundation. The interior was completely altered, and all made into a horse barn with twelve single stalls, four box stalls, feed room and harness room. Wood fittings were used throughout with concrete floors and bottoms for the mangers. The implement shed, 20 feet by 110 feet, was moved one hundred feet north and turned half way around so that it now forms a good protection for the yards. Moving these buildings places the horse barn parallel with the cattle barns, improves the grouping of the buildings, and affords room for large yards for exercising young horses.

Water piping was laid to connect the houses of the superintendent, assistant to the superintendent, foreman, herdsman and boarding house, the office, the horse barn, the cattle barns and the dairy, with the central pneumatic water supply installed in 1921. This water supply system will also afford fire protection for these buildings. Septic tanks were installed for the residence buildings.

During the war no painting was done, and many of the buildings required it very badly. The houses built for the assistant to the superintendent and the foreman in 1920 were painted for the first time, and the office, storage building and horse barn were repainted.

IMPROVEMENTS TO GROUNDS

Three new clumps of shrubs, mainly of new varieties, were planted along the new south driveway into the grounds. New caragana hedges were started west of the residences of the superintendent and assistant to the superintendent. A new caragana hedge and grass border were started on the south side of the vegetable garden to prevent soil drifting. A new trial hedge, Russian Olive, was added to the 28 experimental hedges previously under test.