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DOMINION OF CANADA
DEPARTMENT OF AGRICULTURE
DOMINION EXPERIMENTAL FARMS

EXPERIMENTAL STATION

KAPUSKASING, ONT.

REPORT OF THE SUPERINTENDENT
SMITH BALLANTYNE

FOR THE YEAR 1924

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**DOMINION EXPERIMENTAL STATION,
KAPUSKASING, ONT.**

REPORT OF THE SUPERINTENDENT, SMITH BALLANTYNE

THE SEASON

Comparing the average monthly mean temperature for a seven-year period, with those recorded in 1924, January, February and April were found to be below, while March was 3.9 degrees above the average.

For the five growing months, May 1 to September 30, May, June, July and September were all below while August was slightly above the average. May in particular was much cooler than normally, being 3.7 degrees below the average, and this delayed seeding operations materially, as it was the middle of May before much seeding was accomplished.

October was above, while November and December were below the average, particularly the latter which was 5.5 degrees below the average.

The total precipitation for the year was 23.15 inches, which is very close to the seven-year average of 23.29 inches.

The five growing months, however, received 14.19 inches or 61.29 per cent of the year's total precipitation; while the seven-year average for the same months is 12.50 inches or 53.68 per cent.

July and August in particular had very high precipitation, which had the effect of lengthening the growing period and delaying maturity to a very marked degree. This condition was intensified by the fact that July, August and September had a total of over 92 hours less sunshine than the seven-year average for the same three months.

No severe summer frosts were experienced, and as a result, while many of the crops were late in maturing, yet they were finally harvested and cured in good condition, giving abundant yields of straw, and average yields of fair quality grain.

Fall ploughing continued until November 15, which is about average for this district.

MONTHLY PRECIPITATION

Month	1918	1919	1920	1921	1922	1923	1924	Average 7 years
January.....	1.50	0.50	0.65	1.52	1.20	0.30	1.70	1.05
February.....	1.00	0.95	0.35	0.75	1.00	0.46	1.00	0.78
March.....	1.50	0.80	1.70	2.25	0.63	0.60	0.95	1.34
April.....	0.67	2.04	3.35	4.80	2.35	0.87	1.05	2.07
May.....	0.75	1.52	1.18	3.12	1.82	0.22	1.84	1.49
June.....	1.08	0.23	1.45	1.23	0.60	4.20	1.77	1.50
July.....	2.88	0.48	2.57	7.01	3.04	2.10	4.05	3.16
August.....	0.14	5.92	1.35	3.20	1.73	3.53	3.87	2.82
September.....	2.75	3.00	3.11	7.26	0.81	5.05	2.66	3.52
October.....	1.98	3.60	1.49	0.56	1.59	2.65	0.88	1.82
November.....	2.56	3.93	0.30	1.55	2.30	1.00	2.08	1.96
December.....	1.50	1.35	1.90	3.42	2.00	0.75	1.30	1.74
Total.....	17.73	24.32	19.40	37.68	19.07	21.73	23.15	23.29

MONTHLY, MINIMUM, MAXIMUM AND MEAN TEMPERATURES

Month	1918			1919			1920			1921		
	Mini- mum	Maxi- mum	Mean	Mini- mum	Maxi- mum	Mean	Mini- mum	Maxi- mum	Mean	Mini- mum	Maxi- mum	Mean
January.....	-50	23	-4.9	-33	33	6.3	-52	30	-8.8	-37	47	1.3
February.....	-52	35	-4.2	-30	37	9.5	-38	31	5.0	-44	33	4.8
March.....	-37	43	9.7	-33	55	15.9	-39	62	13.8	-30	57	11.3
April.....	-7	68	32.3	-12	65	31.5	2	62	30.8	-7	83	33.0
May.....	20	80	41.5	20	84	50.8	20	82	48.4	15	92	44.7
June.....	26	72	49.8	30	93	65.6	33	82	59.2	20	94	57.9
July.....	31	82	57.0	33	94	65.9	34	84	57.1	34	99	66.2
August.....	30	77	57.1	36	84	61.1	27	87	60.7	25	81	53.7
September.....	29	73	43.9	28	85	52.2	22	87	55.2	24	84	50.2
October.....	20	64	40.6	12	70	35.7	10	75	47.5	8	62	35.6
November.....	-2	56	31.3	-22	47	19.9	-11	40	20.0	-28	56	15.5
December.....	-30	55	10.2	-43	35	-3.0	-31	41	12.0	-33	60	6.4

Month	1922			1923			1924			Average 7 years		
	Mini- mum	Maxi- mum	Mean	Mini- mum	Maxi- mum	Mean	Mini- mum	Maxi- mum	Mean	Mini- mum	Maxi- mum	Mean
January.....	-40	30	-4.1	-42	32	-7.0	-50	40	-6.7	-43.4	33.5	-3.3
February.....	-41	32	-2.1	-42	30	-5.9	-32	41	2.5	-39.8	34.1	2.5
March.....	-15	48	18.1	-37	44	3.6	-17	43	16.6	-29.7	50.2	12.7
April.....	8	56	30.5	-15	75	29.3	-7	70	30.4	-5.4	68.4	31.1
May.....	25	85	51.7	15	86	47.0	20	75	41.5	19.2	83.4	46.2
June.....	24	88	56.4	27	91	58.8	29	79	55.1	27.0	85.5	57.5
July.....	32	84	59.9	35	90	62.2	37	89	59.9	33.7	86.8	61.2
August.....	30	88	57.6	35	77	56.1	40	78	58.9	31.8	81.7	57.9
September.....	26	80	52.1	29	82	52.3	28	75	50.5	26.5	80.8	50.9
October.....	6	79	31.7	10	69	41.9	18	77	46.2	12.0	70.8	39.9
November.....	-15	49	24.4	-5	47	27.5	-11	54	21.8	-13.4	49.8	22.9
December.....	-42	33	-3.8	-30	40	15.4	-37	37	-0.2	-35.1	43.0	5.2

MONTHLY HOURS OF SUNSHINE

Month	1919	1920	1921	1922	1923	1924	Average 6 years
January.....	79.9	63.5	101.8	93.9	76.6	88.5	84.0
February.....	93.5	113.8	122.0	85.1	88.1	142.2	107.4
March.....	109.4	144.6	125.1	137.0	142.0	128.5	131.1
April.....	169.4	73.8	187.6	108.0	237.3	161.1	156.2
May.....	255.6	210.8	238.6	240.4	231.9	185.7	235.5
June.....	317.2	250.2	302.6	219.9	256.2	246.5	265.4
July.....	235.6	224.5	276.2	236.8	334.0	202.3	251.5
August.....	152.0	278.9	220.6	188.3	195.6	177.3	202.1
September.....	95.6	173.4	174.7	192.9	140.3	133.7	151.7
October.....	67.9	151.2	80.2	82.2	118.5	148.6	108.1
November.....	43.8	70.0	43.9	32.4	59.5	26.5	46.0
December.....	74.9	46.9	16.8	63.3	41.5	84.6	54.6
Total.....	1,694.8	1,801.6	1,890.1	1,680.2	1,971.5	1,725.5	1,793.9

ANIMAL HUSBANDRY

Live stock raising and dairying must always occupy a prominent place in the system of "mixed farming" for which northern Ontario is so eminently suited.

This branch of farm industry maintains the fertility of the soil; markets in a profitable way the roughages and farm-grown grains; utilizes to good advantage stump-land pasture and furnishes employment during the whole year. Live stock and dairy products are also in good demand in the mining and lumber centres.

Considerable experimental work has been conducted at this Station with live stock in order to ascertain the most suitable feeds and the best methods of feeding, housing and handling the various classes of live stock. A number of young stock suitable for breeding purposes was distributed to settlers at moderate prices to be used as foundation stock.

The whole herd, both dairy and beef, has been given full accreditation under the Accredited Herd System.

DAIRY CATTLE

The number of dairy cattle on hand on December 31, 1924, totalled thirty-eight head. Of this number eleven are pure-bred Ayrshires and include 5 milch cows, 2 heifers, 2 heifer calves, 1 bull calf and 1 bull. The grade Ayrshires include 12 milch cows, 13 heifers and 2 heifer calves.

Pure-bred dairy bulls have always headed the herd at this Station; but no pure-bred females were purchased until 1922, when five registered Ayrshire cows with calf were purchased in the Lachute district of Quebec. These were entered in the R.O.P. and Honour Roll tests as they freshened. They all completed their year in 1924, and one has qualified in both tests and one in the Honour Roll only. These are nice typey individuals and will be used as the foundation of a pure-bred herd.

The herd sire, Ottawa Lord Kyle Third, No. —77284—, is a young bull with good individuality, and should leave some valuable stock. His dam is Flavia 8th of Ottawa —63210—, and he was sired by the imported bull, Overton Lord Kyle —70090— (18830).

MILK RECORDS

The milk yield of each cow is weighed morning and evening during her entire lactation period and recorded on a monthly milk sheet. The milk is tested once each month to determine the percentage of fat which it contains. A record is kept of the feed consumed by each animal during her lactation period and for the time during which she was dry previous to freshening. The data are used in determining the amount of feed required to maintain each animal for one year, the cost of maintenance, and the cost of milk production.

The following table shows the amount of milk produced by each cow that completed a lactation period during the calendar year of 1924. It also shows the cost of feed and the value of the milk produced. The profit column is a comparison between the cost of the feed consumed and the value of the milk produced. The value of the calf and the cost of labour are in all cases neglected.

The cost of feed is based on the following rates which are the average cost of production figures for the roughages and cost prices for the concentrates.

Ensilage, O.P.V. or Sunflowers, per ton.....	\$ 6 00
Roots per ton.....	6 00
Hay, per ton.....	12 00
Meal, per 100 lbs.....	1 90
Pasture, per day.....	0 10

DAIRY HERD RECORD 1924

Name of cow	Age at beginning of lactation period	Date of dropping calf	Number of days in lactation period	Total pounds of milk produced	Daily average yield of milk	Average per cent fat in milk	Value of whole milk at 10 cents per quart	Total cost of feed	Cost per 100 pounds of milk	Profit or loss on cow labour and calf neglected	
											Years
<i>Pure-breds</i>											
Landlady.....	6	Jan. 15, 1924	309	10,365	33.5	3.91	414 60	120 28	1 16	294 32	
Eva of Glenborough.....	7	Oct. 6, 1923	326	8,794	26.8	4.38	350 16	105 30	1 20	244 86	
Lady Alice.....	5	Dec. 3, 1923	302	7,143	23.6	4.36	285 72	104 73	1 46	180 99	
Duchess Geneva.....	6	Nov. 4, 1923	297	6,563	22.0	4.15	262 12	100 77	1 53	161 35	
Blossom of Glenborough.....	7	Oct. 9, 1923	244	5,179	21.2	3.93	207 16	83 61	1 61	123 55	
<i>Grades</i>											
White.....	12	June 16, 1923	358	11,612	32.4	3.4	464 48	121 97	1 05	342 51	
Dewdrop.....	10	April 10, 1924	237	8,009	33.8	4.6	320 36	94 22	1 17	226 14	
White A 1.....	2	Jan. 2, 1924	360	7,713	21.4	4.6	308 52	112 04	1 45	196 48	
Maggie A.....	4	Sept. 11, 1923	292	7,195	24.6	4.1	287 80	114 79	1 59	173 01	
Bloomer A.....	3	April 25, 1923	288	6,390	22.1	4.0	255 60	100 07	1 56	155 53	
Dora A.....	5	July 8, 1923	267	5,571	20.9	3.1	222 84	96 56	1 73	126 28	
Phoebe B.....	4	May 5, 1924	200	5,552	27.7	4.4	222 08	84 35	1 51	137 73	
Phoebe A.....	7	Jan. 30, 1924	270	5,283	19.4	4.1	209 72	97 31	1 85	112 41	
Phoebe A 1.....	3	April 16, 1924	231	5,016	21.6	3.8	200 64	82 51	1 64	118 13	

RATIONS FOR DAIRY COWS

In formulating rations for dairy cows, the suitability of the ration must be kept in mind and a high standard maintained. At the same time it is not economical to purchase too many of the constituent parts. Good clover pasture has been found to be about all that is required during the summer season, sometimes supplemented by a small allowance of grain to the heavier milking cows.

During the winter months an abundant supply of good silage either oats, peas, vetch or sunflower, may be used to good advantage in maintaining the dairy herd. The cattle are fed all the silage they can handle, together with a small allowance of hay, and these two roughages are supplemented by a meal mixture made up of bran, four parts; oats, two parts; barley, two parts; and oilcake, two parts.

The ensilage is fed twice daily, together with the grain which makes the silage more palatable. The hay is also fed twice per day.

The ration for any individual animal must be determined by such factors as the size of the animal, the capacity and constitution, and the ability to give milk. For the grain ration a common standard is to feed one pound of grain for every three to four pounds of milk produced. The following might be considered as a representative ration for a dairy cow weighing around twelve hundred pounds and producing about forty pounds of milk per day:—

Ensilage, O.P.V. or sunflower.....	50 lbs. per day
Clover hay.....	10 " "
Grain.....	12 " "

SUNFLOWER VERSUS O. P. V. SILAGE FOR MILK PRODUCTION

The object of this experiment was to determine the relative value of sunflower and O.P.V. silage for milk production. Ten milking cows were selected for this test. These were in such a stage of lactation when placed on test that they would all continue milking throughout the four thirty-day periods which the experiment was to cover. The ten cows used were made up of three pure-bred Ayrshires, one grade Holstein, two grade Ayrshires and four grade Shorthorns. The experiment commenced on November 15, 1923, and a uniform ration was given to each animal during the whole period, the only variation being in the variety and quantity of silage which was fed. The method of feeding the ensilage was as follows:—

Period 1—Nov. 15 to Dec. 15—Sunflower, 45 lbs. per day.
Period 2—Dec. 16 to Jan. 14—O.P.V., 40 lbs. per day.
Period 3—Jan. 15 to Feb. 13—Sunflower, 45 lbs. per day.
Period 4—Feb. 14 to March 14—O.P.V., 40 lbs. per day.

On account of the sunflower silage containing more moisture than the O.P.V. it was found that the cattle could handle only about ninety per cent as much of the O.P.V. as they could of the sunflower silage. For this reason the ration of O.P.V. is five pounds below that of the sunflower silage. This gave practically the same amount of dry matter consumed in each period, which should be a fair basis of comparison.

Seven days were taken to make the transfer from one silage to the other. The milk record was figured on the latter twenty-one days of each period so that this gave two full days on the unmixed silage before the milk record was considered. Each cow got eight or ten pounds of hay per day, and a grain ration consisting of bran, four parts; ground oats, two parts; ground barley, two parts; and oilcake, two parts, fed at a rate of eight to twelve pounds per cow per day, depending on the size of the cow, her stage of lactation and the amount of milk she was giving. The amount, however, remained constant for each animal during the four periods.

In order to eliminate any error which might occur owing to the natural decline in milk flow, the results obtained during periods one and three were averaged and compared with the results obtained in the second period.

As a check, periods two and four were averaged in like manner and compared with period three, and for the final summary showing the advantage or disadvantage of each silage, the results of these two tables were again averaged. The results obtained are as follows:—

SUNFLOWER VERSUS O.P.V. SILAGE FOR MILK PRODUCTION

Items	Period	Average	Period	Average
	2	periods	3	periods
Experimental feeds	O.P.V.	1 and 3	Sunflowers	2 and 4
		Sunflowers	Sunflowers	O.P.V.
Number of cows in test..... No.	10	10	10	10
Milk produced by 10 cows in 21 days..... lbs.	5,147-0	5,467-5	4,849-0	4,755-0
Average milk per cow per day..... lbs.	24-5	26-0	23-0	22-6
Average per cent fat in milk..... %	3-62	3-54	3-54	3-54
Total fat produced by 10 cows in 21 days..... lbs.	186-32	193-54	171-65	173-08
Average fat per cow per day..... lbs.	0-88	0-92	0-81	0-82
Total meal consumed in 21 days..... lbs.	2,058-00	2,058-00	2,058-00	2,058-00
Total hay consumed in 21 days..... lbs.	1,974-00	1,974-00	1,974-00	1,974-00
Total silage consumed in 21 days..... lbs.	8,400-00	9,450-00	9,450-00	8,400-00
Meal mixture consumed per 100 lbs. fat produced..... lbs.	1,104-55	1,063-34	1,198-95	1,189-04
Hay consumed per 100 pounds fat produced..... lbs.	1,059-46	1,019-94	1,150-01	1,140-51
Silage consumed per 100 pounds fat produced..... lbs.	4,508-37	4,882-71	5,505-38	4,853-24
Meal mixture consumed per 100 lbs. milk produced..... lbs.	39-88	37-64	42-44	43-28
Hay consumed per 100 pounds milk produced..... lbs.	38-35	36-10	40-70	41-51
Silage consumed per 100 pounds milk produced..... lbs.	163-20	172-83	194-88	176-65
<i>Findings from experiment</i>				
Cost of meal mixture..... \$	39 10	39 10	39 10	39 10
Value of hay fed..... \$	11 84	11 84	11 84	11 84
Value of silage fed..... \$	25 20	28 35	28 35	25 20
Total cost of feed..... \$	76 14	79 29	79 29	76 14
Feed cost to produce 100 pounds fat..... \$	40 86	40 96	46 19	43 99
Feed cost to produce 100 pounds milk..... \$	1 47	1 45	1 63	1 60

AVERAGE RESULTS FROM SILAGE TESTS

	Sunflower	O.P.V.
	\$	\$
Feed cost to produce 100 pounds fat.....	43 57	42 42
Feed cost to produce 100 pounds milk.....	1 54	1 53

SILAGE TESTS—AVERAGE RESULTS FOR TWO YEARS

	Sunflower	O.P.V.
	\$	\$
Feed cost to produce 100 pounds fat.....	44 79	45 37
Feed cost to produce 100 pounds milk.....	1 71	1 69

DEDUCTIONS.—The results obtained this year and also the average results for the two years would indicate that for dairy cows there is practically no difference in the feeding value of these two silages.

In actual milk production, however, the sunflower silage seems to have a slight advantage in quantity of milk and also in the per cent of fat.

In feed cost to produce 100 pounds of milk the O.P.V. has an advantage of 1 cent this year and 2 cents in the two-year average. This is caused by the greater quantity of sunflower silage which was consumed while both were charged at an equal rate.

The experiment is being repeated another year.

SUNFLOWER VERSUS O.P.V. SILAGE FOR GROWING CALVES

The object of this experiment is to determine the relative value of these two silages as a feed for growing calves. It was conducted during the same four thirty-day periods as the test with the milking cows. Ten calves were used,—three grade Ayrshires and seven grade Shorthorns. They were weighed at the beginning and end of each thirty-day period and their hay and grain ration was the same for the first two periods. At the commencement of the third period their silage ration was increased by two pounds, and their grain ration by one pound each per day. This was found advisable as the age and development of the calves during the first two months necessitated an increase being made in their silage and grain allowance. The calves, like the cows, were unable to handle quite as large a ration of O.P.V. as of sunflower silage.

The daily ration which was fed each of the ten calves during the four periods is as follows:—

SUNFLOWER VERSUS O.P.V. SILAGE FOR GROWING CALVES—RATION GIVEN

	Hay	Meal	Silage
Period 1—Sunflowers.....	6	4	16
Period 2—O.P.V.....	6	4	14
Period 3—Sunflowers.....	6	5	18
Period 4—O.P.V.....	6	5	16

The grain mixture consisted of equal parts of bran, whole oats, and oilcake. The results obtained in 1924 together with the average results for two years are as follows:—

SUNFLOWER VERSUS O.P.V. SILAGE FOR GROWING CALVES

Items	Average of periods 1 and 3	Average of periods 2 and 4	Two-year average of periods 1 and 3	Two-year average of periods 2 and 4
	Sunflowers	O.P.V.	Sunflowers	O.P.V.
Experimental Ration				
Number of calves in experiment..... No.	10	10	10	10
Total gain of ten calves in 30 days..... lbs.	483.00	231.00	396.00	313.00
Average daily gain per calf..... lbs.	1.61	0.77	1.32	1.04
Hay consumed by 10 calves in 30 days..... lbs.	1,800.00	1,800.00	1,950.00	1,950.00
Meal consumed by 10 calves in 30 days..... lbs.	1,350.00	1,350.00	1,350.00	1,350.00
Silage consumed by 10 calves in 30 days..... lbs.	5,100.00	4,500.00	5,100.00	4,500.00
Hay consumed per 100 pounds gain..... lbs.	372.67	779.22	492.42	623.00
Meal consumed per 100 pounds gain..... lbs.	279.50	584.41	340.90	451.80
Silage consumed per 100 pounds gain..... lbs.	1,055.90	1,948.05	1,287.87	1,437.69
<i>Findings of Experiment</i>				
Cost of meal mixture..... \$	25 65	25 65	24 64	24 64
Value of hay..... \$	10 80	10 80	10 65	10 65
Value of silage..... \$	15 30	13 50	16 57	14 62
Total cost of feed..... \$	51 75	49 95	51 86	49 91
Feed cost to produce 100 pounds gain..... \$	10 71	21 62	13 09	15 94

DEDUCTIONS.—The results obtained this year indicate that the sunflower silage is the better of the two as a feed for growing calves. These differ from the results obtained last year, and may be due to the fact that a portion of the sunflower silage used the first year was two years old and on that account may not have been of as good quality as that used this year, which was all new silage.

This experiment is to be repeated another year.

BEEF CATTLE

The number of beef cattle on hand on December 31, 1924, totalled forty-five head. Of this number the pure-bred Shorthorns included 6 cows, 2 heifers, 1 heifer calf, and 1 bull. The grade Shorthorns included 14 cows, 14 heifers and 7 heifer calves.

The pure-bred cows and heifers were transferred to this Station from the Indian Head Farm and the herd sire Dictator —125442— was obtained from the Brandon Farm in exchange for the Kapuskasing herd sire Jubilee Prince —151283—. This latter was a nice type of bull and was leaving some good stock. The present bull sired some fairly high-producing females at Brandon and should prove very valuable at this Station, now that a number of pure-bred females are here from which to breed.

The beef herd together with their calves have always been pastured on a large area of stump-land seeded as soon as it was burned over. This procedure of pasturing the cows has prevented the keeping of milk records.

During the winter months the beef herd was fed more roughages and less concentrates than the dairy herd. As with the dairy cows, the individual rations vary according to the size, constitution and condition of each animal, but an average ration for a cow weighing 1,200 pounds would include fifty pounds of ensilage, five pounds of hay, five pounds of straw and two pounds of grain per day. The ensilage is fed twice daily with the grain spread over it, while the hay and straw are each fed once a day.

SUNFLOWER VERSUS O.P.V. SILAGE FOR WINTERING BEEF CATTLE

The object of this experiment is to determine the relative value of sunflower versus O.P.V. silage when used as the major portion of the winter ration for beef cows. The test covered four thirty-day periods as was the case with milking cows and growing calves.

For this test ten head of beef cattle were selected and weighed on November 15, 1923. The ration was identical over the four thirty-day periods with the exception of the variety and quantity of silage fed. Sunflower silage was fed during the first and third periods, and O.P.V. silage during the second and fourth periods. During the first and third periods, four of the cattle were fed 45 pounds of silage, 5 pounds of hay, 5 pounds of straw and 4 pounds of grain each per day. The other six head were each fed 35 pounds of silage, 5 pounds of hay and 5 pounds of straw, but no grain. During the second and fourth periods the ration was the same as the above, only that O.P.V. silage was fed instead of sunflower silage and at five pounds less per head per day. The results obtained are as follows:—

SUNFLOWER VERSUS O.P.V. SILAGE FOR BEEF CATTLE

Items	Average of periods 1 and 3	Average of periods 2 and 4	Two-year average of periods 1 and 3	Two-year average of periods 2 and 4
	Sunflowers	O.P.V.	Sunflowers	O.P.V.
Experimental Ration				
Number of cows in test.....No.	10	10	10	10
Total gain of 10 cows in 30 days.....lbs.	336.00	96.00	322.70	210.70
Average daily gain per cow.....lbs.	1.12	0.32	1.07	0.70
Hay and straw consumed by 10 cows in 30 days.....lbs.	3,000.00	3,000.00	3,000.00	3,000.00
Meal consumed by 10 cows in 30 days.....lbs.	480.00	480.00	420.00	420.00
Silage consumed by 10 cows in 30 days.....lbs.	11,700.00	10,200.00	10,575.00	9,075.00
Hay and straw consumed per 100 pounds gain.....lbs.	892.85	3,125.00	929.65	1,423.82
Meal consumed per 100 pounds gain.....lbs.	142.85	500.00	130.15	199.33
Silage consumed per 100 pounds gain.....lbs.	3,482.14	10,625.00	3,277.03	4,307.07
<i>Findings of Experiment</i>				
Cost of meal mixture.....\$	9 12	9 12	7 71	7 71
Value of hay and straw.....\$	18 00	18 00	16 50	16 50
Value of silage.....\$	35 10	30 60	34 09	29 21
Total cost of feed.....\$	62 22	57 72	58 30	53 42
Feed cost to produce 100 pounds gain.....\$	18 51	60 12	18 06	25 35

DEDUCTIONS.—The results from this experiment for this year are very similar to those obtained with the growing calves and show an advantage for the sunflower over the O.P.V. silage. They, however, are different from the results obtained the first year. This experiment will be repeated next year.

It is quite evident, both from observation and from the figures for the two years, that silage made from either O.P.V. or sunflowers gives an excellent succulent feed for dairy cattle, beef cattle and growing calves.

SHEEP

The present flock of breeding sheep consists of twenty-five ewes, nine ewe lambs and one ram, all being registered Shropshire. There are also on hand three pure-bred yearling rams, and four fall lambs (three males and one female). In 1924 thirty-three spring lambs were born. Of these, twenty-eight were living and healthy when the flock went out to pasture. In November and December, five ewes which had failed to conceive the previous autumn, gave birth to seven lambs, four of which are still living. On two occasions this year severe losses were suffered by the flock of sheep from wolves and dogs. A wolf climbed over the corral fence, killed four of the ewes and worried several others; and the flock was attacked later by dogs during the day time, when five more ewes were killed and several worried. As a result of these attacks the lambs failed to develop as they normally would have done. Consequently the male lambs were killed for mutton, while as yet the females have been retained. Some of these may also be discarded on account of poor development.

The winter ration fed to each ewe consisted of two and one-half pounds of clover hay per day, and one-half pound of grain. The grain mixture was composed of whole oats, three parts; bran, one part; and oilcake, five per cent.

After the lambs were weaned the ewes were turned on clover pasture and given an additional amount of grain as a flushing ration previous to breeding.

SUNFLOWER VERSUS O.P.V. SILAGE FOR WINTERING LAMBS

The object of this experiment is to determine the relative value of sunflower and O.P.V. silage as a part of the ration for wintering lambs.

For this experiment thirteen ewe lambs were weighed on November 15, 1923. Their ration was the same for the four thirty-day periods that the test was conducted with the exception of the variety of silage which was fed. In the first and third periods sunflower silage was supplied and in the second and fourth periods it was replaced by the O.P.V. silage.

The ration consisted of one pound of silage, two pounds of clover hay and one-half pound of grain per lamb per day. The grain mixture consisted of three parts of oats, one part of bran and five per cent of oilcake.

The results obtained in 1924, together with the two-year average, are as follows:—

SUNFLOWER VERSUS O.P.V. SILAGE FOR GROWING LAMBS

Items	Average periods 1 and 3 1924	Average periods 2 and 4 1925
	Sunflower	O. P. V.
Experimental Ration		
Number of lambs in test.....No.	13	13
Total gain of 13 lambs in 30 days..... lbs	121.0	53.5
Average daily gain per lamb..... "	0.3	0.1
Total hay consumed by 13 lambs in 30 days..... "	780.0	780.0
Total meal consumed by 13 lambs in 30 days..... "	195.0	195.0
Total silage consumed by 13 lambs in 30 days..... "	300.0	390.0
Hay consumed per hundred pounds gain..... "	644.0	1,457.0
Meal consumed per hundred pounds gain..... "	161.0	364.0
Silage consumed per hundred pounds gain..... "	322.0	728.0
<i>Findings of Experiment</i>		
Cost of meal mixture..... \$	3 31	3 31
Value of hay..... \$	4 68	4 68
Value of silage..... \$	1 17	1 17
Total cost of feed..... \$	9 16	9 16
Feed cost to produce 100 pounds gain..... \$	7 57	17 12
Two-year average feed cost to produce 100 pounds gain..... \$	9 82	12 26

DEDUCTIONS.—The results obtained this year show that sunflower silage gave larger and cheaper gains than the O.P.V. silage. This also applies to the two-year average. This experiment will be repeated another year.

SWINE

The present herd of breeding swine consists of sixteen sows and two boars, all registered Yorkshires. The senior boar, Agassiz Bonus —80699—, is a very fine type of bacon sire and is leaving some good stock. The young boar, Ottawa Wonder 2 —97201—, was imported in dam from the Sinclair herd in Scotland and is used largely for serving young sows previous to selling them to settlers as breeding animals.

During the year seventeen litters were farrowed, giving a total of 170 pigs. Of this number 131 were raised to weaning age.

Most of the females have been disposed of as breeding stock, either at weaning age or as young sows carrying their first litters. They had been used for experimental feeding, which had been carried on along the lines of comparing different feeds and methods of feeding. Some young males were also sold.

PIG-FEEDING EXPERIMENT

The objects of this experiment are to compare: 1. Self-feeding versus pail feeding; 2. Tankage self-fed in the grain mixture; 3. Tankage fed apart from the grain mixture in a separate self-feeder; 4. No tankage in the ration; 5. Skim-milk as a supplement to the meal ration.

For this experiment thirty-two pure-bred Yorkshire pigs were selected on January 2, 1924, and divided into five lots of equal weight and general development. Each lot was housed under similar conditions in the main hog-pen and furnished with a supply of mineral matter. This mixture consisted of charcoal, one bushel; air-slaked lime, four pounds; salt, four pounds; bone meal, four

pounds; and one and one-half pounds of copperas dissolved in water and poured over the mineral mixture. It was kept before them at all times during the experiment.

A similar grain mixture was given to all lots, but it was changed from time to time as the pigs got older. During the first month the mixture consisted of equal parts of ground oats and middlings; during the second month, two parts of ground oats and one part each of shorts and middlings; during the third and fourth months, two parts of ground oats and one part each of shorts, middlings, bran, and ground barley.

The various lots were fed as follows: (a) Lot one, grain mixture self-fed, (b) Lot two, grain mixture pail fed, (c) Lot three, grain mixture plus ten per cent tankage self-fed; (d) Lot four, grain mixture and tankage each self-fed separately; (e) Lot five, grain mixture self-fed and milk hand-fed. Fresh water was available for each lot at all times for drinking purposes.

The skim-milk was charged at fifty cents per one hundred pounds and the other feeds at average market prices. These are as follows:—

Oats.....	per cwt.	\$1 70
Barley.....	"	2 35
Shorts.....	"	1 65
Middlings.....	"	1 95
Bran.....	"	1 60

COMPARISON OF SELF-FEEDING VERSUS PAIL FEEDING. TANKAGE FED BY DIFFERENT SYSTEMS VERSUS NO TANKAGE VERSUS SKIM-MILK. YEAR 1924

Items	Lot 1	Lot 2	Lot 3	Lot 4	Lot 5
	Self-fed	Pail fed	Self-fed and tankage mixed	Self-fed tankage separate	Self-fed and skim-milk
Number of pigs in each lot.....No.	6	6	6	6	6
Total weight of six pigs on January 2.....lbs.	269.0	260.0	260.0	276.0	261.0
Average weight of each pig on January 2....."	44.8	43.3	43.3	46.0	43.3
Final weight of six pigs on May 1....."	737.0	806.0	1,198.0	898.0	881.0
Average weight of each pig on May 1....."	122.8	134.3	199.6	149.6	146.8
Total gain of each lot in 120 days....."	468.0	546.0	938.0	622.0	620.0
Daily gain of each lot....."	3.9	4.5	7.8	5.1	5.1
Average gain of each pig in 120 days....."	78.0	91.0	156.3	103.6	103.3
Average daily gain of each pig....."	0.6	0.7	1.3	0.8	0.8
<i>Feed consumed</i>					
Bran.....lbs.	267.0	266.0	271.0	265.0	268.0
Middlings....."	662.0	661.0	666.0	660.0	663.0
Shorts....."	442.0	441.0	446.0	440.0	443.0
Oats....."	1,104.0	1,102.0	1,112.0	1,100.0	1,106.0
Barley....."	267.0	266.0	271.0	265.0	268.0
Tankage....."			268.0	300.0	
Skim-milk....."					5,420.0
Total meal consumed (tankage included)....."	2,742.0	2,736.0	3,034.0	3,030.0	2,748.0
Average meal consumed per pig....."	457.0	456.0	505.6	505.0	458.0
Average meal consumed per pig per day....."	3.8	3.8	4.2	4.2	3.8
Amount of meal per 100 pounds gain....."	586.0	501.0	323.4	487.1	443.2
Amount of meal per one pound gain....."	5.8	5.0	3.2	4.8	4.4
Cost of feed per lot (labour neglected).....\$	49 49	49 38	57 15	57 39	76 69
Cost to produce 100 pounds gain (labour neglected).....\$	10 57	9 04	6 09	9 22	12 36
Average total gain of each lot in 120 days for 2 years.....lbs.	320.5	362.5	580.5	448.5	406.0
Two-year average cost to produce 100 pounds gain (labour neglected).....\$	11 71	10 32	7 37	10 24	13 56

DEDUCTIONS.—Comparing the results obtained from lots one and two, it is found that the pail-fed lot gave the larger gains and at lower cost per pound of gain when the cost of labour is neglected.

Lots one and three show that those fed tankage made larger and cheaper gains than those fed no tankage.

Comparing lots three and four it is found that those which were supplied 10 per cent of tankage mixed in their grain made greater and cheaper gains than those which received the tankage separately.

Lot 5, which was fed skim-milk, made greater gains than either lots one or two, which got neither skim-milk nor tankage, but smaller gains than either lots three or four, which received tankage. In all cases the cost per 100 pounds gain was greatest with the pigs which were fed skim-milk, when the milk was charged at fifty cents per hundred pounds which is possibly an excessive price.

COMPARISON OF CLOVER PASTURE VERSUS NO CLOVER PASTURE, THE SELF-FEEDER VERSUS PAIL-FEEDING AND LIGHT FEEDING VERSUS ORDINARY FEEDING

The objects of this experiment are: (a) To compare the results obtained from growing pigs on clover pasture, versus inside without any pasture; (b) The use of the self-feeder on clover pasture versus pail-feeding; (c) The results of light feeding versus ordinary feeding both indoors and on clover pasture.

For this experiment fifty pure-bred Yorkshire pigs ranging in age from eight to fourteen weeks were selected on July 3, 1924, and divided equally into five lots of ten pigs each.

Lots one and four were housed inside in the main hog-pen while lots two, three and five were put on clover pasture, each lot having a portable hog-cabin as a shelter.

The meal ration was the same for each lot and consisted of two parts of finely ground oats; two parts of middlings; and one part of finely ground barley plus ten per cent of tankage. During the first few days of the experiment, skim-milk was used instead of tankage and each lot got the same amount.

Lots one and two were fed their grain in normal amounts in the form of a slop mixed in water, while lot three was fed the grain dry from a self-feeder. Lots four and five were fed in the same manner as lots one and two, only much lighter at the commencement of the test, the idea being to develop a good growthy pig before any attempt was made to put on fat. Fresh drinking water was kept before each lot at all times. The results obtained are as follows:—

COMPARISON OF CLOVER PASTURE VERSUS NO CLOVER PASTURE. THE SELF-FEEDER VERSUS PAIL FEEDING AND LIGHT FEEDING VERSUS NORMAL FEEDING

Items	Lot 1	Lot 2	Lot 3	Lot 4	Lot 5
	Inside and hand-fed	Clover pasture and hand-fed normally	Clover pasture and self-fed	Inside and hand-fed lightly	Clover pasture and hand-fed lightly
Number of pigs in each lot.....No.	10	10	10	10	10
Total weight of ten pigs on July 3.....lbs.	474.0	465.0	466.0	475.0	473.0
Average weight of each pig on July 3....."	47.4	46.5	46.6	47.5	47.3
Final weight of 10 pigs on Sept. 2....."	1,263.0	1,276.0	1,463.0	1,154.0	1,200.0
Average weight of each pig....."	126.3	127.6	146.3	115.4	120.0
Total gain of each lot in 91 days....."	789.0	811.0	997.0	679.0	727.0
Average daily gain per pig....."	8.6	8.9	10.9	7.4	8.0
Average daily gain per each lot of ten pigs....."	8.6	8.9	10.9	7.4	8.0
<i>Feed consumed</i>					
Ground oats to each lot.....lbs.	928.0	908.0	1,084.0	852.0	892.0
Middlings to each lot....."	928.0	908.0	1,084.0	852.0	892.0
Ground barley to each lot....."	464.0	454.0	542.0	426.0	446.0
Tankage....."	182.0	177.0	201.0	173.0	183.0
Skim-milk....."	480.0	480.0	480.0	480.0	480.0
Total grain ration per lot (tankage included)....."	2,502.0	2,447.0	2,911.0	2,308.0	2,413.0
Average grain ration per pig....."	250.2	244.7	291.1	230.8	241.3
Average grain ration per pig per day....."	2.7	2.6	3.1	2.5	2.6
Amount of meal per 100 pounds gain....."	317.1	301.7	291.9	339.1	331.9
Amount of meal per one pound gain....."	3.1	3.0	2.9	3.3	3.3
Cost of feed per lot (labour neglected).....\$	51 14	50 05	59 02	47 32	49 48
Cost to produce 100 pounds gain (labour neglected).....\$	6 48	6 17	5 91	6 96	6 80
Three-year average cost to produce 100 pounds gain (labour neglected).....\$	8 48	7 59	7 62	.....	.....

DEDUCTIONS.—Comparing lots one and two this year it is found that the use of clover pasture has given slightly the larger gains and also a little lower cost per 100 pounds of gain, while the three-year average shows pasture to have a very considerable advantage in cost per 100 pounds.

The lot on the self-feeder this year gave the largest gains and the lowest cost of gain of any of the lots; but in the three-year average the cost per hundred pounds is slightly higher than for the lot on clover pasture which was handled under exactly the same conditions other than the method of feeding.

By comparing lots one and four it is found that the light-fed lot gave smaller gains and a slightly higher cost per 100 pounds; but the pigs in this lot appeared to be a better proposition for finishing as bacon hogs.

Comparing lots four and five, it will be noted that there is a slight advantage both in increased gain and in lower cost in favour of the lot on pasture.

From the three years' results it would appear that pigs on good clover pasture may be expected to give slightly larger gains at a little lower cost per 100 pounds than pigs kept inside and pail-fed.

The results obtained from the use of self-feeders seem to indicate that considerable depends on the age and individuality of the pigs included, but in cases where very large gains are obtained there is a danger of sacrificing some of the bacon type as the pigs seem to have a tendency to get thick and fat.

HORSES

The horses which have been maintained at this Station have been kept for work only as no experimental work has been attempted, either in breeding, or feeding.

At the present time there are fifteen horses on the Station. Twelve of these are heavy work-horses either Percheron or Clydesdale grades, and the other three consist of a lighter horse which is used for driving, drawing express, etc., a sucking colt and a saddle pony.

In the summer the horses are required for the regular farm work and during the winter they are employed at hauling pulp, timber, wood, hay, manure, etc.

A record is kept of the feed consumed by each horse, and while this varies considerably with the individuality of the horse and the nature of his work, the following ration might be considered as suitable for a horse weighing 1,500 pounds and working steadily at reasonably heavy work,—mixed hay, eighteen pounds per day; whole oats or oats and bran, fifteen to eighteen pounds per day; this, as already mentioned, depending on the condition of the horse and the nature of the work.

Boiled barley or bran mash may be used to advantage on Saturday nights as a conditioner. In the winter a small teaspoonful of saltpetre occasionally is useful for the prevention of kidney trouble.

FIELD HUSBANDRY

ROTATION OF CROPS

With the object of obtaining some reliable data, as to the most practical and suitable rotations for Ontario's northern clay belt, a comprehensive experiment in crop rotations was commenced in 1922.

Each rotation includes one acre for each year that the rotation covers; that is, a three-year rotation covers three acres, a four-year rotation four acres, and so on.

The rotations are situated on clay-loam soil which is fairly uniform. Some narrow strips of muck are running crosswise of the rotations and therefore should affect all rotations equally.

Some of the main points on which data are being obtained are as follows:—

- (1) The value, if any, of a short rotation in building up the fertility of the soil.
- (2) The effect on the following crop of a sod, one, two and three years old.
- (3) The yield of hay from first, second and third-year meadows.
- (4) The yield of sunflowers, following clover sod, timothy sod, and following grain.
- (5) The yield of grain after (a) sunflowers, (b) hay, (c) grain.
- (6) The success of various rotations involving various proportions of the different types of crop.
- (7) The use of fall or spring grain.
- (8) The value of a summer-fallow, as compared with a cleaning crop like potatoes or sunflowers.
- (9) The value of potatoes as a money crop.

In connection with the cost of production figures, a record is kept of all items involved and a value is set on all products produced. These form a basis on which to compare the rotations and from these figures may be calculated the profits or losses obtained.

Following is a description of each rotation under test. As these rotations have not in all cases completed one cycle, it is too soon yet to make any comparisons.

ROTATION A (THREE YEARS' DURATION)

First year.....	Sunflowers.
Second year.....	Oats.
Third year.....	Clover hay.

This is a short rotation, which should prove valuable in building up the fertility of the soil. It should also be efficient in keeping down weeds of a perennial nature.

The clover sod is manured at the rate of twelve tons to the acre and fall-ploughed for sunflowers. After the sunflowers are removed the land is again fall-ploughed for oats, which are used as a nurse crop to seed down with.

This rotation, demands one-third of the area in hoed crops, and for this reason might not be applicable on all farms.

ROTATION B (FOUR YEARS' DURATION)

First year.....	Sunflowers.
Second year.....	Oats.
Third year.....	Clover hay.
Fourth year.....	Timothy hay.

The manure in this rotation is applied at the rate of sixteen tons to the acre for sunflowers instead of twelve and the rotation covers one more year, otherwise it is very similar to "A."

This should be one of the best and most practical rotations of all those under test, particularly for mixed farming.

ROTATION C (FIVE YEARS' DURATION)

First year.....	Oats.
Second year.....	Sunflowers.
Third year.....	Barley.
Fourth year.....	Clover hay.
Fifth year.....	Timothy hay.

The timothy sod is fall-ploughed for oats. The oat stubble is manured at the rate of twelve tons to the acre and fall-ploughed for sunflowers. After the sunflowers are removed the land is again fall-ploughed for barley which is used as a nurse crop with which to seed down. After the clover hay is cut, manure is applied at the rate of eight tons to the acre, which benefits the timothy meadow the following year.

This rotation gives more grain and also a greater variety in grain produced than rotations A or B. The crops represented are all well adapted to this part of Ontario.

ROTATION D (SIX YEARS' DURATION)

First year.....	Potatoes.
Second year.....	Wheat.
Third year.....	Barley.
Fourth year.....	Clover hay.
Fifth year.....	Timothy hay.
Sixth year.....	Timothy hay.

The land is manured at the rate of sixteen tons to the acre and fall-ploughed for potatoes. After the potatoes are dug the land is again fall-ploughed for wheat, and is also fall-ploughed for barley, which is used as a nurse-crop. After the barley is harvested, the new seeding is given a top dressing of manure at the rate of eight tons to the acre.

This is the longest rotation under test. The crops grown may be used on the farm or disposed of as cash crops. No silage or oats are included in this rotation, and these are two of the main crops needed in mixed farming.

ROTATION E (FIVE YEARS' DURATION)

First year.....	Oats seeded to clover.
Second year.....	Summer-fallow.
Third year.....	Fall wheat.
Fourth year.....	Clover hay.
Fifth year.....	Timothy hay.

The first, fourth and fifth years of this rotation are similar to "C" while the summer-fallow in the second year has taken the place of sunflowers as a cleaning crop, and fall wheat is used to seed out with in the third year instead of barley.

The land is fall-ploughed for the oat crop. The second year the clover is allowed to grow until it has become a fair height, when it is supplemented by an application of manure at the rate of twelve tons to the acre, and ploughed down as a part of the summer-fallowing operation. The land is given frequent cultivation until the latter part of August, when the fall wheat is sown together with some timothy seed. The next spring the clover is sown just as the snow is leaving the ground. After the clover hay is cut the fourth year, the meadow is given a top dressing of manure at the rate of eight tons to the acre, for the benefit of the next two crops.

In this rotation only four crops are obtained, while the manure is applied at the rate of four tons per acre per year, the same as in the other rotations.

COST OF PRODUCING FARM CROPS

Records on cost of production are kept of all field-crops grown. In arriving at these costs, actual prices are used wherever possible, such as the cost of labour, twine, seed, etc. The rent of land is arrived at by multiplying the value of the land by the current rate of interest; the use of machinery is charged at three dollars per acre and is arrived at by figuring the interest on investment, depreciation charges and a percentage for repairs under Eastern Canada conditions. The cost of horse labour is taken at ten cents per hour and is arrived at on the basis of the cost of maintenance for one year divided by the number of hours' work done under Eastern Canada conditions.

The figures which follow are in most cases, from field areas which were not included in the rotations or other experimental work.

COST OF PRODUCING SPRING WHEAT

The only spring wheat produced this year was grown on the one acre included in the six-year rotation, consequently it has been used to show the cost of producing this crop.

The seed was sown on May 13, at the rate of two bushels per acre, and harvested on September 27, making 137 days of growing period or sixteen days longer than in 1923.

The seed germinated well and a good growth developed, giving a fair yield of medium quality grain. The cost of production is as follows:—

Total cost per acre.....	\$33 22
Yield per acre.....	bus. 22
Cost per bushel.....	\$ 1 51

COST OF PRODUCING OATS

The cost of producing oats is figured on an area 4.7 acres in size which was grown under field conditions. Banner was the variety grown and gave a good growth of straw, but owing to cool weather, too much moisture and a lack of sunshine the grain was slow in maturing. The seed was sown on May 16 and 22, and harvested on October 4. The cost of production is as follows:—

Total cost per acre.....	\$26 99
Yield per acre.....	bus. lbs. 40 31
Cost per bushel.....	\$ 0 66

COST OF PRODUCING BARLEY

The figures on cost of production of barley are based on seven acres which were sown with registered O.A.C. No. 21, on May 16, at the rate of two bushels per acre. The ground was fall-ploughed and had previously produced a crop of potatoes for which crop it was manured at the rate of sixteen tons to the acre. The barley germinated well, grew and ripened normally, giving a fair yield of good quality grain. The cost of production is as follows:—

Total cost per acre.....	\$29 21
Yield per acre.....	bus. lbs. 33 9
Cost per bushel.....	\$ 0 88

COST OF PRODUCING FALL WHEAT

One acre of fall wheat was grown on the five-year rotation following summer-fallow. The seed was sown on September 1, 1923, at the rate of two bushels to the acre and harvested on September 9. Dawson's Golden Chaff was the variety used. Some winter-killing occurred, so that only a fair crop was obtained. The cost of production is as follows:—

Total cost per acre.....	\$35 81
Yield per acre.....	bus. lbs. 14 30
Cost per bushel.....	\$ 2 47

COST OF PRODUCING HAY

The hay crop in 1924 was fairly heavy, due to the plentiful supply of moisture throughout the growing season. The weather was somewhat uncertain for curing hay, but sufficient good weather prevailed to allow getting the majority of it made in good condition. The standard hay mixture which has been used is red clover eight pounds, timothy eight pounds, and alsike clover two pounds.

As two years is the normal age of meadows, only one-half of the cost of grass and clover seed is charged to each crop. The first year meadows are mostly clover but by the second year, considerable timothy is generally present. During wet seasons, the clover tends to crowd out the timothy even on meadows which

are two or more years old. Eighty-five acres of hay were grown under field conditions and not included in experimental work in 1924. The cost of production is as follows:—

Total cost per acre.....	\$15 52
Yield per acre.....	tons lbs. 1 1,620
Cost per ton.....	\$ 8 58

COST OF PRODUCING SUNFLOWERS

Twelve acres of sunflowers were sown on June 7, on fall-ploughed timothy sod which was manured at the rate of sixteen tons to the acre, during the winter.

The seed was sown with the ordinary grain drill in rows thirty inches apart and the plants were about six inches apart in the row. Germination was good and a fair crop was obtained, although on account of late seeding the crop was not nearly as far advanced as it should be when harvested the week of September 22.

The cost of production is as follows:—

Total cost per acre.....	\$46 73
Yield per acre.....	tons lbs. 4 238
Cost per ton.....	\$11 34

COST OF PRODUCING OATS, PEAS, AND VETCH MIXTURE

The area from which these data have been secured is a 23.8 acre block of land part of which was new land and the remainder producing the second crop. The land was fall-ploughed and well disked in the spring before seeding. The seed was sown on June 9 and 10 at the rate of two bushels of oats, one bushel of peas and one-half bushel of common vetch per acre. Germination was good and the growth was fair. The crop was harvested from September 18 to 24. The cost of production is as follows:—

Total cost per acre.....	\$31 05
Yield per acre.....	tons lbs. 3 607
Cost per ton.....	\$ 9 41

COST OF PRODUCING POTATOES

Five acres of potatoes were grown under regular field-crop conditions in 1924. They were planted on virgin clay-loam soil which was summer-ploughed and manured at the rate of sixteen tons to the acre previous to planting.

The rows were about three feet apart and the sets were placed twelve to eighteen inches apart in the row. Two varieties were grown, namely, Green Mountain and Irish Cobbler. They were planted the week of June 9, and harvested the week of October 6. All seed used was certified and grew very well, although some of the area got too much rain for best results. The cost of production is as follows:—

Total cost per acre.....	\$118 21
Yield per acre.....	bus. lbs. 115 55
Cost per bushel.....	\$ 1 02

CULTURAL EXPERIMENTS

DATES OF SEEDING FALL WHEAT

The object of this experiment is to determine what date or dates of seeding will give the best results. In 1923 the seed was sown on six different dates at intervals of seven days commencing on August 18, in quadruplicate one-fortieth-acre plots at the rate of two bushels per acre. Dawson's Golden Chaff was the variety used and the results obtained are as follows:—

DATE OF SEEDING FALL WHEAT.

	Date sown											
	Aug. 18		Aug. 25		Sept. 1		Sept. 8		Sept. 15		Sept. 22	
	bush. lbs.		bush. lbs.		bush. lbs.		bush. lbs.		bush. lbs.		bush. lbs.	
Yield per acre.....	28	30	26	30	19	30	13	20	9	10	6	0

This table seems to indicate vividly the value of early seeding for fall wheat.

DATE OF SEEDING FALL RYE

The object of this experiment is to determine what date or dates of seeding would give the best results. In 1923 the seed was sown on five different dates at intervals of seven days commencing on September 22, in quadruplicate one-fortieth acre plots at the rate of one and one-half bushels per acre. Common fall rye was the variety used and the results obtained are as follows:—

DATE OF SEEDING FALL RYE

	Date sown									
	Sept. 22		Sept. 29		Oct. 6		Oct. 13		Oct. 20	
	bush. lbs.		bush. lbs.		bush. lbs.		bush. lbs.		bush. lbs.	
Yield per acre.....	30	0	24	36	22	28	25	00	16	24

While the earliest seeding gives the largest yield, it would appear that fall rye, is not affected so seriously by late seeding as fall wheat.

RATE OF SEEDING SUNFLOWERS

The object of this experiment is to determine the rate of seeding which will give the largest yield and be the most satisfactory generally. In 1924 twelve different rates of seeding were under test. The seed was sown on June 7, in quadruplicate one-fortieth-acre plots, on fall-ploughed sod which was manured at the rate of sixteen tons to the acre, previous to seeding. The results obtained in 1924, together with the four-year average are as follows:—

RATE OF SEEDING SUNFLOWERS

Plot No.	Distance between rows	Distance between plants in rows	Average height in 1924		Yield per acre							
					Green weight, 1924		Dry weight 1924		Average green weight 1921-24		Average dry weight 1923-24	
					tons	lbs.	tons	lbs.	tons	lbs.	tons	lbs.
1.....	24	6	5	00	10	860	1	1,256	14	1,665	1	1,993
2.....	24	12	5	3	7	860	1	114	12	1,450	1	1,289
3.....	24	18	5	3	7	010	1	044	13	692	1	1,068
4.....	30	6	5	5	10	810	1	796	13	1,372	1	1,646
5.....	30	12	4	9	8	180	1	083	9	665	1	1,019
6.....	30	18	4	7	7	080	0	1,853	10	465	1	500
7.....	36	6	4	6	8	1,890	1	282	10	1,967	2	166
8.....	36	12	4	9	7	1,030	0	1,998	11	112	1	1,733
9.....	36	18	4	10	6	900	0	1,933	10	1,535	1	1,295
10.....	42	6	5	00	10	1,740	1	926	12	145	2	155
11.....	42	12	5	00	7	1,840	1	206	11	1,165	1	1,028
12.....	42	18	4	9	5	1,710	0	1,540	10	207	1	1,116

Although this table includes four years' results for green weight and two years' results for dry weight, yet there does not appear to be any one rate of seeding that is consistently and significantly superior to all others. The results do indicate, however, that satisfactory yields may be obtained from almost any reasonable rate of planting, and thus it would appear that convenience in seeding, cultivation and harvesting should be considered largely in deciding what rate of planting to use.

In order to make possible the direct comparison, between the different distances between the rows and also between plants thinned to different distances within the row, the following table has been prepared. This table gives the average yield obtained in 1924, in the green and dry conditions and also the average yield obtained from all plots in green weight for four years and dry weight for two years, under all the various distances between the rows and distance of plants apart within the rows.

RATES OF SEEDING SUNFLOWERS
Rows and Plants at Different Distances Apart

Distance	Yield per acre							
	Green weight 1924		Dry weight 1924		Green weight 1921-24		Dry weight 1923-24	
	tons	lbs.	tons	lbs.	tons	lbs.	tons	lbs.
Rows 24 inches apart.....	8	576	1	471	13	1,268	1	1,450
Rows 30 inches apart.....	8	1,023	1	266	11	157	1	1,055
Rows 36 inches apart.....	7	1,273	1	071	10	1,871	1	1,731
Rows 42 inches apart.....	8	430	1	224	11	505	1	1,433
Plants 6 inches apart.....	10	325	1	815	12	1,787	1	1,990
Plants 12 inches apart.....	7	1,477	1	100	11	348	1	1,267
Plants 18 inches apart.....	6	1,175	0	1,842	11	225	1	994

This table also fails to show any differences that can be taken as significant.

RATE OF SEEDING ENSILAGE CROPS

The object of this experiment is to compare the yield and quality of ensilage crops from various rates of seeding, using, sunflowers, corn and different mixtures of oats, peas and vetch.

In 1924, twenty different mixtures and rates of seeding were under test, in quadruplicate one-fortieth-acre plots, on fall-ploughed, clay-loam soil, which had produced a root crop in 1923, for which it had been manured at the rate of sixteen tons to the acre. The sunflowers and O.P.V. were seeded on May 16 and the corn on May 31. The O.P.V. was harvested on September 6; the corn on September 9, and the sunflowers on September 22. The following table gives the results obtained in 1924 from the different rates and mixtures together with the average results for two years.

DISTANCES BETWEEN ROWS AND RATE OF SEEDING ENSILAGE CROPS

Crops and rate						Yield per acre							
Sun-flowers	Corn	Oats	Peas	Vetch	Clover	Green weight 1924		Dry weight 1924		Green weight 1923-24		Dry weight 1923-24	
						tons	lbs.	tons	lbs.	tons	lbs.	tons	lbs.
ins.	ins.	lbs.	lbs.	lbs.	lbs.	tons	lbs.	tons	lbs.	tons	lbs.	tons	lbs.
24						21	000	2	930	18	100	2	481
30						20	410	1	1,976	16	1,325	1	1,844
36						19	420	2	321	15	590	1	1,867
42						15	270	1	1,508	13	1,395	1	1,331
	24					6	490	0	1,309	6	1,685	0	1,566
	30					4	920	0	943	6	1,160	0	1,565
	36					4	000	0	913	5	500	0	1,264
	42					3	290	0	700	4	1,025	0	1,035
		34	60			9	250	2	803	10	45	2	1,358
		51	60			8	1,430	2	522	9	715	2	1,212
		68	60			8	1,600	2	1,407	9	220	2	1,307
		34	60	28		10	1,520	2	775	10	980	2	1,053
		51	60	28		10	1,860	2	1,449	10	1,770	3	2
		68	60	28		9	1,090	2	422	10	485	2	1,247
		34	60		10	8	1,130	2	817	9	1,085	2	1,590
		51	60		10	8	600	2	576	9	1,220	2	1,435
		68	60		10	8	230	2	320	9	895	2	1,649
		34	60	28	10	10	1,740	2	711	10	1,750	2	1,794
		51	60	28	10	10	1,800	2	1,598	10	840	2	1,772
		68	60	28	10	11	620	3	195	10	870	2	1,661

Like the other experiment in rate of seeding sunflowers the results in this table fail to indicate any marked difference in yield caused by different rates of seeding either with sunflowers, corn or O.P.V. It does indicate, however, that from the standpoint of dry matter alone the O.P.V. is equal to sunflowers in yielding ability.

DATES OF SEEDING ENSILAGE CROPS

The object of this experiment is to determine the best date or dates on which to seed the different ensilage crops, using sunflowers, corn and a mixture of oats, peas and vetch. The sunflowers and corn were sown in drills thirty inches apart and the plants were thinned to six inches apart in the row, while the oats, peas and vetch were sown at the rate of two bushels of oats, one bushel of peas, and one-half bushel of vetch per acre. In 1924, the seed was sown on different dates at intervals of seven days commencing on May 15, until six different dates were planted, in quadruplicate one-fortieth-acre plots, on fall-ploughed, clay-loam soil which was manured at the rate of sixteen tons to the acre the previous year for roots. The results obtained in 1924, together with the average results for two years are as follows:—

DATES OF SEEDING ENSILAGE CROPS

Crop	Date of seeding 1924	Yield per acre							
		Green weight 1924		Dry weight 1924		Average green weight 1923-24		Average dry weight 1923-24	
		tons	lbs.	tons	lbs.	tons	lbs.	tons	lbs.
Sunflowers.....	May 15	21	1,090	2	1,224	19	1,305	3	356
Sunflowers.....	May 22	21	700	2	945	16	1,790	2	1,477
Sunflowers.....	May 29	20	1,990	2	1,198	18	255	2	1,123
Sunflowers.....	June 5	21	1,370	2	1,026	16	1,365	2	286
Sunflowers.....	June 12	17	390	2	58	15	175	2	115
Sunflowers.....	June 19	12	1,100	1	645	12	1,170	1	1,226
O.P.V.....	May 15	12	1,830	2	1,772	11	1,735	3	632
O.P.V.....	May 22	14	720	3	15	12	1,020	3	557

DATES OF SEEDING ENSILAGE CROPS—Concluded

Crop	Date of seeding 1924	Yield per acre							
		Green weight 1924		Dry weight 1924		Average green weight 1923-1924		Average dry weight 1923-24	
		tons	lbs.	tons	lbs.	tons	lbs.	tons	lbs.
O.P.V.....	May 29	12	1,900	2	1,423	11	950	2	1,887
O.P.V.....	June 5	14	70	2	1,419	10	1,675	2	830
O.P.V.....	June 12	13	1,630	2	950	11	715	2	696
O.P.V.....	June 19	13	1,030	2	883	11	1,335	2	978
Corn.....	May 15	1	1,960	0	436				
Corn.....	May 22	1	1,790	0	407				
Corn.....	May 29	4	1,230	0	994	6	875	0	1,404
Corn.....	June 5	5	580	0	1,221	4	1,770	0	1,140
Corn.....	June 12	1	1,480	0	367	4	960	0	1,099
Corn.....	June 19	0	1,640	0	160	2	1,620	0	752

The figures in this table would seem to indicate that there is a tendency for the earlier seeding to give the best results; but they also indicate that there is a long period during which sunflowers and O.P.V. may be sown without seriously affecting the results obtained.

ENSILAGE AND ROOT EXPERIMENT

The objects of this experiment are to compare the yields of sunflowers, corn and a mixture of oats, peas and vetch for ensilage with a root crop of turnips and also to compare the effect of each of these crops on the following crop.

This experiment was commenced on four acres of land; but it was found that one acre divided into four long narrow strips, was very difficult to cut, keep separate etc., so it has been transferred to a larger area and now includes sixteen acres.

It is operated on a four-year rotation as follows:—

First year..... One-quarter area in each of roots, sunflowers, corn and O.P.V.
 Second year..... Oats.
 Third year..... Clover hay.
 Fourth year..... Timothy hay.

The ensilage and root crops are grown on fall-ploughed sod which is manured at the rate of sixteen tons to the acre. After these crops are harvested the land is again fall-ploughed and seeded out to grass and clover the next spring, using oats as a nurse crop.

The results obtained in 1924 are as follows:—

ENSILAGE AND ROOT EXPERIMENT, 1924

Crops	Date seeded	Date harvested	Yield per acre			
			Green weight, 1924		Dry weight, 1924	
			tons	lbs.	tons	lbs.
O. P. V.....	June 16.....	Sept. 23.....	7	730	1	1,682
Turnips.....	June 18.....	Oct. 21.....	4	1,730	0	1,094
Corn.....	June 17.....					
Sunflowers.....	June 16.....	Oct. 2.....	3	985	0	1,092

The O.P.V. gave the largest yield this year and the corn was a complete failure. All of the crops were really too late in being seeded this year for best results, and the weather was too cool for the corn.

GREEN MANURE EXPERIMENTS.

Ploughing Down Sweet Clover and Summer-Fallowing

The object of this experiment is to determine the value, if any, of sweet clover as a green manure when used in conjunction with a summer-fallow. This experiment was commenced in 1922 on virgin clay-loam soil which had never been manured, and is to be operated on a five-year rotation as follows:—

First year.....	Oats seeded to sweet clover.
Second year.....	Sweet clover ploughed down and summer-fallowed.
Third year.....	Barley seeded to timothy and clover.
Fourth year.....	Clover hay.
Fifth year.....	Timothy hay.

The land is always fall-ploughed for the oat crop. The sweet clover is allowed to grow until it is a fair stand before it is ploughed under. Cultivation is continued occasionally throughout the remainder of the season, in order to keep down weeds, conserve moisture and assist in decaying the sweet clover. This puts the soil in good condition for the barley, which is used as a nurse-crop for the grass and clover seed.

Ploughing Down Sweet Clover and Buckwheat

The objects of this experiment are to determine the respective value, if any, of sweet clover ploughed under, and the practice of using an additional crop of buckwheat, one-half acre of which is also ploughed under and one-half acre harvested for grain. This experiment was commenced in 1922, and is located on five acres of clay-loam virgin soil; the rotation is as follows:—

First year.....	Oats seeded to sweet clover.
Second year.....	Sweet clover ploughed down buckwheat planted and one-half of that ploughed down, while the other half is cut for grain if this is possible.
Third year.....	Barley seeded to timothy and clover.
Fourth year.....	Clover hay.
Fifth year.....	Timothy hay.

The land is fall-ploughed for the oat crop. The sweet clover is permitted to grow until it is time to seed the buckwheat. After the buckwheat is harvested from one-half of the plot, the whole acre is again fall-ploughed in preparation for seeding out to grass and clover the next year, using barley as the nurse-crop.

No Green Manure Crop Ploughed Down

This experiment may be compared with the former two rotations, as no green-manure crop is ploughed down; but a legume grain is used for the purpose of building up the soil. It was commenced in 1922 on four acres of clay loam virgin soil on a four-year rotation as follows:—

First year.....	Peas.
Second year.....	Oats.
Third year.....	Clover hay.
Fourth year.....	Timothy hay.

The peas are sown on fall-ploughed sod, and after the peas are harvested the land is again fall-ploughed in preparation for seeding out to grass and clover using oats as a nurse-crop.

*Effect of Growing Non-Legumes, Legumes, and of Ploughing Under
Green Manure*

This experiment makes possible the comparison of oats and barley in the rotation versus peas and oats, and it may also be compared with those having green manure ploughed down. This experiment was commenced in 1922 on clay loam soil, under a four-year rotation as follows:—

First year.....	Oats.
Second year.....	Barley.
Third year.....	Clover hay.
Fourth year.....	Timothy hay.

The oats are sown on fall-ploughed timothy sod. After harvest the land is again fall-ploughed in preparation for barley which is the nurse-crop for the grass and clover seed.

(For further estimates of the value of green-manuring, see the two experiments following.)

FARM MANURE EXPERIMENT

The object of this experiment is to compare the effect of an application of manure at the rate of sixteen tons to the acre once in the rotation, with green manure ploughed down and with no manure applied of any kind. This experiment includes four acres and is operated on a four-year rotation as follows:—

First year.....	Oats.
Second year.....	Barley.
Third year.....	Clover hay.
Fourth year.....	Timothy hay.

The land is fall-ploughed and afterwards manured at the rate of sixteen tons to the acre for oats. After the oats are harvested it is again fall-ploughed and seeded out to grass and clover the following spring using barley as a nurse-crop.

LIME EXPERIMENT

The object of this experiment is to determine the results obtained from the application of two tons of ground limestone to the acre during the second year of the rotation. Four acres of land are used in this experiment and is operated on a four-year rotation as follows:—

First year.....	Oats (disc in 16 tons of manure per acre).
Second year.....	Barley (applying 2 tons of ground limestone).
Third year.....	Clover hay.
Fourth year.....	Timothy hay.

The rotation in this experiment is the same as the one in the farm-manure experiment and also in the experiment where no green-manure crop is ploughed down, the only difference being that ground limestone is applied at the rate of two tons to the acre in the second year. The ground limestone may be applied either in the fall or spring after the land has been fall-ploughed.

DRAINAGE EXPERIMENT

The object of this experiment is to compare the results obtained from tile-drained land with land which is not tile-drained. Twenty acres of uniform clay-loam soil, having some shallow muck areas in each half have been selected for this test. Ten acres of this area were underdrained in 1921 by four drains, while the other ten acres were left undrained, and the whole area is cropped similarly under a four-year rotation as follows:—

First year.....	Hoed crops or O.P.V.
Second year.....	Oats.
Third year.....	Clover hay.
Fourth year.....	Timothy hay.

Five acres of each ten acres were manured at the rate of sixteen tons to the acre in 1922 after haying, and the whole twenty acres were fall-ploughed. During the fall and winter, the other five acres in each area were manured at the same rate and disked in, in the spring. After the hoed crop and O.P.V. were removed the land was again fall-ploughed and seeded out to grass and clover on May 16, 1924, using Alaska oats as a nurse-crop. The statement covering the cost of production on the drained and undrained areas is as follows:—

ALASKA OATS

Items	Drained	Undrained
Total cost per acre.....	\$38 75	\$36 65
Yield per acre.....	bush. lbs. 37 0	bush. lbs. 43 7
Cost per bushel.....	\$1 04	\$0 84

SURFACE DRAINAGE EXPERIMENT

The object of this experiment is to compare the results obtained from different widths of lands. The different widths under test are as follows:—

First area.....	18 feet in width
Second area.....	24 feet in width
Third area.....	36 feet in width
Fourth area.....	48 feet in width

This experiment was established the fall of 1922 under the following rotation:—

First year.....	Oats.
Second year.....	Barley.
Third year.....	Clover hay.
Fourth year.....	Timothy hay.

SURFACE DRAINAGE EXPERIMENT—1924 RESULTS

Widths of lands	Yield per acre	
	Grain	Straw
	bush. lbs.	tons. lbs.
Lands 18 feet in width.....	34 0	2 68
Lands 24 feet in width.....	24 40	0 1,474
Lands 36 feet in width.....	36 19	0 1,590
Lands 48 feet in width.....	41 24	1 140

A partial explanation of the high yield of grain from the wide lands this year may be the fact that a part of this area was sown on May 23, and a heavy rain came which prevented the sowing of the other areas for a number of days as the ground was too wet to work.

Until further data are available on this experiment no conclusions can be drawn.

LAND CLEARING EXPERIMENT

The object of this experiment is to determine the most economical time and method of cleaning new land. In 1920 five acres of green bush were selected for this experiment. The timber was cut and burned on the total area at a cost of \$40 per acre. One acre was cleared that same fall and one acre each year since. The following table shows the cost of clearing immediately after the green bush is cut versus one, two, three and four years later.

LAND CLEARING EXPERIMENT

	Year cleared				
	1920	1921	1922	1923	1924
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Cost per acre.....	63 00	53 75	46 23	41 80	40 00

It will be noted that each year as the stumps become older the cost of clearing drops. The cost in 1924 is not very much lower than that in 1923, on account of 1924 being so wet, but the results indicate that the cost of clearing land falls as the stumps become older and more easily removed.

HORTICULTURE

Similar to other crops, vegetables were late in being planted in 1924, as it was the last of May before the common vegetables were seeded. A plentiful supply of moisture gave good germination, and no damage was suffered from summer frosts; but the weather seemed too cool to give the best results. Small fruits did better than any year in the history of this Station and vegetables were of good quality and gave fair yields.

The variety tests and cultural experiments carried on with vegetables in 1924, were all planted in duplicate plots and the results as presented are based on the average yield of the two plots.

ORCHARD

The orchard which was set out in 1918 consisting of some 203 specimens, representing forty-eight different varieties and strains of the more hardy apples, plums, and crabs, grew well the past year, and four of the trees bore fruit. One of these was the Trail crab; the others are not yet identified, and are possibly from stock.

The trees are let spread out near the ground, with very short trunks, often less than one foot in length, so that they will be better protected during the winter with snow. A hedge has been planted around the horticultural grounds and this should aid materially in protecting the trees.

SMALL FRUITS

RED CURRANTS.—Seven varieties were set out in 1920, in rows six feet apart and five feet between the bushes in the row. These have been bearing for the last three years.

In 1924 the results obtained from the three highest-yielding varieties are as follows: Red Grape 9 pounds 12 ounces; London Red 8 pounds 12 ounces; Simcoe King 8 pounds, from six bushes. These three varieties are also ahead in a three-year average.

WHITE CURRANTS.—Two varieties were set out in 1920. The rows were six feet apart and five feet between the bushes in the row. The yields from these have been very small so far, White Grape gave 4 pounds 4 ounces, and White Cherry 3 pounds 8 ounces in 1924.

BLACK CURRANTS.—Fourteen varieties were planted in 1920, in a similar manner to the red and white currants. These have been bearing since 1922. In 1924 the results obtained from the four highest-yielding varieties are as

follows: Climax 31 pounds, Saunders 29 pounds 12 ounces, Ontario 20 pounds, and Victoria 20 pounds, from six bushes. These same four varieties are ahead for a three-year average.

Black currants seem to do particularly well in this district as the fourteen varieties gave an average yield of 17 pounds 2 ounces in 1924.

GOOSEBERRIES.—Fifteen varieties were set out in 1920, in rows six feet apart and five feet between the bushes in the row. The first fruit was obtained from these in 1922, when a few of the best developed sorts began to bear. In 1924 only two varieties bore any fruit, namely Keepsake and Downing, and these yields were very light.

RASPBERRIES.—Eight varieties were set out in 1920 in rows six feet apart and the canes three feet apart in the row. These have been giving fairly good yields for the last four years. In 1924 the Herbert variety yielded 20 pounds 12 ounces from a thirty-foot row, and the standing and yield of the eight varieties on a four-year average are as follows: Newman 23, 11 pounds 2 ounces, Herbert 10 pounds 4 ounces, Early June 9 pounds 12 ounces, Brighton 9 pounds 7 ounces, King 9 pounds 2 ounces, St. Regis 8 pounds 1 ounce, Sunbeam 7 pounds 10 ounces, and Cuthbert 7 pounds 6 ounces.

STRAWBERRIES.—On account of very dry weather during the spring of 1923, the variety test of strawberries set out at that time failed to develop into a suitable stand for experimental purposes.

The old plantation, one-quarter acre in size, yielded at the rate of 4,400 one-quart baskets to the acre.

VEGETABLES

VARIETY TESTS

BEANS.—Twenty-five varieties were under test. The seed was sown on June 2, in rows thirty feet in length, two and one-half feet apart and the plants two inches apart in the row. The five highest-yielding varieties together with the average yields obtained in quarts over a five-year period are as follows: Round Pod Kidney Wax 20, Early Red Valentine 15, Pencil Pod Black Wax 15, Davis White Wax 11, and Masterpiece 11.

Some pod spot (Anthracnose) was present on a number of the varieties this year.

BROAD BEANS.—Seventeen varieties were under test. The seed was planted on June 5, in thirty-foot rows, which were three feet apart, the plants being three inches apart in the row. The three highest yielding varieties in 1924 together with the yields obtained in quarts are as follows: Long Pod Masterpiece 28, Seville 20, and Long Pod Hangdown 19. The broad bean is a very hardy vegetable, but does not sell as well as other sorts.

BEETS.—Ten varieties were under test. They were seeded on May 31, in rows thirty feet in length and 18 inches apart, and the plants were thinned to two inches apart in the row. The average yield in 1924 from a thirty-foot row was 8 pounds 6 ounces. In regards to quality and uniformity which are even more important in table beets than yield, the Detroit Dark Red and Crosby Egyptian are two of the best tried over a five-year period. Table beets should not be given too much space in the row as this condition encourages large size, woody and coarse roots.

CARROTS.—Eight varieties were under test. The seed was sown in drills thirty feet in length and eighteen inches apart on May 31, and the plants were thinned to one and one-half inches apart in the row. The three largest-yielding

varieties in 1924, together with the yields obtained are as follows: Early Scarlet Horn 26 pounds 11 ounces, Garden Gem 23 pounds 10 ounces, and Improved Danvers 23 pounds 8 ounces. Like beets quality and uniformity are really of equal or greater importance than yield with table carrots. Danvers, and Chantenay are among the best from this standpoint.

CABBAGE.—Thirteen varieties were under test. The seed was sown in the hotbed on May 6, and the plants were transplanted to the garden on June 17. The early varieties were set out eighteen inches apart in rows thirty feet in length, and thirty inches apart, while the late varieties were set 24 inches apart in the row.

The early varieties averaged 49 pounds 4 ounces and the late varieties 32 pounds per thirty-foot row.

Enkhuizen Glory was ahead this year followed by Copenhagen Market and Early Jersey Wakefield. The Copenhagen Market has been giving specially good results both in yields and quality for a number of years.

Golden Acre was six days earlier than any of the others tried.

CAULIFLOWER.—Two varieties were under test. The seed was sown in the hotbed on May 7, and the plants were transplanted to the garden on June 17, in thirty-foot rows with eighteen inches between the plants. The Early Snowball variety yielded 11 pounds 8 ounces and Early Dwarf Erfurt 8 pounds 4 ounces per thirty-foot row. Some of the plants were cut off by cutworms.

CELERY.—Eight varieties were under test. The seed was sown in the hotbed on May 3, and the plants were transplanted to the garden on July 10. The rows were four feet apart and the plants were set six inches apart in the row. Eight varieties gave an average yield of 44 pounds 11 ounces from a thirty-foot row.

Evans Triumph, Winter Queen and Easy Blanching are the three highest-yielding varieties in 1924. These are also among the best for quality which is an important feature in celery.

ENDIVE.—One variety of endive, Meaux Green Curled, was under test. The seed was sown on May 31, in a thirty-foot row and the plants were thinned to six inches apart in the row. The yield was 20 pounds.

KOHL RABI.—Two varieties were under test. The seed was sown on May 31, in thirty-foot rows which were thirty inches apart and the plants were thinned to eight inches apart in the row. Purple Vienna gave a yield of twelve pounds and White Vienna 8 pounds 8 ounces.

KALE OR BORECOLE.—Two varieties were under test. The seed was sown in hotbed on May 7, and the plants set out in the garden on June 17, in thirty-foot rows, with the plants twenty-four inches apart in the row. The Tall Scotch variety gave a yield of 38 pounds and Dwarf Green Curled 10 pounds per thirty-foot row.

LEEKs.—Two varieties were under test. The seed was sown in the hotbed on May 7, and planted in the garden on July 10, in thirty-foot rows, the plants being set six inches apart in the row. The Musselburgh variety gave a yield of 6 pounds 13 ounces and Carentan 5 pounds 4 ounces.

LETTUCE.—Thirteen varieties were under test. The seed was sown on May 31, in drills fifteen inches apart and the plants were thinned to six inches apart in the row. The average yield from the thirteen varieties was 27 pounds 13 ounces from a thirty-foot row. Crispness and quality are of greater importance in lettuce than large yields. Grand Rapids, Salamander, Iceberg and New York are some of the best quality varieties which have been tried.

ONIONS.—Twelve varieties were under test. The seed was sown on June 2, but failed to germinate.

DUTCH SETS.—Two varieties were under test. They were set out on May 13, in rows fifteen inches apart and the sets were placed two inches apart in the row. Yellow Globe Danvers gave a yield of 13 pounds 8 ounces and Large Red Wethersfield 8 pounds 8 ounces from a thirty-foot row.

Dutch sets seem to be a much surer means of getting a crop of onions in this district than onion seed.

PARSLEY.—One variety was under test. The seed was sown in drills fifteen inches apart on May 31, and the plants were thinned to six inches apart in the row. A yield of 6 pounds 8 ounces was obtained from a thirty-foot row.

PARSNIPS.—Three varieties were under test. The seed was sown on May 31, in rows thirty inches apart and the plants were thinned to two inches apart in the row. Hollow Crown yielded 42 pounds 12 ounces; Elcombes Improved Hollow Crown, 42 pounds 4 ounces; and Guernsey XXX, 37 pounds 4 ounces per thirty-foot row.

GARDEN PEAS.—Fifteen varieties were under test. The seed was sown on June 2, in rows three feet apart and thirty feet in length and the plants one inch apart in the row. English Wonder gave the largest yield, followed by McLean Advancer, American Wonder, and Stratagem.

POTATOES.—Eleven varieties and strains were under test. The tubers were planted on June 9, in quadruplicate one-eightieth-acre plots, the sets being placed fifteen inches apart in the row. The seed was all certified and during the season was carefully rogued for disease. The results obtained are as shown in the following table. All varieties and strains passed field inspection for certification except the Bovee.

VARIETY TEST OF POTATOES

Variety	Source of seed	Yield per acre	
		Marketable	Un-marketable
		bush. lbs.	bush. lbs.
Dooley.....	Bronte, Ont.....	258 40	24 20
Carman No. 3.....	Hamilton, Ont.....	256 0	25 40
Irish Cobbler.....	Dorion, Ont.....	248 20	33 20
Irish Cobbler.....	Hillsburg, Ont.....	235 0	44 00
Irish Cobbler.....	N.B.....	228 0	48 20
Green Mountain.....	Fred., N.B.....	219 0	37 20
Davies Warrior.....	Actonvale, Quebec.....	206 20	18 00
Green Mountain.....	Searchmont, Ont.....	189 0	40 00
Irish Cobbler.....	Acton, Ont.....	174 40	48 00
Early Ohio.....	Winnipeg, Man.....	139 33	21 48
Bovee.....	Winnipeg, Man.....	112 40	13 20

RADISH.—Five varieties were under test. The seed was sown on June 2, in drills thirty feet in length and fifteen inches apart. The yields obtained are as follows: French Breakfast 5 pounds, White Icicle 4 pounds 6 ounces, Scarlet Turnip White Tip 4 pounds 4 ounces, Chartier 4 pounds, and Scarlet Oval 3 pounds 8 ounces.

SPINACH.—Four varieties were under test; but for some reason all varieties took on a stunted appearance and went to seed.

SALSIFY.—Two varieties were under test. The seed was sown on June 2, in thirty-foot rows. The plants were thinned to one and one-half inches apart in the row. Mammoth Sandwich Island gave a yield of 16 pounds 8 ounces and Long White 13 pounds 8 ounces.

SWISS CHARD.—One variety, Silverleaf White, was under test. The seed was sown on May 31, in a thirty-foot row. The plants were thinned to three inches apart in the row. A yield of 15 pounds 11 ounces was obtained.

TURNIPS.—Five varieties were under test. The seed was sown on June 2, in drills which were fifteen inches apart and thirty feet in length. The plants were thinned to two inches apart in the row. The yields obtained are as follows: Champion Swede 36 pounds, Golden Ball 29 pounds 2 ounces, Red Top Strap Leaf 23 pounds 14 ounces, Milan Purple Top 18 pounds 6 ounces, and Early Purple Top Milan 17 pounds 4 ounces.

Quality is very important with table turnips, and for this reason the highest-yielding sorts are not always the most desirable. Quality can be controlled to some extent by not giving the roots too much space in the row.

CULTURAL EXPERIMENTS WITH VEGETABLES

RATE OF PLANTING BEANS.—The object of this experiment is to compare the results from planting beans, two, four, and six inches apart in the row. Two varieties were used, and the seed was planted on May 30, in rows thirty feet in length and thirty inches apart. The results obtained are as follows:—

RATE OF PLANTING BEANS

Variety	Yield per thirty-foot row					
	Two inches 1924	Four inches 1924	Six inches 1924	Two-year average two inches	Two-year average four inches	Two-year average six inches
	quarts	quarts	quarts	quarts	quarts	quarts
Round Pod Kidney Wax....	11.5	9.0	6.0	9.5	7.7	5.5
Stringless Green Pod.....	15.5	13.0	8.0	11.3	9.0	6.7

RATE OF PLANTING PEAS.—The object of this experiment is to compare the results obtained from planting peas, one, two, and three inches apart in the row. Three varieties were used and the seed was planted on May 30, in rows which were thirty feet in length and thirty inches apart. The results obtained are as follows:—

RATE OF PLANTING PEAS

Variety	Yield per thirty-foot row					
	One inch 1924	Two inches 1924	Three inches 1924	Two-year average one inch	Two-year average two inches	Two-year average three inches
	quarts	quarts	quarts	quarts	quarts	quarts
English Wonder.....	12.2	8.7	7.0	7.7	5.5	4.1
Thomas Laxton.....	14.0	11.7	7.2	7.3	6.0	3.7

The Stratagem variety failed to germinate and therefore is not included.

DATE OF SEEDING BEETS.—The object of this experiment is to compare the results obtained from beets planted at different dates, at intervals of ten days, beginning as early as possible and continuing until it is thought to be too late. One variety was used and the first date of seeding was on May 30.

The seed was sown in thirty-foot rows which were fifteen inches apart and the plants thinned to two inches apart in the row. The results obtained are as follows:—

DATE OF SEEDING BEETS

Variety	Date seeded 1924	Yield per thirty-foot row			
		1924		Two-year average	
		lbs.	oz.	lbs.	oz.
Detroit Dark Red.....	May 30	43	8	32	0
" ".....	June 10	27	0	24	4
" ".....	" 20	14	0	20	8
" ".....	" 30	9	14	16	7

The seed sown on July 10 failed to germinate.

DATE OF SEEDING CARROTS.—The object of this experiment is to compare the results obtained from carrots planted at different dates, at intervals of ten days, commencing as early as possible and continuing until five dates were seeded. One variety was used and the first date of seeding was on May 30. The seed was planted in rows thirty feet in length and fifteen inches apart and the plants were thinned to one and one-half inches apart in the row. The results obtained are as follows:—

DATE OF SEEDING CARROTS

Variety	Date seeded 1924	Yield per thirty-foot row			
		1924		Two-year average	
		lbs.	oz.	lbs.	oz.
Chantenay.....	May 30	40	8	33	12
".....	June 10	28	8	34	12
".....	" 20	16	13	16	14
".....	" 30	6	13	6	14
".....	July 10	-	-	-	-

DATE OF SEEDING PARSNIPS.—The object of this experiment is to compare the results obtained from different dates of planting, at intervals of ten days commencing as early as possible and continuing until five plantings are under test. One variety was used, and the first date of planting was on May 30. The rows were thirty feet in length and fifteen inches apart and the plants were thinned to two inches apart in the row. The results obtained are as follows:—

DATE OF SEEDING PARSNIPS

Variety	Date planted 1924	Yield from thirty-foot row			
		1924		Two-year average	
		lbs.	oz.	lbs.	oz.
Hollow Crown.....	May 30	45	8	32	4
".....	June 10	26	4	15	2
".....	" 20	12	12	7	14
".....	" 30	6	8	-	-

The seed planted July 10, failed to germinate.

DATE OF PLANTING CABBAGE.—The object of this experiment is to compare the yield and keeping quality of cabbage started in a hotbed with that seeded direct in the garden, at intervals of ten days from as early as possible until four seedings are made. Two varieties were used, namely Copenhagen Market and Danish Ballhead. The seed was sown in the hotbed on May 6, and transplanted to the garden on June 20. The first seed was sown outside on May 16.

From two years' results it would appear that cabbage started in the hotbed give much better results than that sown in the garden, and also that the late seeding of cabbage outside is useless.

METHODS OF BLANCHING CELERY.—The object of this experiment is to compare the results obtained in earliness, crispness, blanching, flavour and yield from different methods of blanching. Golden Self Blanching was the variety used. The seed was sown in the greenhouse on May 3, and the plants were set out in the garden on July 11. The plants were all set out in rows fifteen feet in length and the plants six inches apart in the row, except one planting that was put in a bed six feet square and the plants six inches apart each way. The results obtained during the last two years would seem to indicate that while celery may be fairly well blanched by either ready roofing, boards, earthing up on level or in trenches, yet the latter method gives the largest yields, with much the best quality. No satisfactory results have been obtained from the six-foot bed.

SPROUTING EXPERIMENT WITH POTATOES.—The object of this experiment is to compare the results obtained from potatoes sprouted previous to planting by being exposed for six weeks to subdued light at a temperature of between 40 and 50 degrees Fahrenheit, with potatoes kept as dormant as possible in a dark, cool root-cellar. Two varieties, an early and a main crop variety, were used in this test. The seed was planted in quadruplicate rows sixty-six feet in length and thirty inches apart and the tubers were set one foot apart in the row. They were planted on June 7, and harvested on October 13. The results obtained are as follows:—

SPROUTING EXPERIMENT WITH POTATOES

Variety	How treated	Date ready for use	Yield per acre	
			Market-able	Unmarket-able
			bush. lbs.	bush. lbs.
Irish Cobbler.....	Sprouted.....	Aug. 25	322 18	47 18
".....	Unsprouted.....	Sept. 8	297 0	52 48
Green Mountain.....	Sprouted.....	" 5	377 18	55 33
".....	Unsprouted.....	" 12	363 00	49 30

These results indicate that sprouting has a beneficial effect on the yield obtained, and also on time of maturity.

SPRAYING EXPERIMENT WITH POTATOES.—The object of this experiment is to compare the results obtained from sprayed and unsprayed potatoes. The spray used was the standard Bordeaux mixture and the first spraying was done on July 21. They were sprayed at intervals of seven days until seven sprayings had been applied. The variety used was Irish Cobbler which had been planted on June 9, in quadruplicate one-eightieth-acre plots. Those which were sprayed gave a yield of 273 bushels and 2 pounds of marketable and 37 bushels of unmarketable per acre. While those which were not sprayed gave a yield of 270 bushels and 20 pounds of marketable and 37 bushels of unmarketable per acre.

DATES OF PLANTING EXPERIMENT WITH POTATOES.—The object of this experiment is to compare the results obtained from potatoes planted at intervals of fourteen days. Two varieties were used and the first date of planting was May 9. They were planted in quadruplicate sixty-six-foot rows, and the tubers were set one foot apart in the row. The results obtained are as follows:—

DATE OF PLANTING EXPERIMENT WITH POTATOES

Variety	Date planted 1924	Date ready for use 1924	Yield per acre	
			Market-able	Unmarket-able
			bush. lbs.	bush. lbs.
Irish Cobbler.....	May 9	Aug. 12	313 30	39 36
".....	" 23	" 25	331 6	56 6
".....	June 6	" 29	277 12	59 24
".....	" 20	Sept. 7	173 48	56 6
".....	July 4	Oct. 8	60 30	34 6
Green Mountain.....	May 9	Aug. 18	328 54	40 42
".....	" 23	" 29	332 12	41 48
".....	June 6	Sept. 2	256 18	51 42
".....	" 20	" 12	178 12	45 6
".....	July 4	Oct. 8	59 24	37 24

The results with both varieties show the largest yield from the second date of planting and a gradual decrease as the plantings become later.

GROWING RHUBARB FROM SEED.—The object of this experiment is to determine the length of time required to produce rhubarb ready for cutting when grown from seed. The first series of this experiment was sown with mixed seed in the spring of 1923. This seed came along well and produced some plants which would have done for cutting in 1924. The second series was sown in the spring of 1924 and the seed germinated well, giving a nice stand of plants.

Rhubarb is very easily grown in this district either from seed or from roots and should be given a place in the home garden.

FALL VERSUS SPRING SEEDING OF VEGETABLES.—The object of this experiment is to compare the results obtained in earliness and yield from vegetables when the seed is sown just before the ground freezes up in the fall versus in the spring in the regular way. Seven kinds of vegetables were used and the first fall series was sown in thirty-foot rows on November 8, 1923. The spring series was sown on May 12 in similar sized plots and close by the fall seeding. The results obtained are as follows:—

FALL VERSUS SPRING SEEDING OF VEGETABLES

Crop	Variety	Date ready for use		Yield per thirty-foot row	
		Fall seeding	Spring seeding	Fall seeding	Spring seeding
				lbs. oz.	lbs. oz.
Beet.....	Detroit Dark Red.....	Sept. 6	Sept. 10	7 0	20 4
Carrot.....	Chantenay.....	" 6	" 10	28 0	17 0
Cabbage.....	Copenhagen Market.....			-	1 5
Lettuce.....	Grand Rapids.....	July 4	July 18	19 0	23 0
Onion.....	Red Wethersfield.....	" 21	" 25	1 0	6 8
Radish.....	Scarlet White Tip.....	" 4	" 2	4 0	18 0
Turnip.....	Purple Milan.....		" 17	-	12 12

Unfortunately the fall-sown plots were damaged some by the run-off water in the spring, so that further data are necessary before any conclusions can be drawn.

FLOWERS

In 1924 fifty-eight distinct types or kinds of annual flowers were under test. Many of these were represented by several varieties and colours. Thirty-six were sown in the greenhouse on May 9 and set out in the borders on July 7. The seed of the other twenty-two varieties were sown in the borders and flower garden direct on June 14, with the exception of sweet peas which were seeded on June 11. Owing to the coolness of the season the majority of the plants were later than usual in coming into full bloom, but with the great variation in time required to produce flowers by the different sorts planted, a continuation of bloom was apparent throughout the entire season.

BULBS

Bulb culture was commenced at this Station in the autumn of 1921, when a number of the different sorts were planted in the borders.

A further supply was planted in 1922. In the autumn of 1923 the following bulbs were set out: hyacinths, three varieties; tulips, five varieties; narcissus, four varieties; and crocus, three varieties. Most of these three plantings were alive and gave magnificent bloom during the spring of 1924.

TREES AND SHRUBS AND LAWNS

The ornamental trees and shrubs which have been planted in various locations around the grounds since the establishment of the Station grew very well during the year, and gave the place an attractive and home-like appearance. Practically all of the trees and shrubs planted have proven very hardy and are developing into nice specimens.

For quick growth the laurel-leaved willow and Russian poplar are among the best. For hedge purposes the laurel-leaved willow and caragana are giving good results. For ornamental clumps and lawn decoration the different species and varieties of lilacs, Japanese rose, Missouri or golden currant, Tartarian honeysuckle, *Viburnum lantana*, Japanese barberry, mountain ash, and dwarf caragana all seem suitable and are hardy in this district.

Every year the lawns are improving in thickness and permanency. A mixture consisting of ten pounds of Kentucky blue grass and two pounds of white dutch clover has been used in establishing lawns, with good success.

CEREALS

May 14 is the first date on which any of the cereal plots were seeded in 1924. This is about two weeks later than in 1923. May had a mean temperature which was much below normal and on this account the growth was slow even after seeding. During the five growing months, May 1 to September 30, abundant precipitation was received, which had the effect of giving large yields of straw but also retarding maturity to a marked degree, so that the period required to mature the cereals in 1924 is the longest on record at this Station. Good weather prevailed late in the season, however, and the plots were all harvested, cured, and threshed in fairly good condition.

The cereal plots in 1924 were all sown on clay-loam soil which had been in hoed crop the previous year.

SPRING WHEAT

Three varieties of spring wheat were under test in 1924. The seed was sown on May 14, in quadruplicate one-fortieth-acre plots at the rate of two bushels per acre. The results obtained are as follows:—

VARIETY TEST WITH SPRING WHEAT

Variety	Date of ripening 1924	Number of days maturing 1924	Average length of straw including head 1924	Strength of straw on scale of ten points 1924	Actual yield of grain per acre 1924	Number of days to mature 5-year average 1920-24	Yield of grain per acre 5-year average 1920-24
			inches		bush. lbs.		bush. lbs.
Huron, Ottawa 3.....	Sept. 30	139	41	10	27 00	117	28 14
Marquis, Ottawa 15.....	" 27	136	40	10	24 10	116	26 15
Ruby, Ottawa 135.....	" 20	129	36	9.5	23 10	106	19 29

The Huron variety is ahead both in 1924 and in the five-year average; but it is a bearded variety and is not equal in quality to the Marquis. The Ruby variety is earlier and is a lighter yielder; but may serve a useful purpose in new sections, where the later varieties would be in danger of getting frosted.

OATS

Seven varieties of oats were under test in 1924. The varieties were all sown on May 14, except Liberty, which was sown on May 16. Each variety except O.A.C. No. 72 and Laurel Ottawa 477 was in quadruplicate one-fortieth-acre plots, and these two were in duplicate one-fortieth-acre plots. The rate of seeding was two and one-half bushels per acre. The results obtained in 1924 together with the average yield for three years are as follows:—

VARIETY TEST OF OATS

Variety	Date of ripening 1924	Number of days maturing 1924	Average length of straw including head 1924	Strength of straw on scale of ten points 1924	Actual yield of grain per acre 1924	Number of days to mature 3-year average 1922-24	Yield of grain per acre 3-year average 1922-24
			inches		bush. lbs.		bush. lbs.
O. A. C. No. 72.....	Sept. 30	139	50	8.5	62 32		
Victory.....	" 21	130	46	9.0	62 12	119	67 15
Gold Rain.....	" 21	130	46	8.8	62 12	118	65 16
Laurel, Ottawa 477.....	" 17	126	40	10.0	52 12		
Banner, Ottawa 49.....	" 29	138	48	8.4	51 16	122	63 28
Alaska.....	" 17	126	39	9.4	50 20	114	53 31
Liberty, Ottawa 480.....	" 17	126	41	8.5	25 10	113	42 5

O.A.C. No. 72, Victory, and Gold Rain all yielded about equally in 1924. For the three-year average Victory is ahead, and is followed closely by Gold Rain and Banner.

BARLEY

Four varieties of six-rowed barley and two varieties of two-rowed barley were under test in 1924. They were all sown on May 14, at the rate of two bushels per acre, except Manchurian, which was not seeded until May 16. Each variety was in quadruplicate one-fortieth-acre plots, except Chinese, Ottawa 60, and Charlottetown No. 80, which varieties, on account of a limited supply of seed, were only in duplicate. The results in 1924 together with the four-year average are as follows:—

VARIETY TEST OF BARLEY

Variety	Date of ripening 1924	Number of days maturing 1924	Average length of straw including head 1924	Strength of straw on scale of ten points 1924	Actual yield of grain per acre 1924	Number of days to mature 4-year average 1921-24	Yield of grain per acre 4-year average 1921-24
			inches		bush. lbs.		bush. lbs.
<i>Six-rowed</i>							
Chinese, Ottawa 60.....	Sept. 26	133	38	8.0	50 40	.....	.....
O. A. C. No. 21.....	" 27	136	37	8.7	45 40	109	39 42
Manchurian, Ottawa 60.....	" 28	135	44	8.9	38 12	110	39 09
Himalayan, Ottawa 59.....	" 19	128	30	8.7	28 46	105	32 8
<i>Two-rowed</i>							
Charlottetown, No. 30.....	Sept. 29	138	37	8.0	38 36	.....	.....
Duckbill, Ottawa 57.....	" 30	139	40	8.5	37 4	115	39 15

Barley is one of the best and surest grain crops in northern Ontario.

In 1924, Chinese Ottawa 60 gave the largest yield, while in the four-year average O.A.C. No. 21, Manchurian, and Duckbill are all about equal. In time of maturity the latter variety is a few days later than the others.

FIELD PEAS

Four varieties of peas were under test in 1924. The seed was sown on May 15, except McKay, which was not sown until May 16, in quadruplicate one-fortieth-acre plots for Arthur and Golden Vine and duplicate plots for Chancellor and McKay. The average rate of seeding was three bushels per acre. The results obtained are as follows:—

VARIETY TEST OF FIELD PEAS

Variety	Date of ripening 1924	No. of days maturing 1924	Average length of plant 1924	Actual yield of grain per acre 1924	Number of days to mature 4-year average 1921-24	Yield of grain per acre 4-year average 1921-24
			inches	bus. lbs.		bus. lbs.
Golden Vine.....	Sept. 30.....	138	44	23 30	123	33 05
Chancellor.....	Oct. 6.....	144	47	20 00	.....	.....
Arthur.....	Oct. 6.....	144	50	19 50	122	31 10
McKay.....	Oct. 6.....	143	60	10 00	.....	.....

The Golden Vine variety, which is ahead this year and also in the three-year average, seems to be a good pea for this district as it is a small pea and hardens up well.

The Arthur is also a good pea for this district as a large percentage of the pods are produced near the end of the vine, and on this account the peas seem to mature well and are very uniform.

SPRING RYE

One variety of common spring rye was under test in 1924. The seed was sown on May 5 in quadruplicate one-fortieth-acre plots at the rate of one and one-half bushels per acre. One of the plots did not develop normally, consequently only triplicate plots have been used in the results.

VARIETY TEST OF SPRING RYE

Variety	Date of ripening 1924	No. of days maturing 1924	Average length of straw including head 1924	Strength of straw on scale of ten points 1924	Actual yield of grain per acre 1924		No. of days to mature 3-year average 1922-24	Yield of grain per acre 3-year average 1922-24	
			inches		bus.	lbs.		bus.	lbs.
Common Spring Rye.....	Sept. 30...	138	46	10.0	22	21	125	29	47

Considerable ergot (*Claviceps purpurea*) was noticed in the heads this year, which is the first that has been observed at this Station.

BEANS

Two varieties of beans were under test in 1924. The seed was planted on June 14, in triplicate one-eightieth-acre plots. They were pulled on September 25. The Norwegian 710 variety, from seed produced at Kapuskasing the previous year, gave a yield of 16 bushels and 53 pounds to the acre, and the Beauty variety gave a yield of 14 bushels and 13 pounds to the acre.

The former variety matured much better than the latter.

ROD-ROW TESTING

The rod-row system for the preliminary testing of varieties and strains of cereal crops has been adopted at this Station. In 1924, twenty-eight varieties and strains of spring wheat, twenty-seven of barley, and fifty-one of oats were under test by this system.

The seed is sown in replicated rod-row plots, each plot being bordered on either side by another row of the same variety, seeded at a similar rate, so that all competition and border effect are taken care of. At harvest time the centre row only is used for results and all border rows are discarded. The rows are seven inches apart, which is similar to ordinary field conditions.

This system of testing is fairly efficient and gives promise of being very useful in testing large numbers of varieties and strains.

FORAGE CROPS

Most of the common forage crops do well in northern Ontario. Clovers, alfalfa, sunflowers, annual hays, turnips, and the common grasses have given good results to date. Corn on account of cool weather and frost, and mangels on account of poor germination, drought, and cutworms, have not as yet given very large yields.

As in 1923, the results from the forage crops in 1924 are based on dry yields, as obtained from shrinkage samples which were brought to constant weight in a drying house.

ENSILAGE CROPS

SUNFLOWERS

Ten varieties of sunflowers were under test in 1924. The seed was sown on May 17, in quadruplicate one-fortieth-acre plots, on fall-ploughed clay land which was manured at the rate of sixteen tons to the acre the previous year for O.P.V. The rows were thirty inches apart and the plants were thinned to six inches apart in the row. They were harvested on September 29. The results obtained are as follows:—

VARIETY TEST WITH SUNFLOWERS

Variety	Source of seed	Average height in 1924		% in bloom when cut in 1924	Yield per acre							
					Green weight 1924		Dry weight 1924		Average green weight 1923-24		Average dry weight 1923-24	
					tons	lbs.	tons	lbs.	tons	lbs.	tons	lbs.
Russian Giant.....	D.I. Seed Co.....	7	6	2	19	120	2	1,626	18	340	2	1,045
Black.....	C.P.R.....	6	2	35	15	1,590	2	1,088	12	435	1	1,928
Mammoth Russian.....	McDonald..	7	2	2	15	980	2	311	17	1,610	2	654
Mixed.....	C.P.R.....	5	10	85	13	1,820	2	259	10	1,190	1	1,064
Mammoth Russian.....	C.P.R.....	6	00	81	13	730	1	1,725	11	1,745	1	1,157
Manteca.....	C.P.R.....	5	5	87	13	320	2	174	11	1,060	1	1,427
Manchurian.....	C.P.R.....	5	3	83	12	1,880	2	136	..	..	..	..
Early Ottawa 76.....	C.E.F.....	5	5	92	12	1,470	1	1,487	12	1,935	1	1,521
Menonite.....	Rosthern..	3	9	100	11	1,580	2	671	..	..	..	..
Manchurian.....	McKenzie..	5	0	80	10	670	1	1,352	12	1,635	1	1,688

The Russian Giant variety is ahead this year, both in green and dry weight. It is also ahead in the two-year average.

Mammoth Russian comes second in the two-year average. These two varieties seem about equal in yield and time of maturity.

The others are all earlier sorts and naturally lower yielders, although some of them yield very well indeed, particularly in dry matter.

VARIETY TEST WITH CORN

Twenty-five varieties of corn were under test in 1924. The seed was sown on June 10, in quadruplicate one-eightieth-acre plots, on fall-ploughed sod which was manured at the rate of sixteen tons to the acre previous to seeding. The rows were thirty inches apart and the plants were thinned to about six inches apart in the row. As germination was good, an even stand was obtained; but owing to the weather being rather cool for good growth with corn the yield was small. No damage was suffered from frost until September 7, when the plots located on the lower-lying areas suffered rather severely. All the plots were harvested on September 8.

Although the corn crop was not heavy, the fact that each of seventeen varieties gave a yield of over 5 tons to the acre of green material indicates that some day corn may become a fairly reliable ensilage crop in this district. The average yield of green material for the twenty-five varieties is 5 tons 1,272 pounds. Ten of the varieties each yielded over 6 tons to the acre of green material and these were also the highest yielders except one, of dry material. Their names and source of seed in order of yield of green material are as follows: Northwestern Dent, Brandon; Northwestern Dent, McKenzie; Pride Yellow Dent, Dakota Improved Seed Company; Comptons Early, Duke; Hybrid, Wimple; Northwestern Red Dent, Dakota Improved Seed Company; Yellow Dent, Wimple; Longfellow, Duke; Quebec 28, Macdonald College; and Longfellow, Dakota Improved Seed Company.

ANNUAL HAYS

OATS AS AN ANNUAL HAY

For the last three years a variety test of oats for annual hay has been carried on at this Station, using twelve varieties in 1922, and thirteen varieties in 1923 and 1924.

The objects are to determine the suitability and productiveness of oats when used as hay and to ascertain the most suitable varieties and the best time for harvesting.

In 1924 the thirteen varieties were seeded on June 9, in quadruplicate one-fortieth-acre plots, on fall-ploughed sod, at the rate of two and one-half bushels per acre. The seed germinated well and the growth was good; so that all varieties gave fair yields of good-quality hay.

Each plot was divided into three $\frac{1}{120}$ -acre plots and harvested at three different stages of maturity as follows: (1) when in bloom, (2) when turning, and (3) when nearly ripe.

The green and dry weights for 1924, together with the average for the three years, are as follows:—

VARIETY TEST WITH OATS FOR ANNUAL HAY

Average yield for the three stages of maturity

Variety	Yield per acre							
	Green weight 1924		Dry weight 1924		Average green weight 1922-24		Average dry weight 1922-24	
	tons	lbs.	tons	lbs.	tons	lbs.	tons	lbs.
Victory.....	6	430	2	765	4	1,723	1	1,696
Abundance.....	6	940	2	725	5	1,780	2	346
Banner.....	6	400	2	654	4	1,480	1	1,740
Gold Rain.....	5	1,380	2	417	4	1,260	1	1,655
*O.A.C. No. 72.....	5	1,780	2	308	5	1,190	2	385
Sensation.....	5	1,330	2	140	4	1,850	1	1,735
Leader.....	5	1,600	2	100	4	1,831	1	1,745
Ligowa.....	5	520	2	987	4	380	1	1,391
Alaska.....	6	450	2	051	4	630	1	1,136
O.A.C. No. 3.....	6	340	1	1,897	4	193	1	976
20th Century.....	5	500	1	1,864	3	1,773	1	1,072
Liberty.....	6	630	1	1,567	4	1,716	1	1,288
Daubeney.....	5	290	1	1,489	3	1,230	1	696

*Average for No. 72 is only for 1923-24.

This table shows that good yields of annual hay may be obtained from practically any of the more common varieties of oats; although the coarser-growing and later maturing varieties have been giving the highest yields.

In order to bring out the difference in yield, between the different stages of maturity, the following table has been prepared:—

AVERAGE YIELD OF ALL VARIETIES AT DIFFERENT STAGES OF MATURITY

Stage of maturity	Yield per acre							
	Green weight 1924		Dry weight 1924		Green weight 1922-24		Dry weight 1922-24	
	tons	lbs.	tons	lbs.	tons	lbs.	tons	lbs.
When in bloom.....	7	946	2	285	5	372	1	1,043
When turning.....	6	546	2	312	5	86	1	1,747
When nearly ripe.....	3	1,719	1	1,879	3	1,080	1	1,619

This table indicates that the greatest weight of dry matter is obtained when the oats are turning. The hay cut at this stage is also more palatable than that cut at the third stage and about equal to the first.

PEAS AS ANNUAL HAY

Four varieties of peas were under test in 1924. The seed was sown on June 10, in quadruplicate one-fortieth-acre plots, on fall-ploughed sod. The

FIELD ROOTS

MANGELS

Thirty-five varieties of mangels and eight varieties of sugar beets were under test in 1924. The seed was sown on June 10, in quadruplicate one-eighth-acre plots on fall-ploughed sod, which was manured at the rate of sixteen tons to the acre previous to seeding. The seed was germinating satisfactorily and gave promise of a good stand when the young plants were attacked so severely by cutworms that although the entire area was sown with poison bran as soon as the first damage was noticed, the worms were so numerous that before they were all killed the plots were damaged to such an extent that they were unsuitable for experimental purposes. The variety test of corn, as well as the other root crops were also attacked; but these were protected from serious injury by the poison bait.

METHODS OF EXPERIMENTATION WITH MANGELS

With the object of determining to what extent experimental error may be reduced by replication, and also to determine the effect of competition between the different types of mangels, an experiment was outlined and planted, in one-eighth-acre plots using the five common mangel type, namely, long, half-long, intermediate, tankard, and globe or round; each one being replicated thirty-six times. Unfortunately, this experiment suffered the same fate as the variety test with mangels, and a consequence no reliable results could be obtained.

SWEDE TURNIPS

Twenty-five varieties of swede turnips were under test in 1924. The seed was sown on June 4, in quadruplicate one-eighth-acre plots, on fall-ploughed sod which was manured at the rate of sixteen tons to the acre previous to seeding. The rows were thirty inches apart and the plants were thinned to twelve inches apart in the row.

The plots were harvested on October 13, and the results from the ten, highest-yielding varieties are as follows:—

VARIETY TEST WITH SWEDE TURNIPS

Results from 10 highest-yielding varieties 1924

Variety	Source of seed	Yield per acre				Remarks
		Green weight, 1924		Dry weight, 1924		
		tons	lbs.	tons	lbs.	
Hall's Westbury.....	Bruce.....	13	1,940	1	1,327	Purple top, round.
Bangholm.....	Nappan.....	13	000	1	1,238	Purple and bronze top.
Select Purple Top.....	Steele Briggs.....	13	1,980	1	1,065	Purple top, round.
Bangholm Swede.....	Hartman.....	14	1,480	1	799	Purple top, smooth.
Improved Yellow.....	Hartman.....	12	700	1	777	Bronze top, globe shaped.
Magnum Bonum.....	Bruce.....	12	400	1	709	Purple top mostly round.
Shepperd's Swede.....	Denmark.....	12	540	1	693	Bronze top, round smooth.
Derby Green Top.....	Bruce.....	11	1,780	1	659	Green and bronze top round.
Ditmar's.....	McNutt.....	12	1,440	1	635	Bronze top, smooth.
Bangholm.....	Swedish.....	11	1,880	1	589	Purple top, round.

Swede turnips give fair yields in this district, and fit in very well with live stock farming.

FALL TURNIPS

Fifteen varieties of fall turnips were under test in 1924. The seed was sown on June 5, in a similar manner to the swedes. They were harvested on October 14. The results from the five leading varieties are as follows:—

VARIETY TEST WITH FALL TURNIPS

Variety	Source of seed	Yield per acre				Remarks
		Green weight, 1924		Dry weight, 1924		
		tons	lbs.	tons	lbs.	
Aberdeen Purple Top.....	Steele Briggs.....	16	120	1	1,135	Purple top round and flat.
Bortfelder.....	Hartman.....	18	1,200	1	1,063	Long, white top smooth.
Red Paragon.....	Sutton.....	16	260	1	811	Reddish top, mostly round.
Fyrsk Bortfelder.....	D. I. F.....	14	640	1	688	Long, cream coloured flesh.
Greystone.....	Steele Briggs.....	14	180	1	643	Purplish grey top, mostly round.

The fall turnip is a larger yielder than the swede; but rarely as good a keeper. Owing to its rapid growth, and succulent nature, it may be used to good advantage for late fall and early winter feeding.

DATE OF SEEDING FALL TURNIPS

With the object of comparing the yields obtained and the keeping quality of fall turnips when seeded at different dates, the Hardy Green Round variety was sown on six different dates, at intervals of seven days, in quadruplicate one-eighth-acre plots, commencing on June 5. The results obtained are as follows:—

DATE OF SEEDING FALL TURNIPS

Date of seeding	Yield per acre			
	Green weight, 1924		Dry weight, 1924	
	tons	lbs.	tons	lbs.
June 5.....	27	1,080	1	1,366
June 12.....	24	1,260	1	1,403
June 19.....	17	1,140	1	804
June 26.....	9	1,960	0	1,278
July 3.....	11	360	0	1,915
July 10.....	4	480	0	780

From these results it would appear that even with fall turnips, reasonably early sowing is advisable.

No significant difference could be noted in the keeping quality of the roots produced from the different dates of seeding.

FIELD CARROTS

Sixteen varieties of field carrots were under test in 1924. The seed was sown on June 5, in a similar manner to the other root crops. The plants were

thinned to about four inches apart in the row. They were harvested on October 17, and the results from the six leading varieties are as follows:—

VARIETY TEST WITH FIELD CARROTS

Variety	Source of seed	Yield per acre		Remarks	
		Green weight, 1924	Dry weight, 1924		
		tons	lbs.	lbs.	
White Belgian.....	Trifolium.....	6	1,680	1,637	Long in type.
Improved Short White.....	Steele Briggs.....	7	1,280	1,625	Short in type.
White Belgian.....	D. & F.....	5	1,800	1,445	Very long and slender.
Mammoth Intermediate.....	Bruce.....	6	1,000	1,431	Intermediate.
Danish Champion.....	C. E. F.....	5	1,300	1,417	Intermediate.
White Belgian.....	Bruce.....	6	120	1,417	Long in type.

Carrots do very well in this district and form an excellent feed in small quantities for horses.

LEGUMES AND GRASSES

HAY PRODUCTION FROM GRASSES ALONE AND IN COMBINATION WITH CLOVERS

The objects of this experiment are to compare the results obtained in yield and quality of hay produced from timothy, orchard grass, and meadow fescue, when grown alone and in mixtures, and when these grasses are sown alone and in combination with red clover, alsike clover, and red and alsike clover, and also to compare the results when these mixtures are sown with and without a nurse-crop.

In 1920 the first series of this experiment was seeded, in single plots with and without a nurse-crop. In 1921 the second series was seeded without a nurse-crop in duplicate plots. The 1922 series failed to catch. In 1923 the series was again repeated in triplicate plots with a nurse-crop.

The results included in the following table, show the average yields of cured hay in 1921 and 1922 from the plots seeded in 1920 with and without a nurse-crop; also the green and dry weights per acre in 1923-24 from the plots seeded in 1920, 1921 and 1923, as well as the average dry weights obtained from all plots harvested in 1923-24.

HAY PRODUCTION EXPERIMENT FROM GRASSES ALONE AND IN COMBINATION WITH CLOVERS

Seed sown					Yield per acre														
Red clover	Alsike clover	Timothy	Meadow fescue	Orchard grass	Average cured hay in 1921-22 from plots seeded without nurse-crop in 1920		Average cured hay in 1921-22 from plots seeded with a nurse-crop in 1920		Green weight in 1924 from plots seeded in 1921		Dry weight in 1924 from plots seeded in 1921		Green weight in 1924 from plots seeded 1923		Dry weight in 1924 from plots seeded in 1923		Average dry weight in 1923-24 from plots seeded in 1920, 1921 and 1923		
					tons	lbs.	tons	lbs.	tons	lbs.	tons	lbs.	tons	lbs.	tons	lbs.	tons	lbs.	tons	lbs.
10	8	15			4	20	3	1,220	4	800	2	560	8	1,960	2	660	1	1,205	
10	8	15			3	680	3	1,060	3	1,920	1	1,480	8	1,000	2	560	1	760	
10	6	10			3	560	3	1,800	3	1,060	1	840	8	580	2	80	1	325	
10	6	10			3	360	4	160	3	1,160	1	1,080	8	860	2	160	1	665	
10	6	10			3	920	3	1,740	3	1,600	1	1,140	7	1,200	2	80	1	693	
10	6	10			3	1,160	3	980	4	340	1	1,240	7	1,940	1	1,900	1	493	
6	8	10			3	1,360	2	740	5	140	2	280	7	40	1	1,820	1	982	
6	6	15			2	1,040	2	700	5	1,260	2	380	7	340	1	1,900	1	952	
6	6	15			3	420	2	220	3	440	1	440	7	1,520	1	1,360	1	663	
6	6	10			2	1,080	2	1,040	3	1,860	1	1,280	6	1,160	1	1,560	1	480	
6	6	10			2	1,380	2	200	2	1,640	1	280	6	1,500	1	1,420	1	002	
6	6	10			2	1,440	2	660	2	380	0	1,880	6	500	1	1,060	0	1,984	
8	2	8			2	120	3	700	3	1,280	1	1,160	5	1,600	1	1,400	1	202	
8	2	15			2	1,700	3	920	2	1,520	1	160	5	1,300	1	1,320	1	058	
8	2	15			2	100	3	1,000	2	660	0	1,640	5	000	1	860	0	1,649	
8	2	6			2	1,260	3	160	3	1,440	1	680	4	1,980	1	800	1	101	
8	2	6			2	680	3	1,940	7	340	2	260	7	860	1	1,420	1	593	
8	2	10			2	200	4	1,940	8	520	2	1,340	7	880	1	1,680	1	1,098	
12					1	1,500	2	1,700	6	1,400	2	1,300	5	640	1	1,300	1	1,068	
30					1	840	2	280	4	1,380	1	1,740	4	1,800	1	600	1	491	
30					1	1,520	1	1,980	5	1,520	1	1,080	4	120	1	20	1	175	
8	15				1	1,400	2	760	5	20	1	1,980	5	320	1	520	1	462	
8	15				1	760	2	1,320	3	1,900	1	860	5	000	1	960	1	198	
15	15				1	780	1	1,460	1	1,860	0	1,700	5	1,260	1	1,100	0	1,716	
Average.....					2	1,136	3	28											

Comparing the average yield of column one with column two it is found that nothing was gained by seeding down without a nurse-crop.

In 1923 a yield of 2 tons 1,723 pounds per acre of green weight and 1,273 pounds per acre of dry weight was obtained from those same plots seeded without a nurse-crop and 3 tons 438 pounds per acre of green weight and 1,490 pounds per acre of dry weight was obtained from those seeded with a nurse-crop; thus again indicating no advantage from seeding without a nurse-crop.

It is as yet rather difficult to draw any definite conclusions with regard to the different mixtures. It is worthy of note, however, that good results may be obtained, in this district in hay production, from almost any mixture of the common grasses and clovers.

On close inspection of the table it may be noted that timothy as a grass seems to be giving better results both alone and in mixtures than either orchard grass or meadow fescue, particularly in dry weight. In most cases wherever timothy is replaced by either orchard grass or meadow fescue there has been a reduction in yield. This with the fact that timothy has a longer period over which it may be cut for hay without serious deterioration in quality, would seem to auger well for its use rather than either of the other two.

Orchard grass, however, has the advantage of giving very early growth in the spring and late growth in the fall and on this account, may prove to be of considerable agricultural value in this district, particularly for pasture.

TIMOTHY AND CLOVERS FOR HAY PRODUCTION

The objects of this experiment are to compare the results obtained in yield and quality of hay produced by seeding with various quantities of timothy, red clover, and alsike clover, and to ascertain to what extent red clover may be profitably replaced with alsike in the standard hay mixture.

The results reported this year show the average yields obtained to date from plots in this experiment which were seeded one-half-acre in size; including a second crop in 1921, from 1920 seeding, a first cut in 1922 from 1921 seeding, and a first cut in 1923 from the same plots. There are also shown the results obtained in 1924 from the series seeded in 1923 in triplicate one-fortieth-acre plots:—

TIMOTHY AND CLOVERS FOR HAY PRODUCTION

Seed sown			Yield per acre					
Timothy	Red Clover	Alsike Clover	1920-1921 seeding, cured hay 1921-1923 3-years		1923 seeding, green weight 1924		1923 seeding, dry weight 1924	
			tons	lbs.	tons	lbs.	tons	lbs.
8	10	—	1	1,008	7	20	1	1,360
8	8	2	1	1,852	7	1,000	1	1,420
8	6	3	1	1,363	6	1,880	1	1,680
8	4	4	2	120	6	1,680	1	1,340
8	2	5	2	920	5	1,800	1	1,040
6	10	—	1	520	5	1,880	1	820
6	8	2	1	640	6	680	1	1,520
6	6	3	1	841	5	980	1	760
6	4	4	1	1,430	5	1,080	1	820
6	2	5	1	1,497	7	240	1	1,260

There does not appear to be any very significant differences in the results obtained from these various mixtures. In fact it would seem that timothy, red clover and alsike clover may be each or all varied considerably without materially interfering with the yield of the resultant crop. The nature of the soil; the purpose for which the hay is grown and the quality desired, should of course always be kept in mind when deciding on the most suitable mixture to sow.

LATE AND EARLY CLOVER WITH LATE AND EARLY GRASS

The object of this experiment is to compare the results obtained in yield and quality of hay produced from a mixture of late and early clover and late and early grass.

The results from this experiment in 1924 are from a series of plots which was seeded on May 23, 1923 in triplicate one-fortieth-acre plots, using barley as a nurse crop. The hay was cut on August 11. The results obtained are as follows:—

LATE AND EARLY CLOVER WITH LATE AND EARLY GRASS

Seed sown				Yield per acre			
Timothy	Meadow Fescue	Early Red Clover	Late Red Clover	Green weight 1924		Dry weight 1924	
				tons	lbs.	tons	lbs.
lbs.	lbs.	lbs.	lbs.	tons	lbs.	tons	lbs.
8	—	10	—	7	680	1	1,260
—	15	10	—	8	700	1	1,920
8	—	—	10	7	480	1	1,040
—	15	—	10	6	720	1	1,340

No conclusions can be drawn from the one year's results other than that all mixtures are giving very good yields.

LATE VERSUS EARLY CLOVER IN STANDARD HAY MIXTURE

The object of this experiment is to compare the results obtained in yield and quality of hay produced from using common red clover and late red clover in the standard hay mixture.

The mixtures were sown on May 23, 1923 in triplicate one-fortieth-acre plots using barley as a nurse-crop and the results obtained in 1924 are as follows:—

LATE VERSUS EARLY CLOVER IN STANDARD HAY MIXTURE

Seed sown				Yield per acre			
Timothy	Alsike Clover	Common Red Clover	Late Red Clover	Green weight 1924		Dry weight 1924	
lbs.	lbs.	lbs.	lbs.	tons	lbs.	tons	lbs.
8	2	8	—	5	1,560	1	1,180
8	2	—	8	5	1,920	1	1,200

Like the former experiment, no conclusions can be drawn from the one year's results; but so far there appears to be little or no difference in the results from the two mixtures used.

VARIETY TEST WITH RED CLOVER

The object of this experiment is to compare the results obtained in, hardness, yield and quality of hay produced from different varieties, or strains of red clover procured in different sections of Canada and Europe.

Twelve varieties were sown on May 24, 1923, in triplicate one-fortieth-acre plots using barley as a nurse-crop. The results obtained in 1924 are as follows:—

VARIETY TEST WITH RED CLOVER

Variety	Yield per acre			
	Green weight 1924		Dry weight 1924	
	tons	lbs.	tons	lbs.
St. Clot.....	8	1,280	1	1,240
Kapuskasing.....	7	680	1	1,020
St. Casimir.....	7	1,380	1	1,020
Swedish Medium Late.....	8	680	1	1,000
Swedish Late.....	7	1,680	1	960
Oxdrift.....	8	480	1	900
Ottawa.....	7	520	1	860
Early Swedish.....	7	1,920	1	840
Alta Swede.....	7	620	1	760
North Italy 540.....	5	1,780	1	260
North Central Italy 538.....	4	1,120	0	1,820
South Italy 509.....	4	740	0	1,760

While the results from one year's test are not sufficient on which to draw definite conclusions, yet the evident unsuitability of the Italian-grown seed, for this district, is so marked both from actual yields and from observation, that attention should be called to this fact.

These strains seemed to kill-out during the winter and spring very badly, and the yields as shown here are not actually representative of the crop produced by the red clover alone in these cases, owing to the great tendency of alsike clover to catch-in wherever the red clover was killed.

The advisability of using acclimatized and hardy strains of red clover is very strongly indicated by these results.

VARIETY TEST WITH WHITE DUTCH CLOVER

The object of this experiment is to compare the results obtained in hardiness and yield from different varieties of white dutch clover, secured in various parts of Canada and Europe.

Six varieties were sown on May 24, 1923, in triplicate one-fortieth-acre plots, using barley as a nurse-crop.

The plots were harvested on August 11, the results obtained are as follows:—

VARIETY TEST WITH WHITE DUTCH CLOVER

Variety	Yield per acre		
	Green weight 1924		Dry weight 1924
	tons	lbs.	lbs.
Ladino.....	6	480	1,980
Danish Stryno.....	3	1,300	1,240
Scottish Wild.....	2	440	740
Kentish Wild.....	1	980	560
Danish Morso.....	1	940	560
Commercial.....	1	140	440

The Ladino variety seems to be much the largest yielder of all those tried; but it is doubtful if it has as much creeping ability as some of the other sorts.

White dutch clover is primarily a pasture plant, and more results are needed before any definite conclusion can be drawn.

METHODS OF SEEDING ALFALFA FOR HAY PRODUCTION

The objects of this experiment are to compare the results obtained in yield and quality of hay produced from alfalfa, when seeded broadcast at the rate of twenty pounds per acre, with results when seeded in rows twelve inches apart; and also to compare the results obtained from plots seeded with and without a nurse crop.

The results as shown in the following table cover the average yields of cured hay, from all the one-half-acre plots which have been seeded and cut to date, including the series seeded in 1920 and 1921; also the green and dry weights in 1924 from the series seeded on May 19, 1923 in triplicate one-fortieth-acre plots:—

METHODS OF SEEDING ALFALFA FOR HAY PRODUCTION

Method	Yield per acre					
	Four-year average of cured hay from 1/2 acre plots 1921-24		Green weight 1924		Dry weight 1924	
	tons	lbs.	tons	lbs.	tons	lbs.
<i>With a nurse-crop</i>						
In drills 12 inches apart.....	2	64	12	960	3	639
Broadcast 20 pounds per acre.....	1	1,895	11	1,213	2	1,860
<i>Without a nurse-crop</i>						
In drills 12 inches apart.....	2	1,087	11	1,106	3	166
Broadcast 20 pounds per acre.....	1	1,800	12	1,826	2	1,794
Broadcast 20 pounds per acre (Peel).....	-	-	11	639	2	1,908

Comparing the results obtained to date, it would appear that the plots seeded in rows 12 inches apart tend to give larger yields than those seeded broadcast. It is doubtful, however, if this practice should be recommended at present as there seems to be a greater tendency for weeds to get started in the plots seeded in rows.

The earlier results from this experiment showed quite an advantage in favour of the plots seeded without a nurse-crop, particularly during the first year of the meadow; this, however, is not being corroborated by the later results; so that from the present data, it would appear as though alfalfa will do almost as well when seeded with a nurse-crop as without, if the other conditions are suitable.

NITRO-CULTURE ON ALFALFA

The object of this experiment is to compare the results obtained in yield and quality of hay produced from alfalfa when seeded with and without nitro-culture treatment.

In 1921, two one-tenth-acre plots were seeded with this experiment. In 1923 another series was planted on May 19, in triplicate one-fortieth-acre plots using barley as a nurse-crop. The results obtained are as follows:—

NITRO-CULTURE ON ALFALFA

Treatment	Yield per acre									
	Plots seeded 1921						Plots seeded 1923		Plots seeded 1924	
	Cured hay 1922		Green weight 1923		Dry weight 1923		Green weight 1924		Dry weight 1924	
	tons	lbs.	tons	lbs.	tons	lbs.	tons	lbs.	tons	lbs.
Treated.....	1	1,940	10	450	3	1,465	10	1,400	2	1,740
Untreated.....	1	580	9	1,290	3	967	9	800	2	980

All these results show a marked advantage to be gained by treating alfalfa seed with nitro-culture. This is particularly noticeable from observation, during the first year of the meadow.

NITRO-CULTURE ON RED CLOVER

The object of this experiment is to compare the yields of hay obtained from red clover seeded with and without nitro-culture treatment. In 1921, the first series of this test was seeded in single one-tenth-acre plots. The following table shows the results obtained in 1924, from the series seeded on May 21, 1923 in triplicate one-fortieth-acre plots, as well as those obtained in 1922 and 1923, from the first series seeded:—

NITRO-CULTURE ON RED CLOVER

Treatment	Yield per acre									
	Seeded 1921		Seeded 1921		Seeded 1921		Seeded 1923		Seeded 1923	
	Cured hay 1922		Green weight 1923		Dry weight 1923		Green weight 1924		Dry weight 1924	
	tons	lbs.	tons	lbs.	tons	lbs.	tons	lbs.	tons	lbs.
Treated.....	2	400	8	50	2	858	3	1,660	1	80
Untreated.....	3	800	7	1,406	2	14	4	580	1	340

The results from this experiment to date are somewhat conflicting, but there is no consistent evidence to show that red clover is benefited from nitro-culture treatment, in this district. This is as might be expected, where red clover grows so readily on all cleared areas on which seed is sown.

THE PRODUCTION OF SEED

RED CLOVER SEED PRODUCTION

The objects of this experiment are to compare the results obtained in yield and quality of seed produced from using first or second cutting of red clover for seed production; and also to compare the yields of seed obtained from seeding broadcast, seeding in rows twelve inches apart, and in rows twenty-four inches apart and also to compare the monetary returns from red clover used as a hay crop with red clover used as a seed crop.

The first series of this experiment was seeded in 1920, in duplicate one-half acre plots and the second in 1921 in a similar manner. The series seeded in 1922 did not catch and the fourth was seeded on May 21, 1923, in triplicate one-fortieth-acre plots, using barley as a nurse-crop.

The first series was cut for three years, and the second for two, and the first year's crop has been taken from the fourth. The following table gives the results complete to date:—

RED CLOVER SEED PRODUCTION

Method of seeding and purpose of crop	Yield per acre								Value of crop in 1924	
	Average of seed from all half-acre plots 1921-23		Average of hay and clover straw from all half-acre plots 1921-23		Of seed in 1924		Of hay and clover straw in 1924			
	bus.	lbs.	tons	lbs.	bus.	lbs.	tons	lbs.	\$	cts.
Broadcast, two cuttings for hay.....			1	1,622			1	900		29 00
Broadcast, first cutting for hay second for seed.....	0	17	1	24			1	947		29 47
Broadcast, first cutting for seed.....	1	53	0	1,625	6	30	1	520		162 30
Rows 12 inches apart first cutting for seed	1	38	0	1,504	6	—	1	240		149 60
Rows 24 inches apart first cutting for seed	1	24	0	1,313	7	20	1	40		181 10

The table conveys considerable information. In the first place it shows that the strain of red clover which we are growing here, which seems to be somewhat of a perennial nature, gives very few heads in the second growth, will not give very much seed from the second cut, and therefore could not be depended upon for a supply of seed.

Comparing the yields of seed between broadcast sowing and rows, it is found that the results are somewhat conflicting and hence are not conclusive. The rows in the half-acre plots, were, in some places, not a full stand and this may partly explain the lower seed yields from these plots.

It is very doubtful if there is much advantage in seeding red clover in rows either twelve or twenty-four inches apart, even for seed production. In fact, from observation, it would appear that row seeding gives weeds a much better chance to become established unless cultivation is followed and this necessitates a fair distance between the rows and adds to the cost of production.

Monetary returns depend largely on yield of clover seed as both hay and clover seed are usually a fair price in this district. The results from the one-half-acre plots show that hay would pay better than clover seed; while the results in 1924, from the one-fortieth-acre plots show a marked advantage in favour of seed production. Clover hay was valued at \$20 per ton, clover straw at \$5 per ton and clover seed at 40 cents per pound.

ALSIKE SEED PRODUCTION

The object of this experiment is to compare the results obtained in yield and quality of seed produced from alsike when sown broadcast, in rows twelve inches apart and in rows twenty-four inches apart.

The results in 1924 are from a series seeded on May 21, 1923, in triplicate one-fortieth-acre plots, using barley as a nurse-crop. The following table gives the results in 1924 and the three-year average:—

METHODS OF SEEDING ALSIKE FOR SEED PRODUCTION

Method of seeding	Yield of seed per acre			
	1924		Average of 3 years 1922-24	
	bus.	lbs.	bus.	lbs.
Broadcast.....	6	40	3	41
Rows twelve inches apart.....	6	40	3	44
Rows twenty-four inches apart.....	5	50	3	6

These results show that there is practically no difference in the yields of seed obtained from plots sown broadcast, and those sown in rows twelve inches apart. Both in 1924 and in the three-year average the plots seeded in rows twenty-four inches apart have been below the others in yield.

TIMOTHY SEED PRODUCTION

The object of this experiment is to compare the results obtained in yield and quality of seed produced from seeding broadcast in combination with red clover, broadcast alone, in rows twelve inches apart, and in rows twenty-four inches apart.

Where the red clover is included in the mixture the idea is to cut the plot as mixed hay the first year and save it for seed the second, on the assumption that part of the red clover will have died out by then and the stand therefore be largely timothy.

The results obtained in 1924 are from duplicate one-half-acre plots seeded in 1921 and from triplicate one-fortieth-acre plots seeded May 21, 1923, using barley as a nurse crop.

METHODS OF SEEDING TIMOTHY FOR SEED PRODUCTION

Method of seeding	Amount sown per acre	Yield per acre					
		Seeded 1921 yields 1924		Seeded 1923 yields 1924		Average 1922-24	
		bus.	lbs.	bus.	lbs.		
Broadcast timothy.....	10	2	4	.....	2	8	
Broadcast red clover.....	3	.....	.....	.....	.....	.....
Broadcast timothy.....	10	2	35	5	26	3	23
Rows 12 inches apart.....	.....	3	46	3	42	3	14
Rows 24 inches apart.....	.....	4	7	3	16	3	13

The results from this experiment are somewhat conflicting; but the average of all the cuttings to date would indicate that there is not a great deal of difference between the various methods of seeding.

ALFALFA SEED PRODUCTION

In 1923 a commencement was made in the production of alfalfa seed, when a one-quarter-acre plot of alfalfa which was showing good bloom was kept for seed. This yielded at the rate of three bushels and twenty pounds to the acre. In 1924 the same plot was saved for seed, but for some reason it did not load nearly so well, as only forty pounds per acre were obtained.

It is encouraging to note that alfalfa seed can be matured in this district, and some experiments will be carried on in the near future in order to determine the best methods of planting for seed production.

KENTISH WILD WHITE CLOVER

The objects of this experiment are to determine if a strain of Kentish wild white clover, imported from Europe, will stand the climate in this district, and also to determine if seed can be profitably produced.

Four acres of clay-loam soil were seeded with this seed on May 19, 1922, using oats as a nurse-crop. This was a dry, hard year on seeding, so that the stand, while better than most of the other seeding, was not very thick. It wintered well and gave a good growth in 1923; but only a small yield of seed.

In 1924, however, it has given ninety pounds of good seed, which, while not a large crop, is sufficient proof that the clover is hardy in this district, and will mature seed satisfactorily.

POULTRY

Excellent progress can be reported in connection with the poultry work at this Station since its commencement in 1921, when the first hundred-bird house was erected. A gradual increase has taken place in the accommodation and in the number of birds kept, as well as a marked improvement in the egg production. At the present time the poultry plant consists of two frame and two log poultry houses, each of which will accommodate 100 birds. Besides these there are six colony houses and the new incubator and brooder house.

The permanent flock consists of about four hundred laying hens, three hundred and eighty of which were under experiment during the winter along the lines of comparing breeding, feeding, housing, and general management methods.

The Barred Plymouth Rock is the only breed kept and seems to be well adapted to the climatic and market conditions of New Ontario, as the birds are hardy, of good size, and are making a good showing in egg production.

The prices for the different feeds used in connection with the various experiments dealt with in this report are based on the average market prices for the year and are as follows:—

Wheat.....	\$2 70	per cwt.
Oats.....	1 70	"
Barley.....	2 35	"
Corn.....	2 35	"
Bran.....	1 60	"
Middlings.....	1 95	"
Shorts.....	1 65	"
Low-grade flour.....	2 50	"
Meat meal.....	4 85	"
Tankage.....	2 70	"
Beef scrap.....	4 75	"
Milk.....	0 50	"
Oyster shell.....	2 00	"
Charcoal.....	3 00	"
Grit.....	2 00	"
Chick mash.....	4 40	"
Clover leaves.....	1 00	"
Mangels.....	0 25	"

Eggs are valued at sixty cents per dozen throughout the year.

SKIM-MILK VERSUS BEEF SCRAP FED FOR WINTER EGG PRODUCTION

The object of this experiment is to compare the relative value of skim-milk and beef scrap as a source of animal protein for winter egg production. In 1921-22 this experiment was commenced on November 1 and continued until April 30, covering the six winter months, and using ninety-eight pullets. In 1922-23 it commenced December 1 and continued until April 30, using forty year-old hens and was duplicated with twenty-four pullets. In 1923-24 the experiment covered a period of three months only, commencing on November 1 and concluding on January 31, as it was necessary to break the pens up at this date for pedigree-breeding work. Forty year-old hens were used in the test. They were divided into two pens of twenty birds each, with equal egg production. The ration given to each pen was the same with the exception of the skim-milk and beef scrap. The scratch ration consisted of two parts each of whole wheat and cracked corn and one part each of whole oats and barley. The dry mash consisted of equal parts of bran, shorts, corn meal, ground oats and ground barley. The beef scrap was fed from a hopper and the skim-milk from a drinking vessel. A supply of each was before the respective pens continuously. Besides this ration the birds had a regular supply of mineral matter and green feed.

The results obtained in 1923-24 together with the three-year average are as follows:—

SKIM-MILK VERSUS BEEF SCRAP

Items	Skim-milk 1923-1924	Beef scrap 1923-1924	Skim-milk Three-year average per bird per month	Beef scrap Three-year average per bird per month
Number of birds..... No.	20	20		
Pounds of animal feed..... lbs.	249	126	5.91	0.33
Cost of animal feed..... \$	1 25	5 98	0 029	0 05
Total cost of feed..... \$	11 37	15 05	0 209	0 22
Number of eggs laid..... No.	156	184	5.9	5.46
Value of eggs laid..... \$	7 80	9 20	0 28	0 26
Cost per dozen..... \$	0 87	0 98	0 42	0 48
Profit over costs..... \$	-3 57	-5 85	0 07	0 04

DEDUCTIONS.—The results from this experiment would seem to indicate that:—

1. Skim-milk even at fifty cents per one hundred pounds is a cheaper source of animal protein for laying hens and pullets than beef scrap.
2. Slightly higher production at a lower cost per dozen may be obtained by the use of skim-milk than by beef scrap.
3. Farmers with a plentiful supply of skim-milk need not purchase any other animal feed for their poultry.
4. For poultry keepers other than farmers, who may find it difficult to obtain a supply of skim-milk, beef scrap supplies a very satisfactory source of animal protein, particularly for year-old hens.

SPROUTED OATS VERSUS CLOVER

The object of this experiment is to compare the results obtained from sprouted oats and clover leaves using each as a green feed. In 1922-23 this test was commenced on December 1 and continued until April 30. In 1923-24 it was repeated, commencing on November 1 and ending on April 30, using 100 pullets in each case. The ration fed to each lot was the same with the exception of the

kind of green feed given. The one lot got all the sprouted oats they could handle, from a trough, while the other lot was given the clover in the litter.

The scratch feed consisted of two parts each of whole wheat and cracked corn and one part each of whole oats and barley. The dry mash consisted of equal parts of bran, shorts, corn meal, ground oats and barley plus ten per cent meat meal. Besides this ration, mineral matter and beef scrap in hoppers were available to the birds at all times. The results obtained in 1923-24 together with the two-year average are as follows:—

SPROUTED OATS VERSUS CLOVER

Items	Sprouted oats 1923-1924	Clover leaves 1923-1924	Sprouted oats two-year average per month	Clover leaves two-year average per month
Number of birds..... No.	50	50		
Pounds of green feed..... lbs.	194	180	38.85	23.00
Cost of green feed..... \$	3 29	1 60	0 67	0 28
Total cost of feed..... \$	65 39	65 91	10 69	10 05
Number of eggs laid..... No.	1,549	1,324	296	271
Value of eggs laid..... \$	77 45	66 20	14 80	13 55
Cost per dozen..... \$	0 50	0 59	0 43	0 46
Profit over cost..... \$	12 06	0 29	4 11	3 50

DEDUCTIONS.—The results in this table would indicate that:—

1. Birds getting sprouted oats as a green feed may produce a few more eggs than those getting clover leaves.
2. There is not a great deal of difference in the cost of feed required.
3. Sprouted oats give lower cost of egg production, if no extra cost for labour is included.
4. Green clover leaves make a very satisfactory green feed, if sprouted oats cannot be conveniently arranged for.

WATER VERSUS SNOW

The object of this experiment is to compare the results obtained from the use of water and from snow for laying hens during the winter months. This experiment was commenced on November 16, 1923, and continued until February 15, 1924, using forty year-old hens, twenty in each pen. The hens were divided equally according to former egg production and given identical treatment throughout the period with the exception of their getting either water or snow. Each pen was fed the standard scratch grain and laying mash, but was not forced for egg production, as forcing is supposed to have an injurious after-effect on hatching results and these were pedigreed birds needed for breeding purposes.

During the three months, the pen receiving water laid 62 eggs while the pen receiving snow laid 163. It is not probable that the effect of the snow made this marked difference, and as the number of birds was small with possibly some other factor such as stage of moulting, etc., interfering with the results, no conclusions can be drawn until further tests are made.

CORN IN THE RATION

The object of this experiment is to compare the results obtained in egg production and also in fertility and hatchability, from hens which were fed corn in their ration and hens to which no corn was given.

This test was commenced on November 1, 1923, and continued until January 31, using 100 year-old hens. At the end of January ten hens from each pen were selected with which to test the fertility and hatchability, and transferred to a subdivided colony pen for the next three months, February, March and April, so that the figures as shown represent the results from the 100 birds for the first three months and for twenty birds for the last three months. The results obtained are as follows:—

CORN VERSUS NO CORN

Items		Corn first three months	No corn first three months	Corn last three months	No corn last three months
Number of birds.....	No.	50	50	10	10
Pounds of corn.....	lbs.	290		54	
Cost of corn.....	\$	6 81		1 27	
Total cost of feed.....	\$	31 22	27 67	6 57	7 07
Number of eggs laid.....	No.	237	158	149	147
Value of eggs laid.....	\$	11 85	7 90	7 45	7 35
Cost per dozen.....	\$	1 58	2 10	0 52	0 57
Profit on cost.....	\$	-19 37	-19 77	0 88	0 28
Number of eggs set.....	No.			78	68
Number of eggs fertile.....	"			61	46
Number of chicks hatched.....	"			8	12

DEDUCTIONS.—As these figures are only for one year no definite conclusions can be drawn, but the following propositions are indicated:—

1. That corn has a beneficial effect on egg production, as more eggs at a lower cost per dozen were obtained, from the corn-fed pen.
2. Corn in the ration gave higher fertility, but lower hatchability than no corn.

LIGHTS VERSUS NO LIGHTS

The object of this experiment is to compare the results obtained in egg production and general development of the birds from the use of electric lights from four o'clock in the morning until daylight, with results obtained without lights.

For this experiment one hundred of the best pullets were selected on November 1, 1923, and divided equally as to weight, breeding and general development into two pens of fifty birds each. All conditions were similar with the exception that one pen had the extra hours of light by which to work. The experiment covered six months. The results obtained are as follows:—

LIGHTS VERSUS NO LIGHTS

Items		Lights	No lights
Number of birds.....	No.	50	50
Weight at beginning.....	lbs.	217	227
Weight at finish.....	"	249	240
Total cost of feed.....	\$	59 76	60 85
Number of eggs laid.....	No.	2,067	1,538
Value of eggs laid.....	\$	108 35	76 90
Cost per dozen.....	\$	0 34	0 47
Profit over cost.....	\$	48 59	16 55

The results obtained this year would seem to indicate that more eggs may be obtained by the use of lights than where no lights are employed. The cost of electricity was not taken but the cost of feed was practically the same; consequently those on lights produced the eggs at a lower cost per dozen.

WHOLE MILK VERSUS SKIM-MILK FOR BABY CHICKS

The object of this experiment is to compare the results obtained from the use of whole milk and skim-milk in the ration for baby chicks.

For this test 158 chicks were taken from the incubator and divided equally into two lots of seventy-nine each on May 19. They were given the same conditions in every way except whole milk was given the one lot to drink while the other lot had skim-milk. The experiment covered a period of three weeks. The results obtained are as follows:—

WHOLE MILK VERSUS SKIM-MILK FOR BABY CHICKS

ems	Whole milk	Skim-milk
Number of chicks..... No.	79	79
Weight at commencement, May 19.....	lbs. ozs. 6 4	lbs. ozs. 6 6
Weight three weeks later, June 9.....	22 12	21 8
Gain.....	16 8	15 2
Number died..... No.	4	8
Total cost of feed..... \$	4 00	2 43
Cost of feed per healthy chick..... \$	0 05	0 03

While no definite conclusions can be drawn on the results from one test, yet the figures in the above table would indicate that a larger number of chicks may be raised to three weeks of age by the use of whole milk, but at a greater cost per chick.

CRATE-FATTENING

The objects of this experiment are to determine:—

1. If crate-fattening cockerels is profitable; 2. If home-grown feeds are suitable for crate fattening; 3. If it pays to purchase a commercial feed like corn and add it to the home-grown feeds; 4. If it would pay to use all commercial feeds rather than all or part home-grown; 5. If tankage and water could take the place of skim-milk in a fattening ration.

The results of the experiments in 1922 and 1923 have already been reported. The experiment was repeated again this year, using two lots of birds in a similar manner to the other years. Seventy-two birds were selected and equally divided as to weight and general development, and placed in six crates, each of which had three compartments holding four birds. The birds were all housed in the same quarters and fed the following rations: Pen 1, equal parts of wheat, oats and barley plus skim-milk; pen 2, equal parts of wheat, oats and barley, tankage 15 per cent and water; pen 3, equal parts of wheat, oats, barley, and corn, plus skim-milk; pen 4, equal parts of wheat, oats, barley and corn, tankage 15 per cent, and water; pen 5, equal parts of corn, low-grade flour and middlings, plus skim-milk; pen 6, equal parts of corn, low-grade flour, and middlings, tankage 15 per cent, and water. The oats, barley, wheat and corn, were all finely ground and the coarser hulls were removed from the oats and barley.

Each experiment covered a period of twenty-one days or forty-two feedings. The first lot was fed from October 17 to November 7, and the second lot from November 27 to December 18. Most of the birds stayed in good health, and maintained their appetite to the end of the test. The results obtained in 1924, together with the three-year average, are as follows:—

CRATE-FATTENING EXPERIMENT

Pen	Weight at begin- ning	Weight at end	Value at begin- ning	Value at end	Increase in value	Value of total feed	Net profit per pen
	lbs. ozs.	lbs. ozs.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
1.—First lot.....	64 00	80 2	22 40	28 04	5 64	2 75	2 89
Second lot.....	58 04	74 4	20 38	25 98	5 60	3 23	2 37
Three-year average.....	51 02	71 15	16 36	22 86	6 50	2 74	3 76
2.—First lot.....	63 00	77 0	22 05	26 95	4 90	2 00	2 90
Second lot.....	58 04	73 4	20 38	25 63	5 25	2 29	2 96
Three-year average.....	50 06	66 14	16 13	21 33	5 20	2 04	3 16
3.—First lot.....	64 08	80 4	22 57	28 08	5 51	2 72	2 79
Second lot.....	58 04	76 12	20 38	26 86	6 48	3 10	3 38
Three-year average.....	51 07	73 8	16 45	23 36	6 91	2 75	4 16
4.—First lot.....	61 04	73 0	21 43	25 55	4 12	1 91	2 21
Second lot.....	58 04	73 4	20 38	25 63	5 25	2 05	3 20
Three-year average.....	50 1	66 4	16 02	21 10	5 08	2 05	3 03
5.—First lot.....	62 00	77 8	21 70	27 12	5 42	2 70	2 72
Second lot.....	58 08	79 12	20 47	27 91	7 44	3 03	4 41
Three-year average.....	50 06	71 14	16 12	22 88	6 76	2 58	4 18
6.—First lot.....	61 04	67 12	21 43	23 71	2 28	1 76	0 52
Second lot.....	58 04	66 12	20 38	23 36	2 98	1 97	1 01
Three-year average.....	49 15	66 10	15 97	21 11	5 14	1 90	3 24

DEDUCTIONS.—The figures in this table indicate that:—

1. It pays to crate fatten cockerels.
2. Home-grown feeds are quite suitable for crate fattening.
3. Corn improves the home-grown ration if milk is to be used.
4. If a suitable supply of home-grown feeds are available there is little to gain by purchasing all commercial feeds.
5. In every case skim-milk is superior to tankage and water in the fattening ration.

The crates used are six feet long, sixteen inches wide, and twenty inches high, inside measurements. Each of these is divided by two solid partitions into three compartments, each of which will accommodate four birds.

PEDIGREE WORK

Through the medium of the trap-nest a record is obtained of the egg production of each individual hen. This forms the proper basis for utility selection. From the trap-nest records the breeding pens are selected, pedigreed and mated with the best cockerels available. This is having a marked bearing on the egg production not only of many individual birds but also on the average production of the entire flock. No birds are retained as breeders that have not produced at least 150 or more eggs during their pullet year. On December 31, the birds on hand with records of over 150 eggs were made up as follows:—

Over 200 eggs.....	10
Over 175 eggs.....	24
Over 150 eggs.....	44
Total.....	78

RATIONS

The present standard scratch ration consists of two parts each of cracked corn and whole wheat, and one part each of whole oats and barley; while the laying mash consists of equal parts of bran, middlings, or shorts, corn meal, crushed oats and ground barley, plus ten per cent meat meal.

The scratch grain is fed morning and evening in the litter, and the mash is hopper-fed. Besides the above oyster shell, grit, charcoal and in some cases beef scrap are kept before the birds, in hoppers, at all times.

The green feed may consist of mangels, sprouted oats, clover or alfalfa leaves, or even the cut plants fed in the litter.

BEEES

In the autumn of 1923 sixteen colonies of bees were placed in winter quarters. Eight of these were put in four-colony wintering cases, which allowed for six inches of packing material to be placed on all sides and underneath, with ten to twelve inches on top. The eight colonies all came through alive and in good condition. The packing used was well-dried planer shavings.

Of the eight colonies placed in the office cellar, six came through alive, but one of these was queenless so that it had to be united with another colony, thus reducing the number of colonies, spring count, to thirteen.

The colonies wintered in the cellar were removed to outside quarters on May 10, while those wintered outside were not removed from the packing cases until early in June. An outer case packed with shavings was placed around each brood chamber during the cooler part of the summer.

One hive was placed on scales and a daily record kept of the gain or loss in weight. Notes were also made on the daily climatic features in order that the effect of the weather on honey flow could be determined. The records of the hive on scales are as follows:—

RECORD OF HIVE ON SCALES IN 1924

	May	June	July	August	September	Total
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
Gains.....			70	36.5	31	110
Loss.....	15	12.5				

It may be noted that a loss occurred during the month of June. This is very unusual. July gave the largest flow which usually happens.

Alsike did not commence to bloom this year until after June 20. The first increase made by the hive on scales occurred on June 15. The greatest flow of nectar occurred on July 21, when 15 pounds were collected by the one hive. Two other good days were recorded on August 24, and 26, when 14 and 13 pounds were collected respectively.

Of the thirteen colonies, spring count, only five were used for honey production. Two were used as drone breeders and for the formation of nuclei for the queen-mating yard and six were used entirely in making up nuclei.

During the season the five colonies used for honey production were increased to nine. The following statement gives the season's operations in detail for the five colonies:

FINANCIAL STATEMENT OF APIARY IN 1924

Total weight of honey extracted from five hives.....	530 lbs.
Average weight produced per colony.....	106 lbs.
Average selling price of honey per pound.....	18 cents
Total value of honey produced.....	\$ 95 40
Average value of honey produced per colony.....	\$ 19 08

QUEEN-MATING YARD

As in 1923, the queen-mating yard was again operated very successfully in 1924. The virgin queens were mailed from Ottawa and placed in mating nuclei. As each batch of queens became mated and commenced to lay, they

were sent to Ottawa or to some of the branch Farms or Stations in accordance with instructions received from time to time from the Dominion Apiarist. This work was carried on from June 26, until September 14.

During the season 164 virgin queens were received from Ottawa, 163 of which were alive on arrival. One hundred and three were successfully mated and either shipped out or used in the Station apiary.

After the queen-mating season was over, the nuclei were all united to form strong colonies for winter quarters. On October 10 sixteen colonies were packed in four four-colony wintering cases in the bee-yard and seven were placed in the office cellar on November 8.

FIBRE CROPS

FLAX

VARIETY TEST OF FLAX.—Four varieties were under test in 1924. The seed was sown at the rate of one and one-half bushels per acre on May 15, in triplicate one-fortieth-acre plots. Germination was good and the crop developed into a nice stand. The crop was for the dual purpose of fibre and seed, consequently it had to be pulled and dried in stooks, after which it was shipped to Ottawa for further tests. The results obtained are as follows:—

VARIETY TEST OF FLAX

Variety	Average height 1924	Yield per acre	
		Green weight 1924	Dry weight 1924
	Inches	tons lbs.	tons lbs.
Saginaw.....	26	10 0	3 1,480
Longstem.....	28	9 40	3 800
Riga Blue.....	25	7 720	2 1,820
Pure Line No. 5.....	26	6 1,600	2 1,720

DATE OF SEEDING FLAX.—The object of this experiment is to determine the date or dates of seeding which would give the best results. The first sowing in this experiment was made on May 15, and was repeated at intervals of seven days until four different dates were under test. The results obtained are as follows:—

DATE OF SEEDING FLAX

Date sown	Average height 1924	Yield per acre	
		Green weight 1924	Dry weight 1924
	inches	tons lbs.	tons lbs.
May 15.....	25	7 720	2 1,820
May 22.....	26	7 1,080	2 1,660
May 29.....	28	6 1,120	2 720
June 5.....	28	5 1,080	1 1,420

HEMP

VARIETY TEST OF HEMP.—Two varieties were under test in 1924. The seed was sown on May 14, at the rate of one and one-half bushels per acre in triplicate one-fortieth-acre plots. The seed germinated well but some of the plots received too much rain during the season. The results obtained are as follows:—

VARIETY TEST OF HEMP

Variety	Average height 1924	Yield per acre	
		Green weight 1924	Dry weight 1924
	inches	tons lbs.	tons lbs.
Chington.....	52	9 200	3 1,600
Minnesota No. 8.....	56	7 320	2 1,720

DATE OF SEEDING HEMP.—The object of this experiment is to compare the results obtained from different dates of seeding. The first sowing was made on May 14, and was repeated at intervals of seven days until five different dates were under test. The results obtained are as follows:—

DATE OF SEEDING HEMP

Date sown	Average height 1924	Yield per acre	
		Green weight 1924	Dry weight 1924
	inches	tons lbs.	tons lbs.
May 14.....	56	7 320	2 1,720
May 21.....	54	5 1,860	2 760
May 28.....	54	5 1,600	2 900
June 4.....	54	6 960	2 1,680
June 11.....	54	4 1,040	1 1,440

ILLUSTRATION STATIONS

The operation of five Illustration Stations has been supervised from this Station during the year. These were selected in 1923 and the following men chosen as operators: Walter Kirstine, Matheson, Ontario; H. Labrèche, Val Gagne, Ontario; J. MacDonald, Porquis Junction, Ontario; E. D. Carrère, Cochrane, Ontario; Oliver Genier, Genier, Ontario.

A four-year rotation has been established on these Stations as follows:—

First year.....	Hoed crops.
Second year.....	Grain.
Third year.....	Clover hay.
Fourth year.....	Mixed or timothy hay.

The varieties and practices that have been found to give the best results on the Experimental Station are being introduced on the Illustration Stations. The production of registered grain, certified potatoes, and pure-bred poultry are some of the main lines being featured.

Cost of production figures, and profits or losses, are of interest and importance.

The Illustration Stations would seem to form an excellent means of carrying improved farm practices to the farmer.

GENERAL NOTES

In 1924 the Farm exhibit was on display at four of the fall fairs: New Liskeard, Cochrane, Matheson, and Porquis Junction.

A number of meetings have been attended by members of the staff during the year; several press articles have been prepared and a marked increase has been observed in the correspondence from farmers relating to various problems in connection with northern Ontario agriculture.