DOMINION OF CANADA

DEPARTMENT OF AGRICULTURE

DOMINION EXPERIMENTAL FARMS

EXPERIMENTAL STATION

KAPUSKASING, ONT.

REPORT OF THE SUPERINTENDENT

SMITH BALLANTYNE

FOR THE YEAR 1926

Printed by Authority of the Hon. W. R. Motherwell, Minister of Agriculture,
Ottawa, 1927

TABLE OF CONTENTS

DOMINION EXPERIMENTAL STATION, KAPUSKASING ONTARIO

REPORT OF THE SUPERINTENDENT, SMITH BALLANTYNE

THE SEASON

January and February were particularly mild, the former being 5.6 and the latter 1 degrees above the average for a nine-year period. March, April, May and June on the other hand were all cooler than normal, having a mean temperature of 4.4, 3.3, 0.4 and 3.5 respectively below the nine-year average. July, August and December were above the average, and the other three months of the year, September, October and November, were below the average.

The total precipitation for the year was 21.29 inches, which is 2.16 inches below the nine-year average of 23.45.

The precipitation received during the five growing months, May 1 to September 30, was 7.65 inches or 35.9 per cent of the total received during the year, while the average amount received during the same months over a nine-year period was 12.59 or 53.7 per cent.

May had only 0.17 inch of precipitation which is the lightest ever received during this month over a nine-year period. This made possible the preparation of a good seed-bed; but owing to cool, backward weather in the early part of the month, practically no seeding could be done until May 17. Once it was possible to get on the land, however, the soil worked better every day and by May 24 was in very excellent condition for seeding.

During June and July, which are two of the most important growing months, a fair amount of rainfall occurred, the former receiving 1.94 and the latter 1.78 inches. This had the effect of giving good germination and very fair growth to hay, grain, and other field and garden crops.

The month of August received only 0.91 inch of rainfall; but this assisted materially in the maturing of the grain crops.

During the year 1,622.1 hours of sunshine were recorded, which is the lowest for any year during the last eight, and is 134.8 hours less than the average for an eight-year period.

There was very little damage from summer frosts, although on three occasions during the month of June the thermometer registered below freezing.

This year fall-ploughing was stopped by snow rather than by frost. This snowfall occurred on November 8 when 10 inches of snow fell.

METEOROLOGICAL RECORDS

Month	Temperature. Degrees Fah.						Precipitation (inches)				Sunshine (hours)	
	Mean		Maximum		Minimum		Rain	Snow	Total precipitation		1926	Average 8 years
	1926	Average 9 years	Highest	Mean maximum	Lowest	Mean minimum			1926	Average 9 years		
January	3·0	−2·6	35	16·4	−35	−10·4	.....	16·0	1·60	1·08	70·1	84·9
February	2·6	1·6	35	15·8	−32	−10·6	.....	9·0	0·90	0·87	111·6	103·5
March	8·0	12·4	51	21·6	−27	− 5·6	0·72	3·7	1·09	1·27	170·2	139·6
April	27·9	31·2	70	39·5	−10	16·2	0·10	24·0	2·50	1·99	177·3	167·9
May	45·0	45·4	85	59·6	10	30·5	0·10	0·7	0·17	1·50	288·0	230·4
June	53·4	56·9	79	66·4	29	40·4	1·94	.....	1·94	2·05	211·7	248·7
July	62·0	61·1	89	73·8	36	50·3	1·78	.....	1·78	3·18	184·2	237·1
August	61·0	58·9	92	73·5	32	48·5	0·91	.....	0·91	2·63	147·4	201·1
September	48·4	50·6	72	57·8	21	39·0	2·85	.....	2·85	3·23	138·6	151·2
October	36·8	38·7	70	44·0	18	29·5	1·25	5·5	1·80	1·82	47·8	93·6
November	16·5	22·5	43	22·9	−25	10·1	0·65	39·0	4·55	2·18	31·1	47·6
December	6·9	6·1	34	17·3	−29	3·5	.....	12·0	1·20	1·66	44·1	51·4
Total	.....	.....	.....	.....	.....	.....	10·30	109·9	21·29	23·46	1622·1	1757·0

ANIMAL HUSBANDRY

The season of 1926 has been very favourable for live stock in northern Ontario. The winter was milder than usual and while grass was not very plentiful until about the first of June, pasture during the greater part of the grazing season was particularly good. June, July and September had each a fair amount of precipitation, while July and August had mean temperatures which were above normal.

The general health of the live stock kept on the Station has been good and marked progress has been experienced with the different lines except sheep, which again suffered a severe loss by ravages from dogs.

DAIRY CATTLE

On December 31 the dairy herd totalled thirty-eight head. Of this number, nineteen were pure-bred Ayrshires and included eight milch cows, seven heifers, three bull calves and the herd sire. The grade Ayrshires included seven milch cows, eleven heifers and one calf.

All pure-bred cows are entered in the Canadian Record of Performance for pure-bred dairy cattle, and during the year one cow has qualified.

The herd sire, Ottawa Supreme —88031— was born on March 20, 1924, and has developed very well during the year. He has been given class "A" standing in the Advanced Registry for pure-bred Ayrshire bulls. He is sired by Shewalton Mains Supreme (22659) —83930— an imported bull of extra good breeding. His dam is Castlehill Strawberry (46236) —83931— an imported cow of show type and with good milk records behind her. The young stock from this bull are showing up well and give promise of developing into animals with good size, substance and quality.

SUMMER FEEDING

Good clover pasture has been found to be the best means of supplying the dairy herd with succulent feed during the summer months. As a supplement to the pasture a meal ration is sometimes fed to the largest producers in direct proportion to the amount of milk given by each animal. In the early autumn it is often advisable to feed a certain amount of soiling crops, such as oats, peas and vetch, when the pastures begin to dry up and lose a part of their milk-producing quality. The dairy herd is always stable-fed until about June 1, as the pastures have not got a sufficient start before that date. It has also been found a good practice fairly early in the fall to stable the milking cows during the night, because cold rains and cool nights have a great tendency to reduce milk production.

WINTER FEEDING

A plentiful supply of good quality roughage is necessary in order to carry the live stock during the long winter period in this part of the province.

Sunflower or O.P.V.* silage forms the main bulk of the ration during the winter months. This is supplemented by a liberal feeding of good quality clover hay and a meal mixture as follows: bran four parts, oats two parts, barley two parts and oilcake two parts.

The ensilage is fed twice daily and the grain is sprinkled on top. The hay is also fed twice per day.

The rations are varied considerably, according to the individuality, condition, and milk production of the different cows; but the following might be considered as a fairly good ration for an average-sized cow giving 40 pounds of milk per day: ensilage, 40 pounds; clover hay, 15 pounds; and meal, 12 pounds per day.

If roots are available these are used to replace a part of the silage ration.

Water is available at all times and salt is provided as required.

MILK RECORDS

The milk given by each cow is weighed morning and evening during her entire lactation period and recorded on a stable milk sheet. A test is made of each cow's milk once per month to determine the percentage of fat which it contains. A record is kept of the feed consumed by each cow during her lactation period and for the time during which she was dry previous to freshening. From these data are calculated the amount of feed required per year to maintain each animal, the feed cost of maintenance, and the feed cost of milk production.

In the accompanying table is a statement, showing the amount of milk produced by each cow that completed a lactation period during the calendar year of 1926. It also shows the cost of feed and the value of the milk produced. The profit column shows a comparison between the cost of the feed consumed and the value of the milk produced. The labour and the value of the calf are in all cases not included.

In estimating the cost of feeds the following values were used:—

Ensilage, sunflowers, per ton	$ 3 20
Ensilage, O.P.V., per ton	4 80
Roots, per ton	1 60
Hay, per ton	12 00
Meal, per 100 pounds	1 90
Pasture, per day	0 10

The hay and grain are valued at average local market prices and the value of the silage is arrived at by assuming that 300 pounds of silage containing 25 per cent of dry matter is equal to 100 pounds of hay. The O.P.V. silage contains a higher percentage of dry matter than the sunflower silage and on this account is given a higher value per ton.

The value of roots is arrived at in a similar manner except that the dry matter in roots is given a valuation of 15 per cent more than the dry matter in the silage. This makes 600 pounds of roots containing 10 per cent of dry matter equal to 100 pounds of cured hay.

The actual cost of producing these different crops will be found in the Field Husbandry section of this report.

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

The two crops most commonly grown in northern Ontario at the present time for silage purposes are sunflowers and a mixture of oats, peas and vetch commonly known as O.P.V. The main object of this experiment is to determine the relative feeding value of these two silages for milk production. For this test ten milking cows were selected which were in such stage of lactation that each would continue milking throughout the following four thirty-day periods which the experiment was to cover. This experiment was commenced in the autumn

* Oats, peas and vetch mixture.

Name of cow	Age at beginning of lactation period.	Date of dropping calf.	Number of days in lactation period.	Total pounds of milk for period.	Daily average yield of milk.	Average per cent fat in milk.	Pounds of butter produced in period.	Value of butter at 40 cents per pound.	Value of skim-milk at 50 cents per 100 pounds.	Total value of product.	Total cost of feed.	Cost to produce 100 pounds milk.	Cost to produce 1 pound butter skim-milk neglected.	Profit on cow, labour and calf neglected.
	Years		lb.	lb.	lb.	%	lb.	$	$	$	$	$	$	$
Pure-bred Ayrshires—														
Blossom of Glenborough	9	Sept. 25, 1925	344	9472·9	27·5	3·56	402·17	160·86	45·67	206·53	140·20	1·48	0·349	66·33
Duchess of Geneva	9	Oct. 2, 1925	289	4350·5	15·05	3·74	193·52	77·41	20·93	98·34	91·30	2·10	0·472	7·04
Ena of Glenborough	10	Oct. 15, 1925	277	4470·4	16·1	3·75	199·56	79·82	21·51	101·33	87·58	1·96	0·439	13·76
Grade Ayrshires—														
Phoebe A.I.B. Tatoo 37	3	Oct. 29, 1925	342	6662·6	19·5	4·1	326·43	130·57	31·94	162·51	107·07	1·61	0·328	55·44
Bloomer A.I. Tatoo 31	3	Mar. 10, 1925	380	7577·7	19·9	4·18	377·55	151·02	36·30	187·32	114·63	1·51	0·303	72·69
Dewdrop B Tatoo 35	3	Nov. 2, 1925	343	7907·3	23·1	3·9	370·70	148·28	37·98	186·26	97·53	1·23	0·263	88·73
Phoebe B. I. Tatoo 36	3	Oct. 24, 1925	321	6338·2	19·74	3·9	296·36	118·54	30·45	148·99	101·77	1·61	0·343	47·22
Shorthorns—														
No. 53	3	Oct. 31, 1925	385	7911·3	20·5	3·9	364·85	145·94	38·02	183·96	111·15	1·40	0·305	72·81
No. 48	4	Mar. 16, 1926	359	6213·0	17·31	3·8	283·06	113·22	29·88	143·10	90·13	1·45	0·318	52·97
No. 54	3	Dec. 2, 1925	340	8391·2	24·7	3·9	391·30	156·52	40·31	196·83	108·23	1·29	0·277	88·60
No. 60	3	Nov. 28, 1925	312	4720·2	15·13	3·8	215·83	86·33	22·69	109·02	83·46	1·77	0·387	25·56
Total	.....	.....	3,692	74,015·7	.....	.....	3,421·33	1,368·51	355·68	1,724·19	1,133·05	.....	.....	591·15
Average	.....	.....	335·6	6,728·7	20·0	3·88	311·03	124·41	32·33	156·74	103·00	1·53	0·33	53·74

of 1922 and has now been conducted for a period of four years. In 1926 the ten cows used consisted of three pure-bred Ayrshires, three grade Ayrshires and four grade Shorthorns. The experiment commenced on November 10, 1925, and each animal received a uniform ration during the whole period, differing only in the variety of silage fed as follows:—

Period 1—November 10 to December 10: sunflowers, 40 pounds per day.
Period 2—December 10 to January 9: O.V.P., 40 pounds per day.
Period 3—January 9 to February 8: sunflowers, 40 pounds per day.
Period 4—February 8 to March 10: O.V.P., 40 pounds per day.

For the first three years in which the experiment was conducted, it was found that the cattle could consume about 5 pounds each per day more of the sunflower silage than they could of the O.P.V. This was due to the sunflower silage containing more moisture than the O.P.V. However, in 1926, the ration of sunflower silage was reduced, so that the cattle were able to consume equal quantities of each silage.

At the beginning of each thirty-day period, seven days are taken to transfer from one silage to the other. The milk records are calculated on the latter twenty-one days in each period, so that the cattle are allowed two full days on the unmixed silage before the milk yields are considered. Besides the silage ration nine of the cows got 15 pounds of hay each per day and a grain ration consisting of bran, four parts; grounds oats, two parts; ground barley, two parts; and oilcake, two parts; fed at the rate of 10 pounds each per day. The tenth cow got 12 pounds of hay per day and fifteen pounds of grain, consisting of the same mixture as that fed to the others.

In order to eliminate any error which might occur owing to the natural decline in milk flow from one period to the next, the results obtained during periods one and three are averaged and compared with the results obtained in period two. Periods two and four are also averaged and compared with period three. The average of these two is taken as the basis of comparison. The results are given in the accompanying table.

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

Items		Period 1 1926	Period 2 1926	Period 3 1926	Average Periods 1 and 3 1926
Experimental Feeds		Sunflowers	O.P.V.	Sunflowers	Sunflowers
Number of cows in test	No.	10	10	10	10
Milk produced by 10 cows in 21 days	lb.	5,705·60	5,281·40	4,567·20	5,136·40
Average milk per cow per day	"	27·17	25·15	21·75	24·46
Average per cent fat in milk	%	3·72	3·82	3·61	3·67
Fat produced by 10 cows in 21 days	lb.	212·0	202·0	165·0	188·50
Average fat per cow per day	"	1·01	0·96	0·79	0·90
Total meal consumed in 21 days	%	2,205·0	2,205·0	2,205·0	2,205·0
Total hay consumed in 21 days	"	3,087·0	3,087·0	3,087·0	3,087·0
Total silage consumed in 21 days	"	8,400·0	8,400·0	8,400·0	8,400·0
Meal consumed per 100 pounds milk produced	"	38·65	41·75	48·28	42·93
Hay consumed per 100 pounds milk produced	"	54·11	53·45	67·59	60·10
Silage consumed per 100 pounds milk produced	"	147·22	159·05	183·92	163·54
Meal consumed per 100 pounds fat produced	"	1,040·09	1,091·58	1,336·36	1,169·76
Hay consumed per 100 pounds fat produced	"	1,456·13	1,528·22	1,870·91	1,637·67
Silage consumed per 100 pounds fat produced	"	3,962·26	4,158·42	5,090·91	4,456·23
Findings from experiment—					
Cost of meal mixture	$	41 90	41 90	41 90	41 90
Value of hay fed	"	18 52	18 52	18 52	18 52
Value of silage fed	"	13 44	20 16	13 44	13 44
Total cost of feed	"	73 86	80 58	73 86	73 86
Feed cost to produce 100 pounds milk	"	1 29	1 53	1 62	1 44
Feed cost to produce 100 pounds fat	"	34 84	39 89	44 76	39 18

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

Items		Period 2 1926	Period 3 1926	Period 4 1926	Average Periods 2 and 4 1926
Experimental Feeds		O.P.V.	Sunflowers	O.P.V.	O.P.V.
Number of cows in test	No.	10	10	10	10
Milk produced by 10 cows in 21 days	lb.	5,281·40	4,567·20	4,058·80	4,670·10
Average milk per cow per day	"	25·15	21·75	19·33	22·24
Average per cent fat in milk	%	3·82	3·61	3·77	3·80
Fat produced by 10 cows in 21 days	lb.	202·0	165·0	153·0	177·50
Average fat per cow per day	"	0·96	0·79	0·73	0·85
Total meal consumed in 21 days	"	2,205·00	2,205·00	2,205·0	2,205·00
Total hay consumed in 21 days	"	3,087·00	3,087·00	3,087·00	3,087·00
Total silage consumed in 21 days	"	8,400·00	8,400·00	8,400·00	8,400·00
Meal consumed per 100 pounds milk produced	"	41·75	48·28	54·33	47·22
Hay consumed per 100 pounds milk produced	"	58·45	67·59	76·06	66·10
Silage consumed per 100 pounds milk produced	"	159·05	183·92	206·96	179·87
Meal consumed per 100 pounds fat produced	"	1,091·58	1,336·36	1,441·18	1,242·25
Hay consumed per 100 pounds fat produced	"	1,528·22	1,870·91	2,017·65	1,739·15
Silage consumed per 100 pounds fat produced	"	4,158·42	5,090·91	5,490·20	4,732·39
Findings from experiment—					
Cost of meal mixture	$	41 90	41 90	41 90	41 90
Value of hay fed	"	18 52	18 52	18 52	18 52
Value of silage fed	"	20 16	13 44	20 16	20 16
Total cost of feed	"	80 58	73 86	80 58	80 58
Feed cost to produce 100 pounds milk	"	1 53	1 62	1 99	1 73
Feed cost to produce 100 pounds fat	"	39 89	44 76	52 67	45 40

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

Items		Average results 1926	Average results 1926	Four-year average 1923–26	Four-year average 1923–26
Experimental Feeds		Sunflowers	O.P.V.	Sunflowers	O.P.V.
Number of cows in test	No.	10	10	10	10
Milk produced by 10 cows in 21 days	lb.	4,851·80	4,975·75	5,068·65	4,974·21
Average milk per cow per day	"	23·10	23·69	24·14	23·69
Average per cent fat in milk	%	3·64	3·81	3·80	3·88
Fat produced by 10 cows in 21 days	lb.	176·75	189·75	192·81	192·81
Average fat per cow per day	"	0·84	0·90	0·92	0·92
Total meal consumed in 21 days	"	2,205·0	2,205·0	2,488·50	2,488·5
Total hay consumed in 21 days	"	3,087·0	3,087·0	2,315·25	2,315·25
Total silage consumed in 21 days	"	8,400·0	8,400·0	9,187·50	8,400·00
Meal consumed per 100 pounds milk produced	"	45·45	44·31	49·10	50·03
Hay consumed per 100 pounds milk produced	"	63·63	62·04	45·68	46·55
Silage consumed per 100 pounds milk produced	"	173·13	168·82	181·26	168·87
Meal consumed per 100 pounds fat produced	"	1,247·52	1,162·06	1,290·65	1,290·65
Hay consumed per 100 pounds fat produced	"	1,746·53	1,626·88	1,200·79	1,200·79
Silage consumed per 100 pounds fat produced	"	4,752·48	4,426·88	4,765·05	4,356·62
Findings from experiment—					
Cost of meal mixture	$	41 90	41 90	46 72	46 72
Value of hay fed	"	18 52	18 52	16 19	16 19
Value of silage fed	"	13 44	20 16	17 54	23 94
Total cost of feed	"	73 86	80 58	80 45	86 85
Feed cost to produce 100 pounds milk	"	1 52	1 62	1 59	1 75
Feed cost to produce 100 pounds fat	"	41 79	42 47	41 73	45 04

Deductions.—The data in these tables would seem to indicate that either of these silages makes an excellent winter feed for dairy cows.

In actual milk-production, the sunflower silage has given the best results over a four-year period.

In feed cost to produce 100 pounds of milk and fat the sunflower silage also shows some advantage, both this year and in the four-year average.

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. This experiment has been conducted for four years, and has covered the same periods each year as the one with milking cows.

In 1926 the calves on this test consisted of five Ayrshires and five Shorthorns, four grades and one pure-bred of each. They were weighed at the beginning and end of each thirty-day period. Their ration remained constant for the four periods except for the kind of silage fed.

The ration per day fed each of the ten calves during the four periods is as follows:—

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

Periods	Hay	Meal	Silage
Period 1—Sunflowers	12	3	25
Period 2—O. P. V	12	3	25
Period 3—Sunflowers	12	3	25
Period 4—O. P. V	12	3	25

The grain mixture consisted of equal parts of bran, whole oats and oilcake. The results are given in the accompanying table:—

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

Items		Average results 1926	Average results 1926	Four-year average 1923–26	Four-year average 1923–26
Experimental Ration		Sunflowers	O. P. V.	Sunflowers	O.P.V.
Number of calves in experiment	No.	10	10	10	10
Total gain of ten calves in 30 days	lb.	432·0	358·0	371·0	327·75
Average daily gain per calf	"	1·44	1·19	1·24	1·09
Meal consumed by 10 calves in 30 days	"	900·00	900·00	1,125·00	1,125·00
Hay consumed by 10 calves in 30 days	"	3,600·00	3,600·00	2,325·00	2,325·00
Silage consumed by 10 calves in 30 days	"	7,500·00	7,500·00	6,675·00	6,000·00
Meal consumed per 100 pounds gain	"	208·33	251·40	303·23	343·25
Hay consumed per 100 pounds gain	"	833·33	1,005·59	626·68	709·38
Silage consumed per 100 pounds gain	"	1,736·11	2,094·97	1,799·19	1,830·66
Findings from experiment—					
Cost of meal mixture	$	27 00	27 00	23 57	23 57
Value of hay	"	21 60	21 60	16 05	16 05
Value of silage	"	12 00	18 00	12 60	16 88
Total cost of feed	"	60 60	66 60	52 22	56 50
Feed cost to produce 100 pounds gain	"	14 03	18 60	14 08	17 24

Deductions.—The results show greater gains and at a lower cost per pound for the sunflower silage.

The experiment will be repeated another year.

BEEF CATTLE

The herd of beef cattle totalled thirty-eight head on December 31, 1926. Of this number twenty are pure-bred Shorthorns, and include seven cows, four heifers, three heifer calves, five bull calves and one bull. The grade Shorthorns include nine cows, six heifers and two heifer calves.

The herd sire Dictator —125442— was obtained from the Brandon Farm in exchange for the bull Jubilee Prince —151283—. He was bred by S. A. Moore of Caledonia, Ontario, and is a low-set, thick individual of good Shorthorn type.

He also has considerable backing from the standpoint of milk production as his dam and sire's dam gave 10,689 and 13,535 pounds of milk each respectively.

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 dry cattle. This test has also been conducted for four years and has covered the same periods as those carried on with milking cows and growing calves.

In 1926 ten head of dry cattle were selected and weighed on November 10. The ration given to each animal over the four thirty-day periods was identical with the exception of the variety of silage fed. During periods 1 and 3 they received sunflower silage, and during periods 2 and 4 they received O.P.V. Each animal got 30 pounds per day of silage and 14 pounds per day of hay. In addition to this four of the animals got 2.5 pounds of grain each per day. The results are given in the following table.

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

Items		Average results 1926	Average results 1926	Four-year average 1923–26	Four-year average 1923–26
Experimental Ration		Sunflowers	O.P.V.	Sunflowers	O.P.V.
Number of cattle in experiment	No.	10	10	10	10
Total gain of ten cows in 30 days	lb.	270·50	247·0	281·38	207·35
Average daily gain per cow	"	0·90	0·82	0·94	0·69
Meal consumed by 10 cows in 30 days	"	300·0	300·0	285·0	285·0
Hay consumed by 10 cows in 30 days	"	4,200·0	4,200·0	3,150·0	3,150·0
Silage consumed by 10 cows in 30 days	"	9,000·0	9,000·0	10,162·50	9,037·50
Meal consumed per 100 pounds gain	"	110·91	121·46	101·29	137·52
Hay consumed per 100 pounds gain	"	1,552·68	1,700·40	1,119·48	1,519·90
Silage consumed per 100 pounds gain	"	3,327·17	3,643·72	3,611·66	4,360·68
Findings from experiment—					
Cost of meal mixture	$	5 70	5 70	5 28	5 28
Value of hay	"	25 20	25 20	19 78	19 78
Value of silage	"	14 40	21 60	19 48	25 88
Total cost of feed	"	45 30	52 50	44 54	50 94
Feed cost to produce 100 pounds gain	"	16 75	21 26	15 83	24 58

Deductions.—The results in this experiment show an advantage for the sunflower silage, both in gains made and in cost of production.

SHEEP

The only breed of sheep kept at this Station has been pure-bred Shropshire. The breeding flock at the present time is made up of thirty-two ewes, ten ewe lambs and two rams.

In the spring of 1926 forty-five lambs were born. Of these thirty-four were alive and in good condition when the flock went out to pasture.

On account of the large number of dogs in this section at the present time, it seems almost impossible to carry on sheep raising with any degree of success. During the summer of 1926 the flock was attacked on three different occasions and badly worried by dogs. Altogether four ewes, fourteen lambs and one ram were killed outright or had to be slaughtered. On two occasions the dogs were seen and shot, but no trace could be found of the dogs responsible in the other case.

Sheep would do remarkably well in this part of Ontario were it not for the dog-menace. During the summer all they require is good pasture. In winter, the ewes are given plenty of exercise together with a ration of clover hay supple-

mented by a little grain near lambing time. A good grain mixture is oats, three parts; bran, one part; and oilcake, five per cent.

After weaning, the ewes should be given an additional amount of grain, and if possible fresh clover pasture as a flushing ration previous to the breeding season.

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.

This experiment has been conducted for the last four years. In 1926 seven lambs were used in the test, which commenced on November 14. The ration was the same for the four thirty-day periods that the experiment covered with the exception of the variety of silage given. Sunflower silage was fed during periods one and three, and O.P.V. during periods two and four.

Each lamb was given a ration of silage, 1 pound; clover hay, 2 pounds; and grain, ½ pound per day. The grain mixture consisted of whole oats, 3 parts; bran, 1 part plus 5 per cent oilcake. The results are as follows:—

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

Items		Average results 1926	Average results 1926	Four-year average 1923-26	Four-year average 1923-26
Experimental Ration		Sunflowers	O.P.V.	Sunflowers	O.P.V.
Number of lambs in test	No.	7	7	1	1
Total gain of lambs in 30 days	lb.	33·50	4·0	7·23	4·99
Average daily gain per lamb	"	0·16	0·02	0·24	0·17
Meal consumed by lambs in 30 days	"	105·0	105·0	15·0	15·0
Hay consumed by lambs in 30 days	"	420·0	420·0	60·0	60·0
Silage consumed by lambs in 30 days	"	210·0	210·0	30·0	30·0
Meal consumed per 100 pounds gain	"	313·40	2,625·0	207·47	300·60
Hay consumed per 100 pounds gain	"	1,253·73	10,500·0	829·88	1,202·40
Silage consumed per 100 pounds gain	"	626·87	5,250·0	414·94	601·20
Findings from experiment—					
Cost of meal mixture	$	1 92	1 92	0 26	0 26
Value of hay	"	2 52	2 52	0 43	0 43
Value of silage	"	0 34	0 50	0 06	0 09
Total cost of feed	"	4 78	4 94	0 75	0 78
Feed cost to produce 100 pounds gain	"	14 27	123 50	10 37	15 63

Deductions.—The results in this table indicate an advantage for the sunflower silage as a feed for growing lambs, both this year and in the four-year average.

This experiment is being repeated another year.

SWINE

Pure-bred Yorkshire is the breed of hogs kept at this Station. The herd of breeding stock at the present time is made up of thirteen sows and three boars. The senior boar, Agassiz Bonus —80699—, is a particularly good type of bacon sire, and is leaving a lot of extra good stock. The junior boar, Ottawa Wonder 2 —97201—, was imported in dam from the herd of the Earl of Rosebery, Dalmeny, Scotland. He is a very fair individual and has excellent breeding. The young boar, Ottawa Alexander 199 —109544—, was bred at Ottawa, and is from a good dam and an imported sire, Culcairn Monarch 8 —88845— (36737).

During the year 1926, twenty-three litters were farrowed which gave 235 pigs. Of this number 187 were raised to weaning age.

The best of the young females are sold to settlers as foundation stock, either at weaning age or as young sows carrying their first litters. A number of the males were also disposed of for breeding purposes.

PIG-FEEDING EXPERIMENT

The objects of this experiment are: 1, to compare the results obtained from growing pigs on clover pasture, with those from feeding without pasture; 2, the use of the self-feeder on clover pasture versus pail feeding; 3, the results of light feeding versus ordinary feeding, both with and without clover pasture.

This test has been carried on for a period of five years. In 1926 fifty pure-bred Yorkshire pigs ranging in age from fourteen to twenty weeks were selected and weighed on July 23. These were divided equally into five lots of ten pigs each.

Lots one and four were housed in the main hog-pen and given a small yard each as a run, while lots two, three and five were given clover pasture, and 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; one part of middlings; and one part of shorts plus 10 per cent of tankage.

Lots one and two were fed their grain in normal amounts as a slop mixed with water. Lot three got the meal dry from a self-feeder, while lots four and five were fed in the same manner as lots one and two, only much more lightly, particularly at the commencement of the test, the idea being to develop a big growthy pig, before any attempt was made to put on fat. Fresh drinking water was available to each lot at all times.

In calculating the cost of producing pork in this experiment the feeds used were charged at actual market prices, which are as follows:—

	Per Cwt.
Oats	$1 90
Middlings	2 00
Shorts	1 60
Tankage	4 15

PIG-FEEDING—CLOVER VERSUS NO CLOVER PASTURE; THE SELF-FEEDER VERSUS PAIL-FEEDING; LIGHT FEEDING VERSUS ORDINARY FEEDING

Items		Lot 1 No pasture and handfed normally	Lot 2 Clover pasture and handfed normally	Lot 3 Clover pasture and self-fed	Lot 4 No pasture and handfed lightly	Lot 5 Clover pasture and handfed lightly
Number of pigs in each lot	No.	10	10	10	10	10
Total weight of 10 pigs on July 23	lb	703·0	702·0	703·0	702·0	702·0
Average weight of each pig	"	70·3	70·2	70·3	70·2	70·2
Final weight of ten pigs on Oct. 22	"	1,738·0	1,867·0	1,943·0	1,621·0	1,736·0
Average weight of each pig	"	173·8	186·7	194·3	162·1	173·6
Total gain of each lot in 91 days	"	1,035·0	1,165·0	1,240·0	919·0	1,034·0
Average daily gain per lot	"	11·4	12·8	13·6	10·1	11·4
Average daily gain per pig	"	1·14	1·28	1·36	1·01	1·14
Feed consumed—						
Ground oats to each lot	"	2,332·0	2,514·0	2,714·0	1,830·0	2,302·0
Middlings to each lot	"	1,166·0	1,257·0	1,357·0	915·0	1,151·0
Shorts to each lot	"	1,166·0	1,257·0	1,357·0	915·0	1,151·0
Tankage to each lot	"	466·0	503·0	542·0	366·0	460·0
Total grain ration per lot (tankage included)	"	5,130·0	5,531·0	5,970·0	4,026·0	5,064·0
Average grain ration per pig	"	513·0	553·1	597·0	402·6	506·4
Average grain ration per pig per day	"	5·64	6·08	6·56	4·42	5·56
Amount of meal per 100 pounds gain	"	495·7	474·8	481·5	438·1	489·7
Amount of meal per one pound gain	"	4·96	4·75	4·82	4·38	4·90
Cost of feed per lot (labour neglected)	$	105 63	113 89	122 91	82 90	104 27
Cost of feed to produce 100 pounds gain	"	10 21	9 78	9 91	9 02	10 08
Five-year average cost of feed to produce 100 pounds gain, 1922-26	"	8 80	8 24	8 28	.....	.....
Three-year average cost of feed to produce 100 pounds gain, 1924-26	"	8 37	8 19	8 09	8 10	8 30

Deductions.—Comparing lots one and two, it is found that the use of clover pasture has given an increase in gain of only 30 pounds and at a decrease in cost of production of 43 cents per 100 pounds. For the three- and five-year averages, the decrease in cost of production is only 18 and 56 cents per 100 pounds respectively.

Lot three, on the self-feeder has always given the largest gains, but the feed cost was slightly higher than lot two, which was hand-fed, this year and over a five-year period. The three-year average shows a lower feed cost for lot three.

When lots one and four are compared, it is found that lot one made the greater gains, while lot four made the cheaper gains.

In comparing lots two and five, it is found that lot five made the smaller gains and also at a little greater cost per 100 pounds.

From the standpoint of bacon type the self-fed pigs have a tendency to produce a larger percentage grading thick-smooth than select.

After the experiment was finished twenty-one of the pigs were butchered and the dressing percentage from the different lots are as follows: Lot 1, 75.3; lot 2, 74.6; lot 3, 76.8; lot 4, 73.7; and lot 5, 73.9.

It should be mentioned that no charge has been made for pasture during this experiment, and it is very doubtful if the extra gains made by the pigs would nearly cover the expense incurred for this item.

HORSES

At the present time, twenty horses are kept at this Station. Fifteen of these are heavy work horses, either Percheron or Clydesdale grades. Three are pure-bred French Canadians, two mares and one colt; while the other two consist of a driving horse and a two-year-old mare.

No experimental work has been conducted in connection with horses.

FIELD HUSBANDRY

ROTATION OF CROPS

In order to ascertain the most practical and suitable rotations to use in northern Ontario, an experiment in crop rotations was commenced in 1922.

In this experiment one acre is included for each year that the rotation covers, which uses three acres for a three-year rotation, four acres in a four-year rotation and so on.

These rotations are located on clay-loam soil which is apparently fairly uniform, although a few narrow strips of shallow muck are present; but as these are running crosswise of the rotations they should not materially affect the accuracy of the test.

All these rotations have completed at least one full cycle with the exception of the six-year rotation which will not be complete until 1927. Each year that the rotations are carried on the data obtained will become more reliable.

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. In arriving at these costs, actual prices are used wherever possible, such as the cost of labour, seed, twine, etc. The rent of land is determined by multiplying the value of the land by the current rate of interest on first mortgage, plus taxes; the charge for the use of machinery is arrived at by figuring the interest on investment, depreciation charges and a percentage for repairs. The cost of horse labour is calculated on the basis of the cost of maintenance for one year divided by the number of hours work done.

The return values are based on the current market prices under local conditions for all crops that are salable. For the silage and root crops the value is arrived at by assuming that 300 pounds of ensilage containing 25 per cent of dry matter and 600 pounds of roots containing 10 per cent of dry matter are each equal to 100 pounds of cured hay.

The prices and return values used in the 1926 report are as follows:—

PRICES USED IN FIGURING COST OF PRODUCTION CROP

Expenses

Rent	per acre	$ 4 75
Use of machinery	per acre	2 85
Manure	per ton	2 00
Threshing (oats, barley)	per bushel	0 07
Threshing (wheat)	per bushel	0 15
Ensiling	per ton	0 71
Manual labour	per hour	0 35
Teamsters	per hour	0 36
Horse labour (single)	per hour	0 10
Potatoes	per bushel	2 75
Turnip seed	per pound	0 70
Barley	per bushel	2 25
Wheat	per bushel	2 75
Oats	per bushel	1 26
Peas	per bushel	1 97
Sunflowers	per pound	0 12
Corn	per pound	0 10
Timothy	per pound	0 19
Red Clover	per pound	0 45
Alsike	per pound	0 27
Twine	per pound	0 22

Return Values

Barley	per bushel	$ 0 90
Wheat	per bushel	1 50
Oats	per bushel	0 60
Potatoes	per bushel	1 50
Potatoes (unmarketable)	per ton	3 00
Hay	per ton	15 00
Straw (barley, oats)	per ton	6 00
Straw (wheat)	per ton	4 00
Sunflower silage	per ton	3 00
O.P.V. silage	per ton	5 00
Fall turnips	per ton	1 75
Corn	per ton	2 40

Following is a description of each rotation under test and the results obtained in 1926.

ROTATION A. (THREE YEARS' DURATION)

This is a short rotation including sunflowers, oats and clover hay. It should be valuable in building up the fertility of the soil, and keeping under control weeds of a perennial nature.

The clover sod is manured at the rate of 12 tons to the acre, and fall-ploughed for sunflowers. The land is again fall-ploughed in preparation for seeding out, using oats as the nurse-crop. The results in 1926 from the different crops are as follows:—

ROTATION A (THREE YEARS' DURATION)—RESULTS IN 1926

Rotation year.	Crop	Yield per acre		Value of crop	Cost of production	Profit or loss per acre
		Sunflowers, straw or hay	Grain			
		tons	bush.	$	$	$
1	Sunflowers	8·28		24 84	46 14	−21 30
2	Oats (Alaska)	0·80	29·1	22 26	31 60	− 9 34
3	Clover hay	1·41		21 15	21 26	− 0 11
	Average per acre			22 75	33 00	−10 25

ROTATION B (FOUR YEARS' DURATION)

This is a good practical rotation including sunflowers as a hoed crop, oats, clover hay and timothy hay.

The timothy sod is manured at the rate of 16 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 the nurse-crop to seed out with. The results in 1926 from the different crops are as follows:—

ROTATION B (FOUR YEARS' DURATION)—RESULTS IN 1926

Rotation year	Crop	Yield per acre		Value of crop	Cost of production	Profit or loss per acre
		Sunflowers, straw or hay	Grain			
		tons	bush.	$	$	$
1	Sunflowers	10·69	.....	32·07	48 74	−17 67
2	Oats (Alaska)	0·56	32·0	22 56	34 22	−11 66
3	Clover hay	1·17	.....	17 55	20 03	− 2 48
4	Timothy hay	1·44	.....	21 60	16 64	4 96
	Average per acre	.....	.....	23 44	29 90	− 6 46

ROTATION C (FIVE YEARS' DURATION)

This rotation includes oats, sunflowers, barley, clover hay and timothy hay.

The timothy sod is fall-ploughed for oats. The oat stubble is manured at the rate of 12 tons to the acre and fall-ploughed for sunflowers. After the sunflowers are removed the land is again fall-ploughed for barley which is the nurse-crop used to seed out with. After the clover hay is cut, a top dressing of manure is applied at the rate of 8 tons to the acre. This is for the benefit of the timothy meadow and oat crop. The results in 1926 from the different crops are as follows:—

ROTATION C (FIVE YEARS' DURATION)—RESULTS IN 1926

Rotation year	Crop	Yield per acre		Value of crop	Cost of production	Profit or loss per acre
		Sunflowers, straw or hay	Grain			
		tons	bush.	$	$	$
1	Oats (Alaska)	0·91	33·6	25 62	34 68	− 9 06
2	Sunflowers	8·57	.....	25·71	41 50	−15 79
3	Barley	0·86	36·3	37·83	33 34	4 49
4	Clover hay	1·31	.....	19 65	19 23	0 42
5	Timothy hay	1·91	.....	28 65	22 13	6 52
	Average per acre	.....	.....	27 49	30 17	− 2 68

ROTATION D (SIX YEARS' DURATION)

This rotation covers the longest period of any under test. It includes potatoes, wheat, barley, clover hay and timothy hay for two years.

The timothy sod is manured at the rate of 16 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 the

nurse-crop for seeding out with. The new seeding is given a top dressing of manure at the rate of 8 tons to the acre after the barley is harvested. The results in 1926 from the different crops are as follows:—

ROTATION D (SIX YEARS' DURATION)—RESULTS IN 1926

Rotation year	Crop	Yield per acre		Value of crop	Cost of production	Profit or loss per acre
		Unmarketable potatoes, straw or hay	Potatoes or grain			
		tons	bush.	$	$	$
1	Potatoes	0·69	131·1	198 72	120 64	78·08
2	Wheat (Marquis)	1·09	12·0	21 27	34 29	−13 02
3	Barley	0·96	33·1	35 55	32 45	3 10
4	Clover hay	1·15	.....	17 25	22 29	− 5 04
5	Timothy hay	1·36	.....	20·40	18·10	2 30
6	Timothy hay	1·49	.....	22 35	15 69	6 66
	Average per acre	.....	.....	52 59	40 58	12 01

ROTATION E (FIVE YEARS' DURATION)

This rotation includes oats, summer-fallow, fall wheat, clover hay and timothy hay.

The summer-fallow replaces the hoed crop as a means of cleaning the land, and the fall wheat replaces barley as a grain crop.

The timothy sod is fall-ploughed for the oat crop and clover seed. The clover is allowed to grow until it has become a fair height when it is ploughed under, together with an application of manure at the rate of 12 tons to the acre. After ploughing, the land is disked occasionally until the latter part of August, when the fall wheat is sown together with the timothy seed. The clover is sown the following spring. After the clover hay is cut during the fourth year of the rotation, a top dressing of manure at the rate of 8 tons to the acre is applied for the benefit of the next two crops.

In 1926 the Dawson's Golden Chaff fall wheat mostly winter-killed so that it was thought advisable to reseed it with Marquis spring wheat, hence the crop this year is mixed. The results in 1926 from the different crops grown are as follows:—

ROTATION E (FIVE YEARS' DURATION)—RESULTS IN 1926

Rotation year	Crop	Yield per acre		Value of crop	Cost of production	Profit or loss per acre
		Straw or hay	Grain			
		tons	bush.	$	$	$
1	Oats (Alaska)	0·79	37·9	27 48	37 11	− 9 63
2	Summer-fallow	.....	.....	.....	.....	.....
3	Spring wheat (Replacing Fall wheat)	1·04	13·2	22 92	48 47	−25 55
4	Clover hay	1·02	.....	15 30	27 68	−12 38
5	Timothy hay	1·49	.....	22 35	24 64	− 2 29
	Expenses incurred in seeding Fall wheat	.....	.....	.....	6 92	− 6 92
	Average per acre	.....	.....	17 61	28 96	−11 35

In connection with the fall wheat it may be explained that the item of $6.92 which appears in the cost of production column, represents the expenses incurred in the preparation and seeding the acre of fall wheat, including the seed, which unfortunately was killed out. This charge could not be made against the crop of spring wheat which replaced the fall wheat, and consequently it has been debited against the entire rotation.

COST OF PRODUCING FARM CROPS

Records on cost of production are kept for all field crops grown.

The figures which follow are in some cases from field areas which were not included in the rotations, while in other cases they represent an average of field areas and rotations.

COST OF PRODUCING SPRING WHEAT

The figures used in calculating the cost of producing spring wheat are taken from 2 acres which were sown to Garnet wheat on May 17 at the rate of 2 bushels per acre. This area was in potatoes in 1925 for which crop it had been manured at the rate of 16 tons to the acre. The germination was very good and a nice even stand developed. The crop was harvested on September 10, and was well matured. The cost of production is as follows:—

Total cost per acre	$34 39
Yield of grain per acre.....bushel	19.5
Yield of straw per acre.....ton	1.1
Value of crop per acre	$32 55
Loss per acre	1 84
Cost per bushel of wheat	1.585
Cost per ton of straw	3 17

COST OF PRODUCING BANNER OATS

The area from which these figures are obtained includes 11 acres which were seeded on May 18 at the rate of 3 bushels per acre, on clay-loam soil which had previously produced a crop of sunflowers, for which crop it had been manured at the rate of 16 tons to the acre, and 5 acres which were sown on May 17 and 18, at the same rate per acre. This crop was following sod and received no manure. The crop on the first field developed fairly well and was harvested on September 13, while the second field was harvested on September 14. The average cost of production is as follows:—

Total cost per acre	$31 86
Yield of grain per acre.....bushel	43.7
Yield of straw per acre.....ton	1.14
Value of crop per acre	$38 08
Profit per acre	1 22
Cost per bushel of oats	0.578
Cost per ton of straw	5 78

COST OF PRODUCING ALASKA OATS

These figures represent the average results from 14 acres grown on the one-acre plots in the rotations and are as follows:—

Total cost per acre	$33 11
Yield of grain per acre.....bushel	28.76
Yield of straw per acre.....ton	0.68
Value of crop per acre	$21 31
Loss per acre	11 80
Cost per bushel of oats	0.932
Cost per ton of straw	9 32

COST OF PRODUCING BARLEY

The figures on the cost of producing barley are based on 7 acres grown in the rotations, and 20.8 acres grown in a separate block. The latter field was sown on May 28 and 29 at the rate of 2 bushels per acre. This field had previously produced a crop of oats. No fertilizer was applied for either crop except one acre which received 200 pounds of nitrate of soda this year. The germination was good and a nice even stand resulted which was harvested on September 10 to 13. O.A.C. No. 21 was the variety used. The average cost of production is as follows:—

Total cost per acre	$28 11
Yield of grain per acre.....bushel	24.3
Yield of straw per acre.....ton	0.87
Value of crop per acre	$27 09
Loss per acre	1 02
Cost per bushel of barley	0.932
Cost per ton of straw	6 21

COST OF PRODUCING HAY

Owing to the fact that red clover in new meadows suffered rather severely from freezing and thawing in the spring, the hay crop was not up to the average in yield. There was very good weather, however, for curing and the entire crop was cut and stored in excellent condition.

The standard mixture used is red clover 8 pounds, timothy 8 pounds, and alsike 2 pounds. One-half of the cost of the grass and clover seed is charged to each year's crop as the meadows are ordinarily left for two years only.

The cost of production figures for hay include 22 acres of rotations and 95 acres in large field areas. Haying commenced on July 28, and was completed during the week of August 9. The average cost of production is as follows:—

Total cost per acre	$15 56
Yield per acre.....ton	1.19
Value per acre	$17 85
Profit per acre	2 29
Cost per ton	13 08

COST OF PRODUCING SUNFLOWERS

Sixteen acres of sunflowers were grown in 1926. Four of these were on the rotations and twelve on the surface drainage experiment.

The latter area was planted on May 26, in rows 36 inches apart. For some reason this crop did not develop as it should and consequently the yield was light. The sunflowers were harvested and ensiled on September 17 to 20. The average cost of production is as follows:—

Total cost per acre	$46 90
Yield per acre.....ton	3.66
Value per acre	$10 92
Loss per acre	35 98
Cost per ton	12 81

The high cost per ton is due to the very low yield. Had the yield been larger the value of the crop would have been higher and the cost per ton would have been lower.

COST OF PRODUCING OATS, PEAS AND VETCH MIXTURE

The area from which these data have been secured includes 1 acre in the rotations and 18 acres under field crop. The latter 18 acres were fall-ploughed out of sod. Six acres were on the surface drainage experiment and this area was manured at the rate of 16 tons to the acre previous to seeding, while the other 12 acres did not receive any manure.

The seeding was done on May 22, 24 and 25 at the rate of 3¼ bushels per acre. The crop was cut and ensiled on September 1, 2 and 3. The cost of production is as follows:—

Total cost per acre	$33 94
Yield per acre.....ton	3.30
Value per acre	$16 51
Loss per acre	17 43
Cost per ton	10 27

COST OF PRODUCING POTATOES

The 3.7 acres of potatoes from which these figures were obtained include 1 acre in the rotations and 2.7 under field crop. The land was all fall-ploughed and manured at the rate of 16 tons to the acre. The seed was planted from May 29 to June 4 and the crop was harvested on September 29 and 30. The cost of production is as follows:—

Total cost per acre	$129 68
Yield of marketable potatoes.....bushels	102.51
Yield of unmarketable potatoes.....ton	0.55
Value of crop per acre	155 43
Profit per acre	25 75
Cost per bushel of marketable potatoes	1 25
Cost per ton of unmarketable potatoes	2 50

CULTURAL EXPERIMENTS

DATE OF SEEDING FALL RYE

The object of this experiment is to determine what date or dates of seeding will give the best results. In 1925 the seed was sown on six different dates at intervals of seven days commencing on September 1, in quadruplicate one-fortieth-acre plots at the rate of 1½ bushels per acre. Common fall rye was the variety used. The results are as follows:

DATE OF SEEDING FALL RYE

	Date Sown											
	Sept. 1		Sept. 8		Sept. 15		Sept. 22		Sept. 29		Sept. 6	
	bush.	lb.	bush.	lb.	bush.	lb.	bush.	lb.	bush.	lb.	bush.	lb.
Yield per acre	41	44	23	12	23	32	19	16	19	16	17	8

These figures indicate the advisability of seeding fall rye reasonably early.

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 1926 twelve different rates of seeding were under test. The seed was sown on May 22, in quadruplicate one-fortieth-acre plots, on fall-ploughed sod which was

manured at the rate of 16 tons to the acre, previous to seeding. The seed germinated well and a nice even stand developed. The results are as follows:—

RATE OF SEEDING SUNFLOWERS

Distance between rows	Distance between plants in row	Area occupied by each plant	Yield per acre							
			Green weight 1926		Dry weight 1926		Average green weight 1924–1926		Average dry weight 1924–26	
Inch.	inch.	sq. feet	tons	lb.	tons.	lb.	tons	lb.	tons	lb.
24	6	1·0	18	1,450	2	1,860	11	1,303	1	1,497
24	12	2·0	16	1,150	2	875	10	553	1	924
24	18	3·0	15	1,120	2	871	9	1,347	1	829
30	6	1·25	19	780	2	1,817	12	270	1	1,443
30	12	2,50	17	240	2	592	10	1,520	1	986
30	18	3·75	15	1,920	2	511	9	1,110	1	703
36	6	1·50	18	1,020	2	1,043	11	613	1	1,066
36	12	3·00	17	1,880	2	1,176	10	1,287	1	977
36	18	4·50	16	1,440	2	949	9	727	1	738
42	6	1·75	18	1,260	2	1,951	11	1,183	1	1,436
42	12	3·50	15	290	2	513	9	1,020	1	719
42	18	5·25	14	1,070	1	1,958	8	1 040	1	313

The figures in this table would seem to indicate that the yield of sunflowers is more affected by changing the distance between the plants in the row than by changing the distance between the rows.

It may be noted in the average results of dry weight per acre over a three-year period that in every instance where the spacing of the plants in the row has been changed from 6 to 12 and 18 inches there has been a noticeable decrease in the yield; while on the other hand there is a much smaller decrease in yield where the rows are widened from 24 to 30, 36 and 42 inches apart.

In order to make possible a more direct comparison between the average results from the rows different distances apart and also the plants at different distances within the row, the following table has been prepared.

RATES OF SEEDING SUNFLOWERS—ROWS AND PLANTS AT DIFFERENT DISTANCES APART

Distance	Yield per acre							
	Green weight 1926		Dry weight 1926		Green weight 1924–26		Dry weight 1924–26	
	tons	lb.	tons	lb.	tons	lb.	tons	lb.
Rows 24 inches apart	9	1,347	1	829	10	1,068	1	1,083
Rows 30 inches apart	9	1,110	1	703	10	1,633	1	1,044
Rows 36 inches apart	9	727	1	738	10	876	1	927
Rows 42 inches apart	8	1,040	1	313	9	1,748	1	823
Plants 6 inches apart	11	613	1	1,066	11	1,342	1	1,361
Plants 12 inches apart	10	1,287	1	977	10	595	1	902
Plants 18 inches apart	9	727	1	738	9	556	1	646

The figures in this table show that there is a much greater tendency for the yields to lessen, as the plants are more widely spaced within the row, than where the rows are placed wider apart.

In view of the fact that 24 inches between the rows is not sufficient width to permit of convenient cultivation and harvesting, and 42 inches seems unnecessarily wide with a tendency to give coarse stalks and lower yields, a distance of 30 to 36 inches, with the plants about 6 inches apart in the row should be a suitable spacing to use under ordinary farm conditions.

RATE OF SEEDING ENSILAGE CROPS

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

In 1926, twenty different mixtures and rates of seeding were under test. They were all seeded in quadruplicate one-fortieth-acre plots, on fall-ploughed clay-loam soil which had been manured at the rate of 16 tons to the acre previous to seeding. The sunflowers and O.P.V. were seeded on May 19, and the corn on May 31. The O.P.V. was harvested on September 1, the corn on September 9 and the sunflowers on September 16. Mammoth Russian sunflowers, Northwestern Dent corn, O.A.C. No. 72 oats, Arthur peas and common vetch are the varieties used. A good germination resulted on each plot, and very good yields were obtained. The results are as follows:—

DISTANCES BETWEEN ROWS AND RATE OF SEEDING ENSILAGE CROPS

Crops and rate						Yield per acre							
Sunflowers	Corn	Oats	Peas	Vetch	Clover	Green weight 1926		Dry weight 1926		Average green weight 1924–26		Average dry weight 1924–26	
inch.	inch	lb.	lb.	lb.	lb.	tons.	lb.	tons	lb.	tons	lb.	tons	lb.
24						19	1,380	2	1,707	17	560	2	621
30						16	1,140	2	1,036	16	283	2	71
36						18	200	2	1,572	16	320	2	467
42						15	1,570	2	511	13	1,615	1	1,650
	24					6	140	0	1,572	5	103	0	1,163
	30					6	1,420	0	1,705	4	1,300	0	1,107
	36					5	960	0	1,436	4	62	0	985
	42					4	530	0	1,055	3	562	0	779
		34	60			11	1,080	3	535	10	457	2	894
		51	60			11	1,660	3	862	10	497	2	914
		68	60			11	1,790	3	1,189	10	499	2	1,347
		34	60	28		11	450	3	861	11	452	2	1,068
		51	60	28		12	1,090	3	1,431	11	1,792	2	1,455
		68	60	28		11	1,570	3	1,483	11	576	2	1,101
		34	60		10	10	1,980	3	202	10	126	2	728
		51	60		10	12	560	3	902	10	849	2	999
		68	60		10	12	1,040	3	1,201	10	468	2	1,114
		34	60	28	10	12	740	3	545	11	711	2	878
		51	60	28	10	12	210	3	308	11	666	2	960
		68	60	28	10	12	750	3	817	11	1,372	2	1,458

The average figures in this table show that rows 24 inches apart give the largest yield of both sunflowers and corn, and that rows 42 inches apart give the lightest. The former distance, however, is too close for convenience, consequently 30 or 36 inches is to be recommended in preference to either of the other two.

For O.P.V. there is a greater yield shown in almost every case where the amount of oats seeded has been increased.

The figures also show some advantage where vetch is present, but the yields are lower where clover is included in the mixture.

DATE 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 30 inches apart and the sunflowers were thinned 6 to 12 inches apart in the row, while the oats, peas and vetch were sown at the rate of 2 bushels of oats, 1 bushel of

peas, and ½ bushel of vetch per acre. In 1926 the seed was sown on six different dates at intervals of seven days commencing on May 18, in quadruplicate one-fortieth-acre plots, on fall-ploughed clay-loam soil which was manured at the rate of 16 tons to the acre previous to seeding. The seed gave good germination and good yields were obtained from the sunflowers and O.P.V. The corn, however, was light. The results are as follows:—

DATE OF SEEDING ENSILAGE CROPS

Crop	Date of seeding 1926	Yield per acre							
		Green weight 1926		Dry weight 1926		Average green weight 1924–26		Average dry weight 1924–26	
		tons	lb.	tons	lb.	tons	lb.	tons	lb.
Sunflowers	May 18	17	1,320	2	1,695	17	1,288	2	855
Sunflowers	May 25	17	540	2	800	17	1,178	2	558
Sunflowers	June 1	15	1,090	2	442	17	40	2	499
Sunflowers	June 8	13	890	1	1,488	16	140	1	1,824
Sunflowers	June 15	14	690	1	1,651	14	1,313	1	1,534
Sunflowers	June 22	13	380	1	1,181	13	80	1	1,109
O.P.V	May 18	10	800	3	707	11	437	2	1,792
O.P.V	May 25	8	1,420	2	1,645	11	1,350	2	1,620
O.P.V	June 1	8	590	2	805	11	728	2	1,120
O.P.V	June 8	8	1,860	2	526	11	910	2	740
O.P.V	June 15	9	320	1	1,733	11	583	2	76
O.P.V	June 22	9	740	2	243	11	763	2	351
Corn	May 18	5	1,240	0	1,581	3	1,480	0	933
Corn	May 25	5	1,240	0	1,612	3	1,717	0	1,001
Corn	June 1	3	320	0	913	4	370	0	998
Corn	June 8	2	900	0	681	4	280	0	977
Corn	June 15	2	880	0	638	2	1,467	0	625
Corn	June 22	1	920	0	388	2	787	0	616

The figures in this table indicate that there is a tendency for the earlier seedings of sunflowers, O.P.V. and corn to give the best results. Over a three-year period the largest yields from the former two were obtained from the first seeding, while the second seeding gave the best results with corn. In this connection, however, it is interesting to note that there crops may be sown quite late and still give fairly good results.

ENSILAGE AND ROOT EXPERIMENT

The objects of this experiment are to compare the yields and profit from growing 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. The rotation followed with this experiment is 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 area for ensilage and root crops is fall-ploughed and manured at the rate of 16 tons to the acre. After these crops are harvested the land is again fall-ploughed for the oat crop the next year which is used as the nurse-crop for the grass and clover.

In 1926 it was found necessary to transfer this experiment to a new location and consequently the ensilage and root crops were following potatoes this year instead of hay.

The results from these in 1926 are as follows:—

ENSILAGE AND ROOT EXPERIMENT 1926

Crop	Yield per acre 1926	Cost per acre 1926	Value of crop per acre	Profit or loss (−) per acre	Cost per ton
	tons	$	$	$	$
O.P.V.	3·62	39 45	18 10	−21 35	10 90
Sunflowers	2·76	44 29	7 28	−34 01	16 05
Corn	0·72	39 56	1 73	−37 83	56 33
Turnips	12·10	43 51	21 18	−22 33	3 60

The high costs per ton and the large losses per acre are due to the low yields. Corn and sunflowers were, in particular, almost a failure. Normal yields would have made a very great difference in these figures.

In 1926, the area which was in silage and hoed crops in 1925 was sown to Alaska oats on May 27. They were harvested on September 7. The results are as follows:—

YIELDS OF ALASKA OATS FOLLOWING O. P. V., SUNFLOWERS, CORN AND TURNIPS

Previous crop	Yield of oats per acre 1926
	bush.
O.P.V.	15·9
Sunflowers	27·2
Corn	30·5
Turnips	33·2

A partial explanation of the low yield of oats obtained from the area which was in O.P.V. last year, may be that this plot gave a yield of 3,935 pounds of green material while no yield was obtained from any of the other three crops, owing to too much rain.

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 received any fertilizer of any kind. It is operated on a five-year rotation, including oats, sweet clover, barley, clover hay and timothy hay. The land is fall-ploughed for the oat crop. When the sweet clover is a fair height it is ploughed under after which the soil is cultivated occasionally throughout the remainder of the season. The first cycle of this rotation was completed in 1926 when the results from the different crops are as follows:—

PLOUGHING DOWN SWEET CLOVER AND SUMMER-FALLOWING—RESULTS IN 1926

Rotation year	Crops and treatment	Yield per acre		Cost of summer-fallowing	Value of crop minus cost of summer-fallowing
		Hay straw	Grain		
		tons	bush.	$	$
1	Oats seeded to sweet clover	0·42	18·9	.....	13 86
2	Sweet clover ploughed down and summer-fallowed	.....	.....	.....	.....
3	Barley seeded to timothy and clover	0·80	36·7	6 02	31 81
4	Clover hay	1·03	.....	3 01	12 44
5	Timothy hay	1·05	.....	.....	15 75
	Average per acre	.....	.....	.....	14 77

The cost of the sweet clover seed and the expense of summer-fallowing have been distributed between the next two crops, in the proportion of two-thirds to the barley and one-third to the clover hay.

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 virgin clay-loam soil, which had never received any fertilizer. It is operated on a five-year rotation, including oats, sweet clover and buckwheat, barley, clover hay and timothy hay. The land is fall-ploughed for the oat crop. The sweet clover is allowed to grow until it is time to prepare the soil for buckwheat. While the buckwheat is still green, one-half acre is ploughed under and the other half is ploughed after the crop is harvested. This prepares the land for seeding out to grass and clover the next year using barley as a nurse-crop. This rotation has completed one cycle in 1926 when the results from the different crops are as follows:—

PLOUGHING DOWN SWEET CLOVER AND BUCKWHEAT—RESULTS IN 1926

Rotation year	Crops and treatment	Yield per acre		Cost of summer-fallowing	Value of crop minus cost of summer-fallowing
		Hay or straw	Grain		
		tons	bush.	$	$
1	Oats seeded to sweet clover	0·52	18·7	.....	14 34
2	Sweet clover ploughed down, buckwheat planted and ploughed under	.....	.....	.....	.....
3	Barley seeded to timothy and clover	0·65	22·7	11 69	12 64
4	Clover hay	0·73	.....	5 85	5 10
5	Timothy hay	1·17	.....	.....	17 55
	Average per acre	.....	.....	.....	9 93

The buckwheat which was supposed to be saved for grain on the one-half acre failed to mature and consequently was also ploughed under.

The same procedure was followed in the case of this experiment as with the one previous, in distributing the cost of the sweet clover seed and the summer-fallowing operations, to the next two crops in the ratio of two to one.

No Green Manure Crop Ploughed Down

In this experiment no green manure crop is ploughed down, but a legume grain is introduced to supplement the clover crop in building up the soil. It was commenced in 1922 under a four-year rotation, including peas, oats, clover hay and timothy hay. The timothy sod is fall-ploughed for peas. After the pea crop is harvested the land is again fall-ploughed in preparation for seeding out to grass and clover using oats as a nurse-crop. This experiment had completed one cycle in 1925. The results in 1926 from the different crops are as follows:—

NO GREEN MANURE CROP PLOUGHED DOWN—RESULTS IN 1926

Rotation year	Crop	Yield per acre		Value of crop
		Hay or straw	Grain	
		tons	bush.	$
1	Peas	0·36	12·5	39 66
2	Oats	0·73	20·8	16 86
3	Clover hay	0·63	.....	9 45
4	Timothy hay	0·80	.....	12 00
	Average per acre	.....	.....	15 59

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

The object of this experiment is to use it as a check or base with which all the other experiments may be compared. It was commenced in 1922 under a four-year rotation, including oats, barley, clover hay and timothy hay. The timothy sod is fall-ploughed for the oat crop. After harvest the land is again fall-ploughed in preparation for barley which is used as the nurse-crop for the grass and clover. The results in 1926 from the different crops are as follows:—

EFFECT OF GROWING NON-LEGUMES—RESULTS IN 1926

Rotation year	Crop	Yield per acre		Value of crop
		Hay or straw	Grain	
		ton	bush.	$
1	Oats	0·57	26·4	19 26
2	Barley, seeded down with timothy and clover	0·49	15·0	16 44
3	Clover hay	1·07	.....	16 05
4	Timothy hay	1·17	.....	17 55
	Average per acre	.....	.....	13 86

FARM MANURE EXPERIMENT

The object of this experiment is to compare the effect of an application of manure at the rate of 16 tons to the acre once in the rotation, with green manure ploughed down and with no manure applied of any kind. This experiment was commenced in 1922 under a four-year rotation including oats, barley, clover hay and timothy hay. The land is fall-ploughed and afterwards manured at the rate of 16 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. The results in 1926 from the different crops are as follows:—

FARM MANURE EXPERIMENT—RESULTS IN 1926

Rotation year	Crops and treatment	Yield per acre		Cost of manure	Value of crop minus cost of manure
		Hay or straw	Grain		
		ton	bush.	$	$
1	Oats, 16 tons of manure applied	0·70	38·7	12 80	14 62
2	Barley, seeded to clover and timothy	0·73	33·0	9 60	24 48
3	Clover hay	1·78	.....	6 40	20 30
4	Timothy	1·65	.....	3 20	21 55
	Average per acre	.....	.....	.....	16 19

LIME EXPERIMENT

The object of this experiment is to determine the results obtained from the application of 2 tons of ground limestone to the acre during the second year of the rotation. This experiment was commenced in 1922, under a four-year rotation, including oats, barley, clover hay, and timothy hay. The timothy sod is fall-ploughed and afterwards manured at the rate of 16 tons to the acre

for oats. After these are harvested it is again fall-ploughed and given an application of ground limestone in preparation for seeding out to grass and clover using barley as a nurse-crop. The results in 1926 from the different crops are as follows:—

LIME EXPERIMENT—RESULTS IN 1926

Rotation year	Crops and treatment	Yield per acre		Cost of manure	Value of crop minus cost of manure
		Hay or straw	Grain		
		ton	bush.	$	$
1	Oats, 16 tons of manure applied	0·84	39·7	12 80	16·06
2	Barley, 2 tons of ground limestone applied	0·82	34·5	9 60	26 37*
3	Clover hay	1·39	.....	6 40	14 45
4	Timothy hay	1·60	.....	3 20	20 80
	Average per acre	.....	.....	.....	15 54

*No charge has been made for the lime applied.

DRAINAGE EXPERIMENT

The object of this experiment is to compare the results obtained from tile-drained land and land which is not tile drained. For this test 20 acres of uniform clay-loam soil, which had some shallow muck areas in each half were selected. Ten acres of this area were under-drained in 1921 with four tile drains, while the other 10 acres were left undrained.

The whole area was placed under the following four-year rotation:—

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

In 1926 timothy hay was the crop produced and the results are as follows:—

DRAINAGE EXPERIMENT—RESULTS IN 1926

Items		Drained	Undrained
Total cost per acre	$	17 92	18 02
Yield per acre	tons	1·93	1·83
Value of crop per acre	$	28 89	27 41
Profit per acre	$	10·97	9 39
Cost per ton	$	9 30	9 86

SURFACE DRAINAGE EXPERIMENT

The object of this experiment is to compare the results obtained from using four different widths of lands when ploughing 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 in 1922, under a four-year rotation including oats, barley, clover hay and timothy hay. In 1926, however, no timothy

meadow was harvested as the area was fall-ploughed and seeded to sunflowers and O.P.V. as a substitute for the oat crop. The results are as follows:—

SURFACE DRAINAGE EXPERIMENT—RESULTS IN 1926

Width of lands	Yield per acre 1926	
	Sunflowers	O.P.V.
	ton	ton
Lands 18 feet in width	3·41	6·11
Lands 24 feet in width	2·30	4·04
Lands 36 feet in width	1·78	4·58
Lands 48 feet in width	1·99	5·34

HORTICULTURE

The early part of May was cool and backward, so that no seeding was done in the garden until May 17. The precipitation during May, however, was very light and after the weather warmed up, the soil worked well which made possible the preparation of an excellent seed-bed. June and July received a fair amount of precipitation, which was well distributed. This gave good germination and fairly good growth, so that the results from garden crops in 1926 were well up to the average, and the quality was particularly good.

ORCHARD

On account of wet weather during the autumn of 1925 followed by a light snowfall in the winter, quite a number of the trees in the young orchard were badly frozen back and some killed entirely. A few had blossoms on this spring, but none bore any fruit.

It would appear as though an evergreen or other efficient shelter will be required in this district as protection for the trees in the winter before good results need be expected in the bearing of fruit. A start has been made in getting protection, by the planting of a willow hedge around three sides of the horticultural grounds. This will be supplemented by the planting of evergreens.

SMALL FRUITS

RED CURRANTS.—Seven varieties were set out in 1920, in rows 6 feet apart and 5 feet between the bushes in the row. These all bore very well in 1926, giving the following yields in pounds from six bushes: Red Grape 19.8; London Red 18.5; Long Bunch Holland 14.5; Simcoe King 14; Red Cross 12.8; Victoria 11.5; and Red Dutch 11.3. Over a five-year period the average results in pounds are as follows: Red Grape, 7.4; London Red, 6.9; Victoria, 6.4; Long Bunch Holland, 5.8; Simcoe King, 5.4; Red Dutch, 4.8; and Red Cross, 3.6.

WHITE CURRANTS.—Two varieties were set out in 1920, in rows 6 feet apart, and 5 feet between the bushes in the row. These have always given light yields. In 1926 White Grape gave 4.5 pounds from two bushes and White Cherrry 3.5 pounds from three bushes.

BLACK CURRANTS.—Fourteen varieties have been under test since 1920. They were set out in a similar manner to the red and white currants. These have all been bearing fruit since 1922. In 1926 the results in pounds from the seven highest-yielding varieties are as follows: Kerry, 17; Climax, 16.5; Eagle, 16.5; Saunders, 16; Ontario, 15.5; Topsy, 15; and Eclipse, 14.3. Over a five-year

period the results in pounds from the seven leading varieties are as follows: Saunders, 18; Climax, 16.6; Eagle, 15.8; Ontario, 13.5; Kerry, 13.4; Topsy, 11.4; and Victoria, 11.1.

GOOSEBERRIES.—Fifteen varieties were set out in 1920 in rows 6 feet apart and 5 feet between the bushes in the row. For some reason these have never developed as they should. In 1926 only two varieties gave any yield. Downing and Keepsake each produced one quart from six bushes.

RASPBERRIES.—Eight varieties have been under test since 1920. They were set out in 30-foot rows, 6 feet apart and the canes 3 feet apart in the row. These have been yielding fairly well since 1921. The results in 1926 in pounds are as follows: Herbert, 6.5; Cuthbert, 6.5; Newman, 23.6; Early June, 5; Sunbeam, 4; Brighton, 3.5; King, 3.3; and St. Regis, 3.3. Over a six-year period the average results in pounds are as follows: Newman 23, 9.1; Herbert, 9.1; Early June, 8.2; Brighton, 7.6; King, 7.5; St. Regis, 6.8; Cuthbert, 6.8; and Sunbeam, 5.9.

VEGETABLES

VARIETY TESTS

BEANS.—Twenty-two varieties were under test. The seed was sown on June 9, in rows 30 feet in length, 30 inches apart and the plants 2 inches apart in the row. In 1926 the results in quarts from the seven highest yielding varieties are as follows: Grennell Rustless, 15; Stringless Green Pod, 14.5; Hidasta, 14.3; Davis White Wax, 13.3; Plentiful French, 13; Dwarf French, 12.5; and Henderson Bountiful, 12.3.

BROAD BEANS.—Fifteen varieties were under test. The seed was planted on May 22, in 30-foot rows, 3 feet apart, and the plants 3 inches apart in the row. In 1926 the results in quarts from the five highest yielding sorts are as follows: Long Pod Green, 31; Long Pod Masterpiece, 30; Johnson Wonder, 29; Monarch, 26; and Broad Windsor Taylor, 23. The broad bean is very hardy and grows well in this district, but it is not in as good demand as other sorts.

BEET.—Eleven varieties were under test. The seed was sown on May 20, in drills 30 feet in length, 18 inches apart and the plants were thinned to 2 inches apart in the row. In 1926 the results in pounds from the seven highest yielding sorts are as follows: Eclipse Early, L. S. F., 41.5; Eclipse, McD., 39.5; Early Wonder, 36.5; Detroit Dark Red, Graham, 36; Crosby Egyptian, 35.5; Cardinal Globe, 34.5; and Detroit Dark Red, McD. 32.5. With table beets uniformity and good quality are of greater importance than yield. The Detroit Dark Red, Crosby Egyptian, Black Red Ball, Cardinal Globe and Crimson Globe are among the best tried for quality. Table beets which are not going to be harvested until autumn, should not be given too much space in the row as this encourages large size and coarse, woody roots of poor colour.

CABBAGE.—Fourteen varieties were under test. The seed was sown in the hotbed on May 5, and the plants were transplanted to the garden on June 14. The early varieties were set out 18 inches, and the late varieties 24 inches apart in the row. The rows were 30 inches apart and 30 feet in length. The results in pounds from the seven highest-yielding sorts in 1926 are as follows: Copenhagan Market, 40; Early Jersey Wakefield, 32; Golden Acre, 29; Enkhuizen Glory, 29; Babyhead, 27; Kildonan, 24.5; and Dala, 24. It may be noted that the standard early sorts like Copenhagan Market, Early Jersey Wakefield, Golden Acre and Enkhuizen Glory have given the best results. Golden Acre is the earliest of all those tried, and should prove very valuable where early maturity is desired.

CARROT.—Nine varieties were under test. The seed was sown on May 20, in drills 30 feet in length, 18 inches apart, and the plants were thinned to 1½ inches apart in the row. The results in pounds are as follows: Danvers, 73; Chantenay, 71; Garden Gem, 67; Scarlet Horn, 63; Improved Danvers, 61.5; Maux, 53.5; Nantes Half Long, 52; Oxheart, 51.5; and Early Nantes, 39.5. Over a four-year period the results in pounds are as follows: Chantenay, 31.3; Improved Danvers, 29.3; Nantes Half Long, 27.6; Oxheart, 25; and Maux, 24.3. With table carrots, uniformity and quality are of equal or greater importance than yield. Danvers and Chantenay are among the best of those tried from this standpoint.

CELERY.—Nine varieties were under test. The seed was sown in the greenhouse on April 24, and the plants were transplanted to the garden on July 7. The rows were 30 feet in length, 4 feet apart, and the plants were set 6 inches apart in the row. The results in pounds are as follows: Winter Queen, 66.5; Paris Golden Yellow, 59.5; Giant Pascal, 58; Easy Blanching Super Standard, 56.5; Easy Blanching, 56; French Success, 55.5; Golden Self Blanching, 44; and White Plume, 44. Evans Triumph, which is usually one of the best yielders, failed to germinate this year.

ENDIVE.—One variety, Fine Green Curled, was under test. The seed was sown on May 21, in a 30-foot row and the plants thinned to 6 inches apart in the row. A yield of 21.5 pounds was obtained in 1926. The average yield over a four-year period is 28 pounds.

KOHL-RABI.—Two varieties were under test. The seed was sown on May 21, in rows 30 feet in length and the plants were thinned to 8 inches apart in the row. White Vienna gave a yield of 57 pounds and Purple Vienna, 28.5 pounds.

KALE OR BORECOLE.—Two varieties were under test. The seed was sown in the hotbed on May 5, and the plants were set out in the garden on June 15, in 30-foot rows, with the plants 24 inches apart in the row. Tall Scotch gave a yield of 46 pounds and Dwarf Green Curled, 40.5 pounds.

LEEKS.—Two varieties were under test. The seed was sown in the hotbed on May 5, and the plants were transplanted to the garden on June 16, in 30-foot rows, the plants being set 6 inches apart in the row. Musselburgh gave a yield of 17.5 pounds, and Carentan 14.5 pounds.

LETTUCE.—Fourteen varieties were under test. The seed was sown on May 21, in drills 30 feet in length and 18 inches apart. The plants were thinned to 6 inches apart in the row. The average yield from the fourteen varieties was 44.4 pounds. With lettuce, crispness and quality are of even greater importance than large yields. The climate of northern Ontario is particularly adapted to the growing of excellent quality lettuce. The three common types, head, cos and leaf have all been represented in the variety tests and have all given good satisfaction.

ONIONS.—Twelve varieties were under test. The seed was sown on May 20, in drills 30 feet in length and 18 inches apart. The plants were thinned to 1 inch apart in the row. The results in pounds from the seven largest yielding varieties are as follows: Southport Yellow Globe, 41; Southport White Globe, 33; Ailsa Craig, 31.5; Giant Prizetaker, 30.5; Extra Early Flat Red, 26; Yellow Globe, 25; and Yellow Globe Danvers, 24.5.

Two varieties grown from sets were also under test. These were set out on May 27, in rows 18 inches apart and the sets were placed 2 inches apart in the row. Yellow Globe Danvers gave a yield of 34 pounds and Large Red Wethersfield 23 pounds per 30-foot row.

PARSNIP.—Three varieties were under test. The seed was sown on May 20, in rows 30 feet in length, 30 inches apart, and the plants were thinned to 2 inches apart in the row. The results in pounds are as follows: Hollow Crown, 56.5; Elcombe Improved Hollow Crown, 50.5; and Guernsey XXX, 43.5. The parsnip is a vegetable which demands a deep, mellow soil, which is fairly rich and well drained.

GARDEN PEAS.—Eight varieties were under test. The seed was sown on May 19, in rows 30 feet in length and 3 feet apart. The plants were 1 inch apart in the row. The results in quarts are as follows: McLean Advancer, 25.8; Stratagem, 23.5; American Wonder, 22.5; Laxtonian, 19; Thomas Laxton, 17.5; Gradus X American Wonder, 17.5; Gregory Surprise X English Wonder, 16; and English Wonder, 15.5. Over a four-year period the four leading varieties are: McLean Advancer, Stratagem, American Wonder, and Thomas Laxton.

POTATOES.—Eleven varieties and strains were under test. The tubers were planted on May 26, in quadruplicate one-eightieth-acre plots, the sets being placed 15 inches apart in the row. The results are as follows:—

VARIETY TEST OF POTATOES

Variety	Source of seed	Yield per acre							
		Marketable 1926		Unmarketable 1926		Three-year average			
						Marketable		Unmarketable	
		bush.	lb.	bush.	lb.	bush.	lb.	bush.	lb.
Green Mountain	Fredericton, N.B.	274	20	21	20	205	47	31	33
Davies Warrior	Actonvale, P.Q.	252	40	17	00	185	00	18	47
Green Mountain	Searchmont, Ont.	242	00	17	40	184	07	31	13
Irish Cobbler	Acton, Ont.	235	00	17	20	177	00	34	40
Irish Cobbler	Heaslip, Ont.	215	40	20	40				
Irish Cobbler	Hillsburg, Ont.	212	00	17	20	190	20	27	07
Irish Cobbler	N.B.	204	00	19	20	180	27	29	40
Irish Cobbler	Dorion, Ont.	165	40	10	40	186	27	24	00
Early Ohio	Winnipeg, Man.	161	00	20	20	137	04	18	55
Carman No. 3	Hamilton, Ont.	160	40	10	40	178	53	17	00
Bovee	Winnipeg, Man.	158	00	31	40	123	33	21	40

PUMPKIN.—Two varieties were under test. The seed was sown in the greenhouse on May 13, and the plants were transplanted to the garden on June 26, in hills 10 feet apart. Connecticut Field gave a yield of 20 pounds and Small Sugar 18.5 pounds from three hills.

RADISH.—Eight varieties were under test. The seed was sown on May 21, in drills 30 feet in length and 18 inches apart. The results in pounds from the four highest yielding sorts are as follows: Scarlet Oval XXX, 23.8; French Breakfast, Patmore, 21.5; White Icicle, 20.8; and French Breakfast, James, 17.8. This climate is particularly well suited to the growing of high-quality radish, and any of the common sorts give good results.

SPINACH.—Five varieties were under test. The seed was sown on May 21, in 30-foot rows 18 inches apart. The results in pounds are as follows: Broad Victoria, 14.3; Long Standing, 14; Broad Flanders, 13.3; Viroflay, 10.5; and Victoria, 10.3.

SALSIFY.—Three varieties were under test. The seed was sown on May 21, in 30-foot rows 18 inches apart. The plants were thinned to 1½ inches apart in the row. The results in pounds were as follows: Long White, 44; Mammoth Sandwich Island, 35; and Long Black, 16.

SQUASH.—Four varieties were under test. The seed was sown in the greenhouse on May 13, and the plants were transplanted to the garden June 26, in hills 10 feet apart. English Vegetable Marrow gave a yield of 30 pounds from three hills. No yields were obtained from the other three sorts.

TURNIP.—Five varieties were under test. The seed was sown on May 21, in drills 30 feet in length and 18 inches apart. The plants were thinned to 2 inches apart in the row. The results in pounds are as follows: Red Top Strap Leaf, 28.3; Early Purple Top Milan, 26.8; Milan Purple Top, 19; Golden Ball, 17.5. The Champion Swede variety gave 32.8 pounds.

TOMATOES.—Thirteen varieties were under test. The seed was sown in the green house on April 24, and the plants were transplanted to the garden on June 28, in 30-foot rows 3 feet apart. The plants were set 3 feet apart in the row. No ripe fruit was obtained, but each variety gave some green fruit suitable for pickling. The results in pounds from the seven leading sorts are as follows: Prosperity, 29.8; Sparks Earliana, 19.3; Avon Early, 17.3; Burbank, 15.5; Select Earliana, 15.5; Earliana, 14.8; and Early Mascot, 13.8.

CULTURAL EXPERIMENTS WITH VEGETABLES

RATE OF PLANTING BEANS.—The object of this experiment is to compare the results from planting beans, 2, 4 and 6 inches apart in the row. Two varieties were used. The seed was planted on June 10, in rows 30 feet in length and 30 inches apart. The results are as follows:—

RATE OF PLANTING BEANS

Variety	Yield per thirty-foot row					
	Two inches 1926	Four inches 1926	Six inches 1926	Three-year average two inches	Three-year average four inches	Three-year average six inches
	quarts	quarts	quarts	quarts	quarts	quarts
Round Pod Kidney Wax	12·5	11·8	8·5	10·5	9·1	6·5
Stringless Green Pod	13·0	10·0	8·5	11·9	9·3	7·3

RATE OF PLANTING PEAS.—The object of this experiment is to compare the results from planting peas, 1, 2, and 3 inches apart in the row. Three varieties were used. The seed was planted on May 19, in rows 30 feet in length and 30 inches apart. The results are as follows:—

RATE OF PLANTING PEAS

Variety	Yield per thirty-foot row					
	One inch 1926	Two inches 1926	Three inches 1926	Two-year average one inch	Two-year average two inches	Two-year average three inches
	quarts	quarts	quarts	quarts	quarts	quarts
English Wonder	11·5	9·5	10·3	14·7	12·8	12·3
Thomas Laxton	12·5	6·5	7·0	14·8	13·0	11·0
Stratagem	11·0	9·5	8·0	16·3	14·3	15·0

DATE OF SEEDING BEETS, CARROTS AND PARSNIPS.—The object of this experiment is to compare the results from beets, carrots and parsnips when planted at different dates, at intervals of ten days, commencing as early as possible and continuing until five plantings are under test. Detroit Dark Red beet, Chantenay carrot, and Hollow Crown parsnip are the varieties used. In 1926 the first date of seeding was on May 20. The seed was sown in rows 30 feet in length and 18 inches apart for the beets and carrots, and 30 inches for parsnips. The beets and parsnips were thinned to 2 inches, in the row, and the carrots to 1½ inches. The results are as follows:—

DATE OF SEEDING BEETS, CARROTS AND PARSNIPS

Date sown, 1926	Yield per thirty-foot row											
	Beet				Carrot				Parsnip			
	1926		Four-year average		1926		Four-year average		1926		Four-year average	
	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.
May 20	39	8	27	10	64	8	36	00	52	0	33	8
May 31	40	0	23	04	44	8	29	14	45	8	20	3
June 10	27	8	18	01	19	8	14	7	25	0	11	5
June 21	6	8	10	04	11	12	8	2	23	8	8	2
June 30	5	8	7	00	5	8	3	14	9	8	3	0

METHODS OF BLANCHING CELERY.—The object of this experiment is to compare the results in earliness, crispness, blanching, flavour and yield from the different methods of blanching. Golden Self Blanching was the variety used. In 1926, the seed was sown in the greenhouse on April 24, and the plants were transplanted to the garden on July 8. The rows were 15 feet in length and 4 feet apart, and the plants were set 6 inches apart in the row. The results during the last four years indicate that celery may be fairly well blanched by either ready roofing, boards, earthing up on the level or in trenches. That earthed up on the level has given the largest yields, but it is surpassed in quality by that grown in trenches. The use of boards and tar paper, however, has the advantage of requiring less labour, and the rows may also be planted much closer together.

SPROUTING EXPERIMENT WITH POTATOES.—The object of this experiment is to compare the results from potatoes which are sprouted previous to planting by being exposed for six weeks to subdued light at a temperature of 40 to 50 degrees Fahrenheit, with those kept dormant in a cool, dark root-cellar. Two varieties were used. The seed was planted in quadruplicate rows, 66 feet in length, 30 inches apart, and the tubers were set 1 foot apart in the row. In 1926 they were planted on June 4, and harvested on October 5. The results are as follows:—

SPROUTING EXPERIMENT WITH POTATOES

Variety	How treated	Yield per acre							
		Marketable 1926		Unmarketable 1926		Three-year average marketable		Three-year average unmarketable	
		bush.	lb.	bush.	lb.	bush.	lb.	bush.	lb.
Irish Cobbler	Sprouted	298	6	26	24	281	36	29	42
Irish Cobbler	Unsprouted	280	30	28	36	258	52	34	6
Green Mountain	Sprouted	345	24	19	48	327	48	44	33
Green Mountain	Unsprouted	305	48	36	18	297	44	46	34

SPRAYING EXPERIMENT WITH POTATOES.—The object of this experiment is to compare the results from sprayed and unsprayed potatoes, using Bordeaux mixture. In 1926 the first spraying occurred on July 19. Seven sprayings were applied at intervals of seven days. The variety used was Irish Cobbler, which was planted on May 27, in quadruplicate one-eightieth-acre plots, and harvested on September 28. The results are as follows:—

SPRAYING EXPERIMENT WITH POTATOES

Treatment	Yield per acre							
	Marketable 1926		Unmarketable 1926		Three-year average marketable		Three-year average unmarketable	
	bush.	lb.	bush.	lb.	bush.	lb.	bush.	lb.
Sprayed	262	00	17	45	226	07	24	55
Unsprayed	247	20	22	40	212	40	27	07

DATE OF PLANTING POTATOES.—The object of this experiment is to compare the results from potatoes planted at different dates, at intervals of fourteen days, beginning as early as possible and continuing for five dates. Two varieties were used and the first date of planting in 1926, was May 18. The seed was planted in quadruplicate 66 foot rows, and the tubers were set 1 foot apart in the row. The results are as follows:—

DATE OF PLANTING POTATOES

Variety	Date planted 1926	Date ready for use 1926	Yield per acre							
			Marketable 1926		Unmarketable 1926		Three-year average marketable		Three-year average unmarketable	
			bush.	lb	bush.	lb.	bush.	lb.	bush.	lb.
Irish Cobbler	May 18	Aug. 10	314	36	38	30	266	34	36	18
Irish Cobbler	June 2	Aug. 22	264	00	40	42	256	18	42	10
Irish Cobbler	June 16	Sept. 3	204	36	38	30	218	10	45	28
Irish Cobbler	" 29	Oct. 1	148	30	33	00	163	32	42	10
Irish Cobbler	July 13	" 1	104	30	38	30	94	14	31	10
Green Mountain	May 18	Aug. 20	282	42	38	30	261	48	39	58
Green Mountain	June 2	Sept. 1	265	06	33	00	267	40	42	54
Green Mountain	" 16	" 14	205	42	31	54	217	48	49	08
Green Mountain	" 29	Oct. 1	138	36	38	30	162	26	42	54
Green Mountain	July 13	" 1	45	06	38	30	63	26	37	02

FALL VERSUS SPRING SEEDING OF VEGETABLES.—The object of this experiment is to compare the results in earliness and yield from vegetables when the seed is sown just before the ground freezes in the fall and when sown in the spring in the regular way. Seven kinds of vegetables were used in this test. The

seed was sown on October 29, 1925, and on May 17, 1926. The results are as follows:—

FALL VERSUS SPRING SEEDING OF VEGETABLES

Crop	Variety	Date ready for use		Yield per thirty-foot row			
		Fall seeding 1926	Spring seeding 1926	Fall seeding 1926	Spring seeding 1926	Three-year average Fall seeding	Three-year average Spring seeding
				lb. oz.	lb. oz.	lb. oz.	lb. oz.
Beet	Detroit Dark Red	Aug. 15	Aug. 28	8 0	56 0	5 00	29 1
Carrot	Chantenay	" 1	Aug. 15	41 0	81 0	27 11	38 0
Cabbage	Copenhagen Market	.....	Oct. 16	.....	38 0	.....	13 2
Lettuce	Grand Rapids	July 8	July 17	40 0	46 0	32 0	33 0
Onion	Red Wethersfield	Aug. 28	Sept. 1	11 0	20 0	7 0	11 3
Radish	Scarlet White Tip	June 17	June 17	11 0	67 0	6 5	35 11
Turnip	Purple Milan	.....	July 8	.....	91 0	.....	38 4

FLOWERS

The annual flowers grown in 1926 did very well. Although the precipitation was below normal, the light showers that came had the effect of producing numerous flowers, so that the bloom was continuous from early summer until late autumn. Fifty-one distinct types or kinds of annual flowers were under test. Several of these were represented by many varieties and colours. Twenty-seven were sown in the greenhouse on April 27. These were transferred to the borders on July 5. The seed of the other twenty-four were sown direct in the borders and flower-beds on June 14, with the exception of the sweet peas which were seeded on May 28.

Bulbs are very useful as a means of getting magnificent bloom, in the very early spring. Each year a number of the best varieties of hyacinths, tulips, narcissus and crocus are planted in the autumn, and most of these have been proving hardy, and giving good bloom.

TREES, SHRUBS AND LAWNS

The judicious planting of hardy trees and shrubs add materially to the beauty and comfort of home surroundings. Those planted on the Station grounds, have grown very well during the past year. Special mention might be made of a white spruce hedge planted in the spring of 1924. The trees used were quite small and the results indicate that a satisfactory growth may be expected from this species provided the trees are properly set out and cared for.

Where rapid growth is desired, the laurel-leaved willow and Russian poplar are quite suitable. For deciduous hedges, the Caragana and laurel-leaved willow have been giving good satisfaction. For ornamental clumps, the Lilac, Caragana, Japanese rose, Japanese barberry, Golden currant, Tartarian honeysuckle, Viburnam lantana and Mountain ash have all proven hardy in this district.

CEREALS

The first half of May was somewhat cool and backward so that very little seeding could be done until May 17. This was three days later than 1924 or 1925. The precipitation during May, however, was 0.17 inch, which is the smallest amount received during this month over a nine-year period. This made possible the preparation of a good seed-bed. June and July had a fair amount of precipitation, which caused good germination and fair growth. August was somewhat dry and this hastened maturity, so that the season proved to be fairly satisfactory for the production of cereal grains.

SPRING WHEAT

Four varieties were under test. The seed was sown on May 17, in quadruplicate, one-fortieth-acre plots, at the rate of 2 bushels per acre. The results are as follows:—

VARIETY TEST WITH SPRING WHEAT

Variety	Date of ripening	No. of days maturing	Average length of straw including head	Strength of straw on scale of ten points	Actual yield of grain per acre	No. of days to mature 7-year average 1920–26	Yield of grain per acre 7-year average 1920–26
	Sept.		inch		bush. lb.		bush. lb.
Huron, Ottawa 3	20	126	40	10	26 50	120	27 11
Marquis, Ottawa 15	17	123	38	10	26 40	119	25 31
Ruby, Ottawa 135	3	109	36	10	21 40	109	19 41
Garnet, Ottawa 652	2	108	35	10	21 20	.....	.....

The Huron variety is ahead this year and also in the seven-year average. This wheat, however, is a bearded type and does not equal the Marquis variety in milling quality. The Ruby and Garnet have each given about the same yield this year, but it was observed that the Garnet was somewhat better in colour and quality.

OATS

Seven varieties were under test. The seed was sown on May 20, in quadruplicate one-fortieth-acre plots, at the rate of 2½ bushels per acre. The results are as follows:—

VARIETY TEST WITH OATS

Variety	Date of ripening	No. of days maturing	Average length of straw including head	Strength of straw on scale of ten points	Actual yield of grain per acre	No. of days maturing 5-year average 1922–26	Yield of grain per acre 5-year average 1922–26
	Sept.		inch		bush. lb.		bush. lb.
Victory	14	117	42	9·3	57 2	122	64 08
O.A.C. No. 72	17	120	45	9·3	51 26	.....	.....
Banner, Ottawa 49	15	118	43	9·3	50 20	124	61 18
Alaska	Aug. 31	103	39	9·0	45 30	115	50 20
Gold Rain	Sept. 11	114	44	9·6	45 00	120	60 24
Liberty, Ottawa 480	3	106	37	9·1	33 8	115	38 26
Laurel, Ottawa 477	6	109	38	9·4	27 22	.....	.....

The Victory variety is ahead both this year and in the five-year average. This oat seems to do very well under this climate. O.A.C. No. 72 and Banner are about equal this year. Alaska is considerably earlier than the others and the grain is of excellent quality. It is a very suitable variety where early maturity is desired. Liberty and Laurel are both hulless varieties.

BARLEY

Seven varieties were under test. The seed was sown on May 20, in quadruplicate one-fortieth-acre plots, at the rate of 2 bushels per acre, except Gold

Swedish, which was seeded in duplicate only, owing to limited seed. The results are as follows:—

VARIETY TEST WITH BARLEY

Variety	Date of ripening	No. of days maturing	Average length of straw including head	Strength of straw on scale of ten points	Actual yield of grain per acre	No. of days maturing 6-year average 1921–26	Yield of grain per acre 6-year average 1921–26
			inch		bush. lb.		bush. lb.
Gold Swedish	Sept. 11	114	36	9·5	54 28	.....	.....
Chinese, Ottawa 60	Aug. 31	103	37	9·5	38 36	.....	.....
Duckbill, Ottawa 57	Sept. 11	114	40	10·0	38 36	118	38 27
Charlottetown 80	Sept. 16	119	33	10·0	35 10	.....	.....
O.A.C. No. 21	Aug. 31	103	39	9·5	34 28	109	39 41
Manchurian, Ottawa 50	Sept. 2	105	36	10·0	32 14	111	39 09
Himalayan, Ottawa 59	Aug. 28	100	28	10·0	27 24	108	31 21

Gold Sweedish has given a very excellent yield this year. The grain is also of very good quality. O.A.C. No. 21 is still ahead in the six-year average, but is followed closely by Manchurian, which is a similar variety. Duckbill is a two-rowed variety which is somewhat later than the others, but it is a very good yielder and quite strong in the straw. Himalayan is a hulless variety.

FIELD PEAS

Five varieties were under test. The seed was sown on May 13, in quadruplicate one-fortieth-acre plots. The average rate of seeding was 3 bushels per acre. The results are as follows:—

VARIETY TEST WITH FIELD PEAS

Variety	Date of ripening	No. of days maturing	Average length of plant	Actual yield of grain per acre	No. of days to mature 6-year average 1921–26	Yield of grain per acre 6-year average 1921–26
			inch	bush. lb.		bush. lb.
Arthur	Sept. 7	117	46	54 50	125	35 20
Golden Vine	Sept. 3	113	43	52 20	123	36 18
MacKay	Sept. 23	133	49	51 10	.....	.....
Chancellor	Aug. 30	109	39	45 10	.....	.....
Early Raymond	Sept. 2	112	45	33 40	.....	.....

The field peas gave a very excellent yield this year, largely due to early seeding and reasonably dry weather in the early autumn, which hastened the maturity. The Chancellor is a small pea, but it ripened up better than any of the other sorts and should prove very valuable where early maturity is desired.

COMMON VETCH

With the object of determining if vetch seed could be matured in this district, one variety, namely Common vetch was sown on May 13, in quadruplicate one-fortieth-acre plots, at the rate of 1½ bushels per acre. An average yield of 36 bushels and 44 pounds was obtained, but the grain was not sufficiently matured to be suitable as seed.

SPRING RYE

One variety of common spring rye was under test. The seed was sown on June 5, in quadruplicate one-fortieth-acre plots at the rate of 1½ bushels per acre. It gave a yield of 13 bushels and 12 pounds per acre. Over a five-year period the yield is 25 bushels and 3 pounds.

FALL WHEAT

Five varieties were under test. The seed was sown on September 2, 1925, in quadruplicate one-fortieth-acre plots at the rate of 2 bushels per acre. The results are as follows:—

VARIETY TEST WITH FALL WHEAT

Variety	Strength of straw on scale of ten points	Average length of plant	Actual yield of grain per acre	
		inch	bush.	lb.
Kharkov 22 M.C.	10·0	40	17	20
Kanred	9·8	34	13	10
Minhardi	10·0	40	13	10
O.A.C. 104	10·0	41	9	40
Dawson's Golden Chaff	10·0	39	9	10

The Kharkov 22 M.C. appeared more winter hardy than any of the other sorts under test. The yield of all varieties was somewhat reduced by rust infection.

FALL RYE

Two varieties were under test. The seed was sown on September 1, 1925 in quadruplicate, one-fortieth-acre plots, at the rate of 1½ bushels per acre. The results are as follows:—

VARIETY TEST WITH FALL RYE

Variety	Strength of straw on scale of ten points	Average length of plant	Actual yield of grain per acre	
		inch	bush.	lb.
Common	10	56	30	40
Dakold	10	50	28	32

FORAGE CROPS

The soil and climate of northern Ontario are particularly well adapted to the growing of many of the most important forage crops, such as clover, alfalfa, sunflowers, annual hays, turnips and grasses. Other crops like corn and mangels are not quite so sure; however, a fair yield of mangels was obtained this year.

ENSILAGE CROPS

VARIETY TEST WITH SUNFLOWERS

Five varieties were under test. The seed was sown on May 28, in quadruplicate one-fortieth-acre plots, on fall-ploughed sod which was manured at the rate of 16 tons to the acre previous to seeding.

The rows were 30 inches apart, and the plants were thinned to from 6 to 12 inches apart in the row. They were harvested on September 17. The results are as follows:—

VARIETY TEST WITH SUNFLOWERS

Variety	Source of seed	Average height 1926	Per cent in bloom when cut 1926	Yield per acre			
				Green weight 1926	Dry weight 1926	Average green weight 1924–26	Average dry weight 1924–26
		inch		tons lb.	tons lb.	tons lb.	tons lb.
Mam. Russ.	McDonald	71	1	14 60	2 82	14 853	1 1,837
Giant Russ.	D.I.S. Co.	63	10	12 210	1 1,569	14 1,630	1 1,978
Early, O. 76	C.E.F.	66	85	11 800	1 1,411	11 801	1 1,275
Manchurian	C.P.R.	65	33	10 620	1 1,361	11 479	1 1,434
Mennonite	Rosthern	44	98	8 100	1 550	.....	.....

Mammoth Russian is ahead this year and second in the three-year average, while Giant Russian stands second this year and first in the three-year average. The Mammoth Russian variety is the one most widely grown in Ontario and seems to be well suited for silage purposes.

VARIETY TEST WITH CORN

Twenty-two varieties were under test. The seed was sown on May 31, in quadruplicate one-eightieth-acre plots on fall-ploughed clay land which was manured at the rate of 16 tons to the acre previous to seeding. The rows were 30 inches apart and the plants were about 6 inches apart in the row. The seed germinated well and a fairly even stand resulted, but the mean temperature seems to be too low to permit of very large yields from corn. It was not damaged to any extent by frost as it was harvested on September 9, which was before the fairly severe frost on September 23. The average yield of green material for the twenty-two varieties is 8 tons 127 pounds and for dry material 1,977 pounds per acre. The ten highest-yielding varieties gave an average yield of 9 tons 736 pounds of green material and 1 ton 383 pounds of dry material. Their names and source of seed in order of yield of dry material are as follows: Northwestern Dent, Dakota Improved Seed Company; Northwestern Dent, McKenzie; Pride Yellow Dent, Ninety Day White Dent, and Longfellow, Dakota Improved Seed Company; Burr Leaming, Carter; Northwestern Dent, Brandon; Hybrid, Wimple; Silo King, Rennie; Northwestern Dent, Nebraska grown, McKenzie.

ANNUAL HAYS

OATS AS AN ANNUAL HAY

The objects of this experiment are (1) to determine the suitability and productiveness of oats when used as hay and (2) to ascertain the most suitable varieties and the best stage of maturity for harvesting.

In 1926 thirteen varieties were under test. The seed was sown on May 21, in quadruplicate one-fortieth-acre plots, on fall-ploughed clay land, at the rate of 2½ bushels per acre. A good germination resulted and fairly good yields were obtained.

One-third of each plot was harvested when in bloom, one-third when turning and one-third when nearly ripe. The results are as follows:—

VARIETY TEST WITH OATS FOR ANNUAL HAY. AVERAGE YIELD FOR THE THREE STAGES OF MATURITY

Variety	Yield per acre							
	Green weight 1926		Dry weight 1926		Average green weight 1924–26		Average dry weight 1924–26	
	tons	lb.	tons	lb.	tons	lb.	tons	lb.
Abundance	8	1,373	3	484	6	1,694	2	912
Victory	8	293	2	1,822	6	1,828	2	624
Ligowa	7	1,813	2	1,669	6	498	2	367
20th Century	7	307	2	1,564	5	1,176	2	83
O.A.C. No. 3	7	1,733	2	1,563	6	564	2	314
Leader	7	1,987	2	1,485	6	526	2	278
Banner	8	80	2	1,481	6	1,300	2	607
O.A.C. No. 72	7	1,920	2	1,410	6	623	2	371
Gold Rain	7	1,053	2	1,223	5	1,908	2	249
Liberty	7	67	2	1,206	6	49	1	1,936
Sensation	7	453	2	915	5	1,801	2	23
Daubeney	6	1,307	2	642	5	1,599	2	95
Alaska	6	480	2	450	5	1,913	2	85

It is worthy of note that fairly good yields of both green and dry material have been obtained from most of the varieties under test. Oats make a very satisfactory annual hay crop and when well cured are relished by nearly all kinds of live stock.

In order to make possible a direct comparison 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 1926		Dry weight 1926		Average green weight 1924–26		Average dry weight 1924–26	
	tons	lb.	tons	lb.	tons	lb.	tons	lb.
When in bloom	9	1,480	2	1,252	7	1,193	2	235
When turning	8	222	2	1,786	6	1,341	2	531
When nearly ripe	4	1,729	2	1,116	4	730	2	221

The most noted thing in this table is the comparatively large amount of dry matter which oats contain, even when in the very green stage. The greatest weight of dry matter has been obtained when the crop is turning and at this time the palatability is also particularly good. This would indicate that when oats are going to be used as a hay crop they should be cut when about 10 to 20 per cent have turned.

PEAS AS ANNUAL HAY

Five varieties were under test. The seed was sown on May 21, in quadruplicate one-fortieth-acre plots on fall-ploughed clay-loam soil. The average rate of seeding was 3 bushels per acre. The results are as follows:—

VARIETY TEST WITH PEAS AS ANNUAL HAY

Variety	Yield per acre							
	Green weight 1926		Dry weight 1926		Average green weight 1924–26		Average dry weight 1924–26	
	tons	lb.	tons	lb.	tons	lb.	tons	lb.
Arthur	8	820	2	782	10	1,837	2	380
MacKay	10	110	2	555	.....	.....	.....	.....
Golden Vine	7	400	2	263	10	243	2	296
Canadian Beauty	8	1,250	2	113	11	490	2	876
Black Eyed Marrowfat	8	590	2	4	10	1,420	2	329

Peas give very good yields of both green and dry material when grown as annual hay, but they seem to lack in palatability when grown and fed alone, consequently they should be used in a mixture with oats or oats and vetch and under this condition will improve both the yield and quality of the crop on account of their rank-growing nature and their high protein content.

VETCH AS ANNUAL HAY

Common vetch was under test as an annual hay. The seed was sown on May 21, in quadruplicate one-fortieth-acre plots, on fall-ploughed clay-loam soil. The results are as follows:—

VETCH AS ANNUAL HAY

Variety	Yield per acre							
	Green weight 1926		Dry weight 1926		Average green weight 1924–26		Average dry weight 1924–26	
	tons	lb.	tons	lb.	tons	lb.	tons	lb.
Common	8	660	2	316	9	1,937	1	1,774

While vetch is tested alone, this is only with the idea of determining the yielding ability, as it is better sown in a mixture with oats or oats and peas either as an annual hay or silage.

SWEET CLOVER AS ANNUAL HAY

Three varieties were under test. In 1926 the seed was sown on June 5, in quadruplacate one-fortieth-acre plots at the rate of 20 pounds to the acre. The crop was harvested on September 25. The results are as follows:—

VARIETY TEST WITH SWEET CLOVER AS ANNUAL HAY

Variety	Yield per acre							
	Green weight 1926		Dry weight 1926		Average green weight 1924–26		Average dry weight 1924–26	
	tons	lb.	tons	lb.	tons	lb.	tons	lb.
White Blossom	3	400	1	1,838	6	1,586	1	1,917
Yellow Blossom	1	40	0	974	4	176	1	142
Hubam	4	360	1	1,783	7	389	1	1,974

The figures in this table indicate that White Blossom sweet clover is practically equal to Hubam as an annual hay; while the Yellow Blossom is finer in nature and gives a lighter yield than either of the other two. The White Blossom also has the advantage over the Hubam, in that is gives a good crop the second year, without further seeding.

BIENNIAL VERSUS ANNUAL SWEET CLOVER

The object of this experiment is to compare the results obtained from biennial sweet clover during the second year with annual sweet clover. The two biennial varieties were sown on June 13, 1925, in quadruplicate one-fortieth-acre plots, on fall-ploughed clay-loam soil which had been planted to mangels the previous year. The rate of seeding was 20 pounds per acre. The Hubam, which is the annual variety, was sown on June 5, 1926 in a similar manner. The biennial varieties were harvested on August 3, and the annual on September 25. The results are as follows:—

BIENNAL VERSUS ANNUAL SWEET CLOVER

Variety	Yield per acre							
	Average height 1926	Green weight 1926		Dry weight 1926		Average green weight 1924–26		Average dry weight 1924–26	
Biennal—	inch	tons	lb.	tons	lb.	tons	lb.	tons	lb.
White Blossom	70	11	940	3	98	10	207	2	933
Yellow Blossom	46	9	1,070	2	1,009	8	1,216	2	344
Annual—									
Hubam	33	2	1,250	1	1,027	6	208	1	1,361

Both the White and Yellow Blossom sweet clover have given larger yields in their second year than has the Hubam during the first year.

FIELD ROOTS

The field roots were all seeded in quadruplicate one-eightieth-acre plots, on fall-ploughed sod which was manured at the rate of 16 tons to the acre previous to ploughing. The soil was a clay-loam and the rows were 30 inches apart. The seed germinated well and a nice even stand developed on practically all plots.

MANGELS

Thirty-two varieties were under test. The seed was sown on May 25, and the plants were thinned to 8 inches apart in the row. The plots were harvested on September 30, and October 1. The results from the twelve highest-yielding varieties are as follows:—

VARIETY TEST WITH MANGELS. RESULTS FROM 12 HIGHEST-YIELDING VARIETIES

Variety	Source of seed	Per cent true to type 1926	Yield per acre							
			Green weight 1926		Dry weight 1926		Average green weight 1925–1926		Average dry weight 1925–1926	
			tons	lb.	tons	lb.	tons	lb.	tons	lb.
Giant Yellow Intermediate	Steele Briggs	90	11	900	1	1,179	9	1,810	1	850
Eluethan Mammoth	Hartmann	85	11	220	1	1,165	9	1,470	1	1,039
Barres Oval	G. Swedish	60	14	520	1	1,157	11	820	1	916
Prize Mammoth Long Red	Steele Briggs	92	11	1,300	1	928	.....		.....	
Yellow Eckendorfer	General Swedish	90	13	1,400	1	771	11	900	1	608
Yellow Leviathan	Steele Briggs	95	9	1,260	1	748	9	390	1	787
Rosted Barres	Hartmann	80	11	1,420	1	715	15	1,550	2	217
Giant White Feeding	Bruce	94	11	1,960	1	713	10	580	1	606
Giant White Feeding Sugar	Steele Briggs	92	12	1,220	1	687	10	1,970	1	740
Stryno Barres	Hartmann	90	11	1,920	1	602	10	200	1	627
White Red Top Half Sugar	Hartmann	92	9	320	1	571	9	280	1	575
Eclipse	McKenzie	90	10	1,560	1	489	.....		.....	

The mangel seed germinated very well this year and a nice even stand developed; but the yield is not large. The results indicated, however, that mangels may become a reasonably sure crop. Early seeding is possibly one of the main factors in getting a good stand.

SWEDE TURNIPS

Twenty-eight varieties were under test. The seed was sown on May 26, and the plants were thinned to 12 inches apart in the row. The roots were harvested on October 2, and the results from the twelve highest-yielding varieties are as follows:—

VARIETY TEST WITH SWEDE TURNIPS. RESULTS FROM 12 HIGHEST-YIELDING VARIETIES

Variety	Source of seed	Yield per acre							
		Green weight 1926		Dry weight 1926		Average green weight 1924–26		Average dry weight 1924–26	
		tons	lb.	tons	lb.	tons	lb.	tons	lb.
Bangholm	Noppan	17	200	1	1,057				
Bangholm	Charlottetown	14	1,060	1	998				
Bangholm Sludsgaard	Trifolium	14	1,500	1	719				
Olsgaard Bangholm	Hartmann	16	380	1	671				
Bangholm	Kentville	13	700	1	471				
Bangholm (Klunk)	Trifolium	14	880	1	453				
White	Bruce	13	80	1	381	9	1,600	1	102
Improved Yellow	Gen. Swedish	12	420	1	138	10	373	1	38
Bangholm	Gen. Swedish	13	1,000	1	112	10	640	0	1,975
Canadian Gem	Bruce	12	260	1	12	9	680	0	1,774
Selected Purple Top	Steele Briggs	11	240	0	1,967	10	1,193	1	136
Hartley's Bronze Top	Bruce	10	580	0	1,963	8	1,320	0	1,711

Swede turnips are a fairly sure crop in this district, owing to their ability to grow during damp weather, when the mean temperature is low.

FALL TURNIPS

Ten varieties were under test. The seed was sown on May 26, and the plants were thinned to 12 inches apart in the row. They were harvested on September 29. The results are as follows:—

VARIETY TEST WITH FALL TURNIPS

Variety	Source of seed	Yield per acre							
		Green weight 1926		Dry weight 1926		Average green weight 1924–26		Average dry weight 1924–26	
		tons	lb.	tons	lb.	tons	lb.	tons	lb.
Devonshire Greystone	Steele Briggs	22	1,240	1	713	15	1,533	1	225
Improved Greystone	Steele Briggs	21	540	1	687	12	173	1	208
Pomeranian White Globe	Steele Briggs	15	1,740	1	411	13	1,762	1	250
Aberdeen Purple Top	Steele Briggs	19	1,380	1	407	14	1,627	1	288
Green Top Yellow Aberdeen	Ewing	14	1,960	1	270	10	1,967	0	1,938
Purple Top Mammoth	Sutton	19	1,720	1	131	14	567	0	1,923
White Globe	Ewing	17	1,240	0	1,880	13	393	0	1,877
Early Six Weeks	Sutton	19	480	0	1,871	13	1,984	0	1,668
Red Paragon	Sutton	15	880	0	1,829	14	1,200	1	84
Hardy Green Round	Sutton	15	880	0	1,657	13	31	0	1,738

Fall turnips are rapid growers and for this reason they may be used to better advantage for late seeding than swedes. They are primarily intended for fall and early winter feeding as they are not as good keepers as the swedes. They have one advantage over the swedes in that they are rarely if ever attacked by cutworms.

DATE OF SEEDING FALL TURNIPS

The object of this experiment is to compare the yields obtained and the keeping quality of fall turnips when seeded at different dates. The variety used was Hardy Green Round. The seed was sown at intervals of seven days, commencing on May 26. The roots were harvested on September 29. The results are as follows:—

DATE OF SEEDING FALL TURNIPS

Date of seeding	Yield per acre							
	Green weight 1926		Dry weight 1926		Average green weight 1924–26		Average dry weight 1924–26	
	tons	lb.	tons	lb.	tons	lb.	tons	lb.
May 26	23	580	1	958	20	1,013	1	853
June 2	18	1,180	1	411	17	307	1	342
June 9	15	1,160	1	177	13	873	1	107
June 16	12	1,780	1	29	9	553	0	1,413
June 23	13	140	0	1,809	8	167	0	1,176
June 30	8	1,200	0	1,268	4	560	0	657

While fall turnips are rapid growers and are better adapted to late seeding than swedes, nevertheless, they will give the best results when seeded reasonably early, as is indicated from the results this year and also by the results over a three-year period. There was little or no difference observed in the keeping quality of the roots grown from the different seedings.

FIELD CARROTS

Fifteen varieties were under test. The seed was sown on May 27. The plants were thinned to about 4 inches apart in the row. They were harvested on October 4, and the results from the ten leading varieties are as follows:—

VARIETY TEST WITH FIELD CARROTS

Variety	Source of seed	Yield per acre							
		Green weight 1926		Dry weight 1926		Average green weight 1924–26		Average dry weight 1924–26	
		tons	lb.	tons	lb.	tons	lb.	tons	lb.
White Belgian	Bruce	6	360		1,272	5	27		1,046
Large White Belgian	Trifolium	5	920		1,121	5	333		1,092
Large White Belgian	Hartmann	5	260		1,121	4	1,780		1,067
Mammoth Intermediate Smooth White	Bruce	5	1,400		1,085	5	480		1,051
Large White Belgian	Steele Briggs	4	1,020		979	4	707		924
Danish Champion	C.E.F	4	1,260		951	4	453		947
James	D.L.F	3	900		910				
Long Red Surrey	Steele Briggs	4	500		879	3	1,720		877
Long Orange Belgian	Bruce	4	920		872	3	1,767		897
Long Orange	Bruce	3	1,880		854	2	1,980		726

Field carrots give very good results in this district and are desirable feed to use for live stock, particularly 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 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.

In 1924 this experiment was seeded in quadruplicate one-fortieth-acre plots using barley as a nurse-crop. In 1925 it was again seeded in a similar manner. The results obtained in 1926 from these two seedings, and also the average results from the 1923-24 seedings are shown in the following table:—

HAY PRODUCTION EXPERIMENT FROM GRASSES ALONE AND IN COMBINATION WITH CLOVERS

Seed sown per acre					Yield per acre					
					Seeded 1924		Seeded 1925		Seeded 1923–24	
Red Clover	Alsike clover	Timothy	Meadow Fescue	Orchard grass	Green weight 1926	Dry weight 1926	Green weight 1926	Dry weight 1926	Average green weight first and second year crop	Average dry weight first and second year crop
lb.	lb.	lb.	lb.	lb.	tons lb.	tons lb.	tons lb.	tons lb.	tons lb.	tons lb.
10	.....	8	.....	.....	3 190	1 292	5 250	2 10	5 1,934	1 1,530
10	.....	.....	15	.....	2 880	0 1,706	4 970	1 1,277	5 1,000	1 1,217
10	.....	.....	.....	15	2 0	0 1,257	4 370	1 685	5 615	1 753
10	.....	6	10	.....	2 200	0 1,568	4 1,160	1 1,641	5 611	1 1,077
10	.....	6	.....	10	1 1,800	0 1,370	4 700	1 1,432	5 190	1 978
10	.....	.....	10	10	1 760	0 951	4 670	1 1,233	4 1,370	1 556
.....	6	8	.....	.....	2 950	0 1,866	5 1,270	2 458	4 1,816	1 1,109
.....	6	.....	15	.....	2 110	0 1,474	4 630	1 891	4 1,278	1 731
.....	6	.....	.....	15	2 440	0 1,375	4 520	1 523	4 1,514	1 477
.....	6	6	10	.....	2 230	0 1,545	5 30	1 1,774	4 1,437	1 862
.....	6	6	.....	10	1 950	0 1,115	5 500	1 1,469	4 899	1 626
.....	6	.....	10	10	1 860	0 1,124	3 1,730	1 475	4 298	1 685
8	2	8	.....	.....	2 370	0 1,839	5 710	1 1,777	4 1,642	1 1,027
8	2	.....	15	.....	1 1,530	0 1,332	5 0	1 1,757	4 1,231	1 888
8	2	.....	.....	15	2 450	0 1,473	4 1,680	1 892	4 1,138	1 587
8	2	6	10	.....	2 1,200	0 1,931	5 1,640	1 1,690	4 1,198	1 1,021
8	2	6	.....	10	2 1,520	0 1,845	5 1,370	1 1,470	5 1,016	1 1,175
8	2	.....	10	10	2 540	0 1,436	4 1,840	1 969	5 1,050	1 1,082
.....	.....	12	.....	.....	2 830	0 1,890	3 1,720	1 1,017	4 544	1 1,135
.....	.....	.....	30	.....	1 1,070	0 1,190	2 1,270	1 25	3 1,156	1 314
.....	.....	.....	.....	30	1 390	0 842	2 860	0 1,783	3 27	0 1,824
.....	.....	8	15	.....	1 1,150	0 1,202	3 660	1 819	3 1,358	1 438
.....	.....	8	.....	15	1 1,930	0 1,495	3 730	1 613	3 1,369	1 452
.....	.....	.....	15	15	1 1,220	0 1,308	3 900	1 509	3 1,576	1 366

In order to make possible a more direct comparison between the different sorts and mixtures under test the following table has been prepared:—

AVERAGE OF THE DIFFERENT MIXTURES

Plots averaged	Yield per acre from plots seeded in 1923-24			
	Average green weight first and second year crop		Average dry weight first and second year crop	
	tons	lb.	tons	lb.
Where Red Clover is the base (6 plots)	5	620	1	1,019
Where Alsike Clover is the base (6 plots)	4	1,207	1	748
Where red and Alsike mixed are the base (6 plots)	4	1,879	1	963
Where no clover is used (6 plots)	3	1,338	1	422
Where Timothy is included (4 plots)	4	1,984	1	1,200
Where Meadow fescue is included (4 plots)	4	1,166	1	788
Where Orchard grass is included (4 plots)	4	824	1	410
Where Timothy and Meadow fescue are included (4 plots)	4	1,151	1	850
Where Timothy and Orchard grass are included (4 plots)	4	1,369	1	808
Where Meadow fescue and Orchard grass are included (4 plots)	4	1,074	1	672

The figures in this table indicate that reasonably good yields of hay may be obtained from all the various mixtures under test. Comparing the three different grasses, however, it is found that the timothy is apparently quite superior to either meadow fescue or orchard grass, particularly the latter, both when grown alone and in the various mixtures.

On the average the mixtures containing red clover alone have given larger yields than those containing alsike alone or a mixture of red and alsike.

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.

In 1924 this experiment was seeded in quadruplicate one-fortieth-acre plots, using barley as a nurse-crop. In 1925 it was repeated in a similar manner. The results obtained in 1926 from these two seedings, and also the average results from the 1923-24 seedings, are shown in the following table:—

TIMOTHY AND CLOVERS FOR HAY PRODUCTION

Seed sown per acre			Yield per acre									
			Seeded 1924				Seeded 1925				Seeded 1923-24			
Timothy	Red Clover	Alsike Clover	Green weight 1926		Dry weight 1926		Green weight 1926		Dry weight 1926		Average green weight first and second year crop		Average dry weight first and second year crop	
lb.	lb.	lb.	tons	lb.	tons	lb.	tons	lb.	tons	lb.	tons	lb.	tons	lb.
8	10	.....	3	1,760	1	1,146	3	1,130	1	614	6	364	1	1,476
8	8	2	3	1,110	1	800	3	1,690	1	723	6	401	1	1,459
8	6	3	3	1,500	1	784	3	1,370	1	699	6	332	1	1,590
8	4	4	3	1,610	1	984	3	1,680	1	541	6	66	1	1,360
8	2	5	3	1,200	1	758	3	870	1	430	5	424	1	1,065
6	10	.....	3	1,540	1	988	3	670	1	273	5	1,100	1	1,288
6	8	2	4	100	1	898	3	1,960	1	651	5	1,702	1	1,475
6	6	3	4	540	1	1,036	3	1,270	1	505	5	1,167	1	1,274
6	4	4	4	80	1	1,050	3	1,020	1	419	5	452	1	1,182
6	2	5	3	1,900	1	843	3	890	1	264	5	1,344	1	1,239

The figures in this table would seem to indicate that timothy, red clover, and alsike clover may be each or all varied considerably in a mixture without materially affecting the yield obtained. The kind of soil, the purpose of the crop, and the quality of the hay desired must, however, always receive due consideration in the formulating of a suitable hay mixture.

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.

This experiment was seeded in 1924 in quadruplicate one-fortieth-acre plots, using barley as a nurse-crop. In 1925 it was repeated in a similar manner. The results obtained to date are as follows:—

LATE AND EARLY CLOVER WITH LATE AND EARLY GRASS

Seed sown per acre				Yield per acre					
				Seeded 1924		Seeded 1925		Seeded 1923-24	
Timothy	Meadow fescue	Early Red Clover	Late Red Clover	Green weight 1926	Dry weight 1926	Green weight 1926	Dry weight 1926	Average green weight first and 2nd year crop	Average dry weight first and 2nd year crop
lb.		lb.		tons lb.	tons lb.	tons lb.	tons lb.	tons lb.	tons lb.
8	.....	10	.....	5 1,380	1 1,973	4 390	1 1,160	6 1,389	1 1,561
.....	15	10	.....	5 50	1 1,552	4 840	1 1,144	6 1,030	1 1,535
8	.....	.....	10	5 1,120	1 1,742	5 220	1 1,636	6 1,157	1 1,595
.....	15	.....	10	4 1,590	1 890	4 450	1 1,146	5 1,775	1 1,238

There seems to be a tendency for the timothy to give better results than the meadow fescue. There does not appear to be much difference between the two clovers, however.

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 and late red clover in the standard hay mixture.

In 1924 this experiment was seeded in quadruplicate one-fortieth-acre plots, using barley as a nurse-crop. In 1925 it was repeated in a similar manner. The results to date are as follows:—

LATE VERSUS EARLY CLOVER IN STANDARD HAY MIXTURE

Seed sown per acre				Yield per acre					
				Seeded 1924		Seeded 1925		Seeded 1923-24	
Timothy	Alsike Clover	Common Red Clover	Late Red Clover	Green weight 1926	Dry weight 1926	Green weight 1926	Dry weight 1926	Average green weight first and second year crop	Average dry weight first and second year crop
lb.	lb.	lb.	lb.	tons lb.	tons lb.	tons lb.	tons lb.	tons lb.	tons lb.
8	2	8	.....	2 1,760	1 284	5 1,440	2 28	4 1,252	1 998
8	2	.....	8	2 1,970	1 262	6 810	2 212	4 1,225	1 906

These figures would seem to indicate that there is practically no difference in the yielding ability of these two clovers, when used in the standard hay mixture.

VARIETY TEST WITH RED CLOVER

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

In 1924 thirteen varieties were sown in quadruplicate one-fortieth-acre plots, using barley as a nurse-crop. In 1925 the experiment was repeated in a similar manner.

In 1926 the plots seeded in 1924 were unsuitable to use for experimental purposes, owing to the fact that the hard winter had killed out practically all varieties. The results obtained in 1926, together with the three-year average for first-year meadow, are as follows:—

VARIETY TEST WITH RED CLOVER

Variety	Yield per acre							
	Seeded 1925				Seeded 1923-25			
	Green weight 1926		Dry weight 1926		Average green weight first year crop		Average dry weight first year crop	
	tons	lb.	tons	lb.	tons	lb.	tons	lb.
Early Swedish	8	1,640	2	719	7	524	1	1,357
St. Clet	8	840	2	538	7	653	1	1,442
C.E.F.	6	40	1	1,865	7	284	1	1,401
Kenora	5	1,280	1	1,701	.....		.....	
Umbria	5	1,840	1	1,538	.....		.....	
Late Swedish	6	840	1	1,360	6	1,813	1	1,182
Alta Swede	5	1,240	1	1,227	7	592	1	1,533
Chateauguay	5	1,480	1	1,116	6	671	1	865
Marche	5	160	1	926	.....		.....	
Alfred Station	4	1,040	1	577	.....		.....	
Kapuskasing	5	840	1	551	6	1,471	1	974
Vankleek Hill	4	480	1	368	.....		.....	
Emelia	3	1,760	1	258	.....		.....	

It is very difficult to get absolutely accurate figures in a test of this nature, for the reason that where the red clover of one or more varieties partly kill out, there is a marked tendency for alsike clover and even timothy to replace it in the plot, so that the yields as presented are not entirely representative of the crop produced by the red clover alone. For instance, the Italian sorts, which are southern-grown, killed out rather badly; but the yields compare reasonably well with the other sorts on account of alsike, etc., replacing that which killed out.

VARIETY TEST WITH TIMOTHY

The object of this experiment is to compare the results obtained in yield and quality of hay produced from different varieties and strains of timothy.

In 1924 five varieties were sown in quadruplicate one-fortieth-acre plots, using barley as a nurse-crop. In 1925 the experiment was repeated in a similar manner with three varieties. The results are as follows:—

VARIETY TEST WITH TIMOTHY

Variety	Yield per acre									
	Seeded 1924				Seeded 1925				Seeded 1924			
	Green weight 1926		Dry weight 1926		Green weight 1926		Dry weight 1926		Green weight 1925–26		Dry weight 1925–26	
	tons	lb.	tons	lb.	tons	lb.	tons	lb.	tons	lb.	tons	lb.
Ohio, Commercial	2	840		1,976	4	1,620	1	1,535	2	660	1	128
Grade No. 1	2	270		1,758	4	1,300	1	1,701	2	250	0	1,903
Ohio No. 9349	1	1,900		1,644	4	1,490	1	1,598	1	1,655	0	1,655
Boon O	1	1,500		1,510	.....		.....		1	1,725	0	1,781
Ohio No. 6779	1	1,510		1,493	.....		.....		1	1,450	0	1,626

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 20 pounds per acre, versus when seeded in rows 12 inches apart; and also to compare the results from plots seeded with and without a nurse-crop.

In 1924 this experiment was seeded in quadruplicate one-fortieth-acre plots, using barley as a nurse-crop. In 1925 it was repeated in a similar manner. The results are as follows:—

METHODS OF SEEDING ALFALFA FOR HAY PRODUCTION

Method	Yield per acre											
	Seeded 1924				Seeded 1925				Seeded 1923-24			
	Green weight 1926		Dry weight 1926		Green weight 1926		Dry weight 1926		Average green weight first and 2nd year crop		Average dry weight first and 2nd year crop	
	tons	lb.	tons	lb.	tons	lb.	tons	lb.	tons	lb.	tons	lb.
With a nurse-crop—												
In drills 12 inches apart	6	800	1	1,399	4	550	1	230	7	1,559	2	278
Broadcast 20 lb. per acre	6	400	1	1,318	4	620	1	266	7	1,432	2	276
Without a nurse-crop—												
In drills 12 inches apart	6	100	1	1,166	6	1,210	1	1,688	8	89	2	621
Broadcast 20 lb. per acre	7	100	1	1,634	7	450	1	1,982	8	1,309	2	887

The figures in this table would seem to indicate that there is no significant difference in the yields obtained from alfalfa when sown broadcast at the rate of 20 pounds per acre and in rows 12 inches apart. In actual practice, it is possible that the broadcast method is the better of the two, because there seems to be greater tendency for weeds to become established when the seeding is done in rows.

There is quite a marked difference this year between the plots seeded with and without a nurse-crop, in favour of the latter method. This is something which is apparently materially affected by the season and other local conditions.

It is always most marked during the first year meadow and the first cut. Considering the average results, however, it is doubtful if the increase in yield is sufficiently large to justify recommending the adoption of this practice on a large scale, because it means the loss of one season's crop and there is also greater danger of weeds becoming established.

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 1924 this experiment was seeded in quadruplicate one-fortieth-acre plots at the rate of 20 pounds per acre, without a nurse-crop. In 1925 it was repeated in a similar manner. The results are as follows:—

NITRO-CULTURE ON ALFALFA

Treatment	Yield per acre									
	Seed 1924				Seeded 1925				Seeded 1923-24			
	Green weight 1926		Dry weight 1926		Green weight 1926		Dry weight 1926		Average green weight first and second year crop		Average dry weight first and second year crop	
	tons	lb.	tons	lb.	tons	lb.	tons	lb.	tons	lb.	tons	lb.
Treated	4	230	1	323	6	1,125	1	1,567	6	1,588	1	1,675
Untreated	4	1,500	1	573	6	675	1	1,503	6	1,252	1	1,616

The figures in this table fail to show any advantage from nitro-culture treatment. This may be explained by the fact that the various farm implements cultivating the experimental grounds have distributed the bacteria from other alfalfa areas over the entire field so that artificial inoculation has ceased to be necessary or effective. During the first years of the test, however, a marked advantage was obtained from treating the seed with nitro-culture, and farmers would be well advised not to neglect this feature, when seeding out with alfalfa, more particularly where none has been previously grown.

NITRO-CULTURE ON RED CLOVER

The object of this experiment is to compare the results obtained from red clover when seeded with and without nitro-culture treatment. In 1925 this experiment was seeded in quadruplicate one-fortieth-acre plots using barley as a nurse-crop. The results are as follows:—

NITRO-CULTURE ON RED CLOVER

Treatment	Yield per acre							
	Seeded 1925				Seeded 1923-25			
	Green weight 1926		Dry weight 1926		Average green weight first year crop		Average dry weigh weight first year crop	
	tons	liv	tons	lb.	tons	lb.	tons	lb.
Treated	5	240	1	493	6	396	1	1,075
Untreated	5	130	1	409	5	1,919	1	1,025

The figures in this fail to show any significant difference in yields between treated and untreated red clover. As red clover grows so readily in this district it would seem safe to assume that the soil is already sufficiently well inoculated with the proper bacteria for this plant.

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 12 inches apart, and in rows 24 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 series which was harvested in 1926 was seeded on June 19, 1925 in quadruplicate one-fortieth-acre plots, using barley as a nurse-crop. The results are as follows:—

RED CLOVER SEED PRODUCTION

Method of seeding and purpose of crop	Yield per acre				
	Of seed 1926		Of hay and clover straw 1926		Value of crop 1926
	bush	lb.	tons	lb.	$ cts.
Broadcast, two cuttings for hay	..	..	1	335	17 51
Broadcast, first cutting for hay second for seed	..	..	1	340	17 55
Broadcast, first cutting for seed	2	30	1	650	47 30
Rows 12 inches apart, first cutting for seed	2	20	1	310	43 82
Rows 24 inches apart, first cutting for seed	2	30	1	550	47 10

It was found that no second crop developed which would be worth harvesting either for hay or seed.

The yields of seed are practically the same from the three different methods of seeding. In view of this fact the broadcast method would appear to be the best method to employ as it has a tendency to control weeds better than where the seed is sown in rows.

With hay valued at $15 per ton, clover straw at $4 per ton and clover seed at 28 cents per pound, the seed crop has given the best returns.

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 12 inches apart and in rows 24 inches apart.

The results in 1926, are from a series which was seeded on June 19, 1925, in quadruplicate one-fortieth-acre plots, using barley as a nurse-crop. The results obtained to date are as follows:—

ALSIKE SEED PRODUCTION

Method of seeding	Yield of seed per acre			
	1926		Average 1922-26	
	bush.	lb.	bush.	lb.
Broadcast	3	45	4	7
Rows twelve inches apart	3	20	4	1
Rows twenty-four inches apart	3	5	3	38

The figures in this table indicate that there is very little difference in the yields of seed obtained from seeding broadcast, and in rows 12 or 24 inches apart.

It may be noted, however, that the broadcast seeding has given slightly the better results, both this year and in the five-year average. This together with the fact that it tends to give a more even stand with fewer weeds, would seem to recommend this system.

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 12 inches apart, and in rows 24 inches apart.

The plot seeded with a mixture of timothy and red clover is cut for hay the first year and saved for seed the second; the idea being that the red clover will have largely died out and consequently the stand would be mostly timothy.

In 1924 this experiment was seeded in quadruplicate one-fortieth-acre plots, using barley as a nurse-crop. In 1925 it was seeded in a similar manner; but the stand from the latter seeding was too uneven to use for experimental purposes, so that the yields in 1926 are from the 1924 seeding. The results obtained to date are are as follows:—

TIMOTHY SEED PRODUCTION

Method of seeding	Seed sown per acre	Yield per acre							
		Seeded 1924 yield 1926		Seeded 1921, 23, 24					
				Average yield first year crop		Average yield second year crop		Average yield first and second year crop	
	lb.	bush.	lb.	bush.	lb.	bush.	lb.	bush.	lb.
Broadcast { timothy	10	..	..	..	..	..	..	..	..
Broadcast { red clover	8	3	41	..	..	3	34	..	..
Broadcast, timothy	10	5	10	4	23	5	8	4	40
Rows 12 inches apart	..	5	0	3	43	4	45	4	20
Rows 24 inches apart	..	6	27	3	25	5	36	4	31

The plots seeded in rows 24 inches apart have given the largest yield of seed this year. This method is also ahead in the average results from second-year meadow over a four-year period; but in the four-year average, from both first and second year meadow, it is slightly surpassed by the broadcast method. Considering the fact that fields sown in rows are quite apt to become weedy unless cultivated, which takes extra time and naturally adds to the cost of production, it is possible that the broadcast method is to be preferred.

If pure timothy seed is desired it is not advisable to sow a mixture of red clover and timothy, because the crop remains more or less of a mixture, even during the second year and makes it impossible to obtain pure seed.

FERTILIZER EXPERIMENTS

The object of this experiment is to determine to what extent commercial fertilizers may be economically employed for the growing of grain and hay crops on clay areas in Northern Ontario. The various fertilizer materials used, were applied to the first crop of the following rotation: First year, O.P.V.; second year, grain; third year, clover hay; and fourth year, mixed hay.

For this test an area of clay-loam soil which appeared fairly uniform was selected in the autumn of 1925 and fall-ploughed. The O.P.V. was seeded on June 9, in duplicate one-fortieth-acre plots, at the rate of two bushels of oats, one bushel of peas and one-half bushel of vetch per acre.

Good germination resulted but the oats in the mixture were badly damaged by green aphides, so that the results this year may not be representative of what would have been obtained had the crop not been interfered with.

The total quantities of fertilizer were applied the same date as the seed was sown with the exception of the nitrate of soda which was divided into two applications.

The following table shows the fertilizer applied and the yields obtained in 1926:—

FERTILIZER EXPERIMENT 1926

Plot No.	Amount of fertilizer applied per acre						Yield per acre			
	Manure	Nitrate of soda	Super-phos-phate	Muriate of potash	Cal-careous subsoil	Basic slag	Green weight 1926		Dry weight 1926	
	tons	lb.	lb.	lb.	tons	lb.	tons	lb.	tons	lb.
1	8						5	240	1	358
2							3	1,700	0	1,873
3		100	250	50			4	1,400	0	1,861
4		100	250				4	1,860	1	374
5			250	50			4	880	1	80
6							3	1,580	0	1,718
7		100		50			4	1,040	1	2
8		100					3	1,880	0	1,707
9			250				2	1,580	0	1,195
10							2	140	0	943
11					4		1	1,680	0	817
12						500	4	800	0	1,820

Plots 2, 6, and 10 are check plots and therefore did not receive any fertilizer this year.

This experiment will be repeated for a number of years and no conclusions will be drawn until further data are available.

POULTRY

Excellent progress may be reported in connection with the poultry activities during the year 1926. The general health of the flock has been good and a marked increase in production over former years has been obtained.

During the year, 4,948 eggs were set, of which 4,609 or 93.1 per cent were fertile. In all 2,562 chicks were hatched of which 2,330 or 90.9 per cent were alive at three weeks of age. It required 1.9 eggs for each chick hatched and 2.1 eggs for each chick alive at three weeks of age.

The present flock is made up of three hundred laying pullets which are kept on experiments each winter, and one hundred and twenty pedigreed hens which are used for breeding purposes.

In addition to these there are also two pens of twelve birds each entered in the Canadian Egg-Laying Contest at Ottawa.

The Barred Plymouth Rock is the only breed which has been kept, and seems to meet the requirements of a general purpose breed very well, as the birds are a fair size and good layers.

The prices charged per hundred pounds for the various feeds used during the year are based on the average market prices for the year which are as follows: —

Wheat, $2.95; oats, $1.90; barley, $2.25; corn, $2.80; bran, $1.45; middlings, $2; shorts, $1.60; low-grade flour, $2.50; meat meal, $5.45; tankage, $4.15; beef scrap, $5.45; skim-milk, $0.50; oyster-shell, $2.40; charcoal, $2.80; grit, $1.85; chick starter mash, $5.20; chick growing mash, $4.54; clover leaves, $1; and mangels, $0.25.

The eggs are valued at sixty cents per dozen for the six months from November 1, to April 30, and forty-five cents from May 1 to October 31.

SKIM-MILK VERSUS BEEF SCRAP

The object of this experiment is to compare the results obtained from the use of skim-milk and beef scrap as a source of animal protein for winter egg production. In 1925-26 this test was commenced on November 1, and continued until April 30, covering a period of six months. One hundred pullets were used. They were divided equally as to size and general development into two pens of 50 birds each. The ration given to each pen was the same with the exception of the skim-milk and beef scrap. The scratch grain 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, middlings, corn meal, ground oats and barley. The beef scrap was fed from a hopper and the skim-milk from a drinking vessel. A supply of each was available to the respective pens at all times. Mineral matter and green feed were also supplied to each lot. The results are as follows:—

SKIM-MILK VERSUS BEEF SCRAP

Items	Skim-milk, 1926	Beef scrap, 1926	Skim-milk two-year average	Beef scrap two-year average
Number of birds.....No.	50	50	50	50
Pounds of animal feed.....lb.	1,602·0	119·0	1,538·0	111·5
Cost of animal feed.....$	8·01	6·49	7·69	5·51
Pounds of scratch feed.....lb.	1,548·0	1,601·0	1,588·5	1,624·5
Pounds of mash.....lb.	587·0	672·0	522·5	553·0
Total cost of feed.....$	70·73	72·51	76·35	75·38
Number of eggs laid.....No.	4,927·0	5,039·0	3,914·50	3,874·0
Value of eggs laid.....$	246·35	251·95	195·73	193·70
Cost per doz.....$	0·17	0·17	0·23	0·23
Profit over cost.....$	175·62	179·44	119·38	118·32

The birds getting beef scrap ate a little more scratch grain and mash than those getting skim-milk, both this year and in the two-year average.

Higher production was obtained from beef scrap this year; but in the average over a two-year period those getting skim-milk have given the largest number of eggs.

The cost per dozen is the same for each feed and the profit is also about equal.

These figures would seem to indicate that farmers who have a supply of skim-milk would not benefit by purchasing other animal feed for their poultry, while other poultry keepers who may not have a supply of skim-milk may use beef scrap to good advantage.

SPROUTED OATS VERSUS CLOVER

The object of this experiment is to compare the relative value of sprouted oats versus clover leaves when used as a green feed. This test has been conducted for four years, using 100 pullets each year. In 1925-26 it was commenced on November 1, and continued until April 30, covering a period of six months. The ration fed to each lot was the same with the exception of the green feed. The one lot got all the sprouted oats they could handle from a trough while the other lot was fed clover in the litter.

Both lots received a scratch ration 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, middlings, corn meal, ground oats and barley plus ten per cent meat meal. In addition, mineral matter and beef scrap were kept before the birds in hoppers, continuously.

The results are as follows:—

SPROUTED OATS VERSUS CLOVER

Items		Sprouted oats, 1926	Clover, 1926	Sprouted oats four-year average	Clover four-year average
Number of birds	No.	50	50	50	50
Pounds of green feed	lb.	403·0	490·0	292·5	287·8
Cost of green feed	$	7·66	4·90	5·81	2·88
Pounds of scratch	lb.	1,612·0	1,813·0	1,600·0	1,642·8
Pounds of mash	lb.	663·0	666·0	574·8	606·8
Total cost of feed	$	75·31	78·49	70·57	69·38
Number of eggs laid	No.	5,083·0	5,116·0	3,113·0	3,106·5
Value of eggs laid	$	254·15	255·80	155·65	155·33
Cost per doz	$	0·18	0·18	0·27	0·27
Profit over cost	$	178·84	177·31	85·08	85·95

The figures in this table would seem to indicate that there is no significant difference in the results obtained from the use of sprouted oats and clover leaves as a green feed for laying pullets.

It is worthy of note, however, that no charge has been included for labour. The sprouting of the oats means quite a lot more labour than preparing the clover and on this account the clover leaves would seem to be the better of the two.

LIGHTS VERSUS NO LIGHTS

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

This test has been conducted for three years, using one hundred pullets in each case. The first two years it covered a period of six months only, from November 1 to April 30, but in 1926 it was decided to keep the two pens separated for another six months in order to determine what effect the lights used during the first six months would have on the total yearly production. The birds are equally divided as to weight, general development and breeding, into two pens of fifty each. All conditions were similar except that the one pen had these extra hours of light to work during the six months from November 1 to April 30, while the other had not.

The results are as follows:—

LIGHTS VERSUS NO LIGHTS

Items		Results Nov 1 to April 30		Results April 1 to Oct. 31		Results Nov. 1 to April 30	
		Lights 1926	No lights 1926	Lights 1926	No lights 1926	Lights three-year average	No lights three-year average
Number of birds	No.	50	50	50	50	50	50
Weight at beginning	lb.	207·0	203·0	278·0	280·0	220·67	221·67
Weight at finish	"	278·0	280·0	.....	.....	262·33	260·33
Pounds of scratch	"	1,581·0	1,562·0	1,772·0	1,705·0	1,565·33	1,560·67
Pounds of mash	"	560·0	456·0	440·0	494·0	501·67	442·0
Total cost of feed	$	70·20	66·37	67·53	66·54	66·98	65·51
Number of eggs laid	No.	4,651·0	4,442·0	4,002·0	4,780·0	3,421·0	2,944·7
Value of eggs laid	$	232·55	222·10	150·08	179·25	171·05	147·23
Cost per doz	.....	0·18	0·18	0·20	0·17	0·23	0·27
Profit over cost	"	162·35	155·73	82·55	112·71	104·07	81·72

The figures in this table would seem to indicate that:—

1. Lights have very little effect on the body-weight of laying pullets during the winter months.

2. Lights also have little effect on the amount of feed eaten, and therefore on the cost of feed.

3. Lights have an effect, however, on the number of eggs laid during the winter months, as the three-year average shows an advantage of nearly 500 eggs for the pen on lights, and also an advantage of 4 cents per dozen in cost.

4. Over the whole year the pen with lights laid fewer eggs than the pen without lights.

5. The biggest advantage in the use of lights would appear to be the fact that more eggs are obtained during the winter months when the price is high.

HATCHING-EGGS VERSUS DAY-OLD CHICKS

The object of this experiment is to determine the relative advantage to the farmer from purchasing hatching eggs or day-old chicks. Arrangements were made with the Experimental Station at La Ferme to furnish this Station with sixty eggs for hatching and three weeks later with sixty hatched chicks. In this way a comparison could be made between the cost of obtaining chicks by purchasing the eggs and hatching them and purchasing day-old chicks direct. This experiment has been conducted for two years. The results are as fallows:—

HATCHING EGGS VERSUS DAY-OLD CHICKS

Items		Hatching eggs, 1926	Day-old chicks, 1926	Hatching eggs two-year average	Day-old chicks two-year average
Date received	Date	April 26	May 20	.....	.....
Number received	No.	60	60	60	60
Price	$	6·00	15·00	6·00	15·00
Express	"	0·75	0·55	0·75	0·99
Cost of hatching	"	1·00	.....	1·00	.....
Total cost	"	7·75	15·55	7·75	15·99
Number of chicks alive	No.	35·0	58·0	30·0	59·0
Cost per chick	$	0·22	0·27	0·26	0·27
Total cost including labour	"	9·00	15·55	9·00	15·99
Cost per chick including labour	"	0·26	0·27	0·30	0·27

These figures would seem to indicate that a farmer can get started in poultry fairly successfully either by purchasing hatching eggs at 10 cents each and incubating them at home, or day-old chicks at 25 cents each. There does not appear to be a very marked difference in the cost per chick between the two methods and the system adopted should probably depend more on the farmers accommodation for, and knowledge of, incubators.

This experiment will be continued for a number of years.

EFFECT OF SUPPLEMENTARY FEEDS ON FERTILITY, HATCHABILITY AND VIABILITY

The object of this experiment is to determine the effect upon fertility, hatchability and viability when supplementary feeds such as cod-liver oil, raw liver, bone meal and a mixture of the former two are added to the regular ration given to the breeding stock.

For this test eighty pedigreed hens were divided into ten pens of eight birds each, making duplicate pens for each feed under test as well as for the check pen which received the ordinary ration.

The cod-liver oil was fed at the rate of ¼ teaspoonful per bird per day; the raw liver ½ ounce per bird per day and the bone meal was mixed in the dry mash at the rate of 5 per cent by weight. When the cod-liver oil and raw liver were both used the quantity of each was reduced one-half.

In order to eliminate any effect caused by the different males used, the experiment was divided into two periods with one week between them. The first period covered the regular pedigree mating season when the male birds were kept in their respective pens, while the second period the male birds were alternated daily. The first period covered 53 days and the second period 41 days. Separate records were kept for each of the two periods. The results are as follows:—

EFFECT OF SUPPLEMENTARY FEEDS ON FERTILITY HATCHABILITY AND VIABILITY

Experimental Ration	No. of eggs set	Per cent fertile	Per cent blood rings	Per cent dead germs	Per cent dead in shell	Per cent fertile hatched	Per cent mortality in first three weeks	No. of eggs required per chick at three weeks
	No.	%	%	%	%	%	%	No.
Cod-liver oil—								
Regular mating	415	93·3	6·3	7·7	30·6	52·2	13·4	2·4
Males alternated	204	97·1	22·1	11·3	25·0	39·9	20·3	3·2
Total	619	94·5	11·5	8·9	28·8	48·0	15·3	2·6
Raw Liver—								
Regular mating	423	98·3	4·0	7·8	26·2	61·3	3·9	1·7
Males alternated	341	99·1	12·0	5·9	16·1	65·7	4·1	1·6
Total	764	98·7	7·6	6·9	21·7	63·3	4·0	1·7
Bone meal—								
Regular mating	412	97·3	7·0	12·4	20·6	58·9	2·1	1·8
Males alternated	289	97·9	18·0	13·5	22·5	44·9	15·0	2·7
Total	701	97·6	11·6	12·8	21·4	53·1	6·6	2·1
Cold-liver oil and liver—								
Regular mating	437	87·6	4·1	5·5	24·7	60·8	11·2	
Males alternated	312	96·8	15·1	4·8	17·6	61·3	17·8	2·1
Total	749	91·5	8·7	5·2	21·8	61·0	14·1	2·1
								2·1
Ordinary ration (check)—								
Regular mating	446	98·2	8·5	9·2	29·8	53·9	4·2	2·0
Males alternated	291	95·9	19·6	7·2	22·3	48·7	11·8	2·4
Total	737	97·3	12·9	8·4	26·9	51·9	7·0	2·1

The greatest difference between the regular mating period and the period when the males were alternated is in the percentage of blood rings, which for some reason showed a marked increase during the latter, in every pen. There is also some increase in the percentage of fertility in all pens except one. This, however, may be partly due to the difference in the time of year.

The raw liver seems to have given the best results of any of the feeds under test in fertility, hatchability and viability.

The bone meal comes second for fertility and viability, while the pen getting raw liver and cod-liver oil is second in hatchability.

There are, however, so many conditions that might affect the results in an experiment of this kind that few, if any, conclusions should be drawn from one year's figures.

This experiment is being repeated another year.

HATCHING RESULTS FROM DIFFERENT DATES OF SETTING

During the incubation season, a total of 4,948 eggs were set. Of this number 1,030 were set in March; 2,205 in April; 1,156 in May and 557 in June.

The results obtained from those set during the different months are shown in the following table:—

HATCHING—RESULTS FROM DIFFERENT DATES OF SETTING

Month set	Number of eggs set	Per cent fertile	Per cent total eggs hatched	Per cent fertile eggs hatched	Per cent chicks hatched alive when wing banded	Total eggs required for one chick hatched	Total eggs required for one chick at three weeks
	No.	%	%	%	%	No.	No.
March	1,030	88·1	59·0	67·0	94·1	1·7	1·8
April	2,205	95·0	51·2	54·0	92·3	2·0	2·1
May	1,156	92·4	44·7	48·4	83·0	2·2	2·7
June	557	96·9	55·1	56·9	93·2	1·8	1·9

These figures show that the fertility was lowest for the eggs set in March, but the hatchability of the eggs and the viability of chicks were higher for this month than for any of the other three, which resulted in fewer eggs being required per chick at three weeks of age.

COST OF ARTIFICIAL INCUBATION

The object of this experiment is to determine the amount of coal-oil used and consequently the cost of hatching in various sized machines.

Three different sized machines were used and the following table gives the details of the test:—

COST OF ARTIFICIAL INCUBATION

Incubator	Capacity of incubator	Number of settings	Total eggs set	Oil used	Cost of oil	Cost per 100 eggs
	No.	No.	No.	Gals.	$	$
Buckeye No. 5	600	5	2,835	30·8	10·78	0·38
Buckeye No. 4	350	4	1,440	15·3	5·36	0·37
Canadian Queen	120	3	421	7·3	2·56	0·61

The low cost of hatching in the No. 4 machine is largely due to the fact that this machine was set at ten eggs per setting overs its capacity, while the No. 5 machine was set at 33 eggs below the rating on account of the automatic egg-turning trays which would not permit of a larger number being included.

COAL REQUIRED TO OPERATE BROODER STOVE

The object of this experiment is to determine the quantity and cost of coal required to operate the ordinary No. 18 Buckeye brooder stove. This brooder, in a house 10 by 12 feet in size, will furnish sufficient heat for 500 chicks until they are about three to four weeks of age, at which time they would require more space for best results. In actual practice, however, it is not always possible to have 500 chicks hatched at one time, as this would require quite a large flock of breeding hens or else the eggs would have to be kept for a longer period than would be desirable. In fact, better results are generally obtained where the number of chicks is kept below the rating of the brooder, particularly if the operator has had no previous experience in the brooding and rearing of chicks.

The following table gives the details of the test: —

COAL REQUIRED TO OPERATE BROODER STOVE

Month	Coal used per month	Coal used per day	Value of coal used	Capacity of brooder	Cost per 100 chicks per month
	lb.	lb.	$	No.	cts.
April	441·2	14·7	4·41	500	88
May	310·7	10·0	3·11	500	62
June	304·0	10·1	3·04	500	61

It may be noted that this stove will brood chicks at a cost for coal of 88 cents per 100 chicks during the month of April, and 62 cents during the month of May, when operated at the normal capacity of 500. If, however, as is quite often the case only one-half this number of chicks were brooded the cost would automatically be doubled.

It is also of interest to note that the consumption of coal was just as high during the month of June as it was during the month of May, although less heat would be required, indicating that this is about the minimum amount of coal on which this stove can be operated.

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 feed rather than all or part home-grown; and (5) if tankage and water could take the place of skim-milk in a fattening ration.

This experiment has been conducted for five years and two of those years with duplicate lots, making in all 504 birds, which have been used in the test. In 1926 it was repeated in a similar manner to the other years. Seventy-two well-developed cockerels were selected and divided equally as to weight and general development, and placed in six crates, each of which had three compartments holding four birds. The pens 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, but these were included in the charges against the respective pens.

The experiment was commenced on October 15, and continued until November 5, covering a period of twenty-one days or forty-two feedings. Every year the birds have stayed in excellent health throughout the test as only one bird has died during the five years which the experiment has been conducted.

The results are as follows:—

CRATE-FATTENING EXPERIMENT

Pen	Weight at beginning		Weight at end		Value at beginning		Value at at end		Increase in value		Total value of feed		Net profit per pen	
	lb.	oz.	lb.	oz.	$	cts.	$	cts.	$	cts.	$	cts.	$	cts.
1. 1926	54	4	71	8	18	99	25	03	6	04	2	50	3	54
Five-year average	52	15	71	15	17	55	23	78	6	23	2	69	3	54
2. 1926	54	8	69	4	19	08	24	24	5	16	1	98	3	18
Five-year average	52	6	67	11	17	43	22	44	5	01	2	05	2	96
3. 1926	54	0	73	4	18	90	25	64	6	74	2	75	3	99
Five-year average	53	0	73	14	17	62	24	43	6	81	2	80	4	01
4. 1926	54	0	66	4	18	90	23	19	4	29	2	00	2	29
Five-year average	52	2	67	3	17	33	22	25	4	92	2	08	2	84
5. 1926	54	4	71	12	18	99	25	11	6	12	2	44	3	68
Five-year average	52	6	72	3	17	43	23	89	6	46	2	55	3	91
6. 1926	55	0	65	0	19	25	22	75	3	50	1	76	1	74
Five-year average	52	4	66	10	17	39	21	98	4	59	1	83	2	76

The figures in this table indicate that:

1. Crate-fattening cockerels is profitable.
2. Home-grown feeds are quite suitable for crate-fattening.
3. Corn does improve the home-grown ration if skim-milk is used.
4. It is unnecessary to obtain other commercial feeds than corn in order to obtain excellent results, if home-grown feeds are available.
5. In every case skim-milk has proven superior to tankage and water in the fattening ration, both from the standpoint of gains made and profits obtained.
6. If no milk is available reasonably good success may be obtained from the use of tankage and water.

RATIONS

The home-grown grains, such as wheat, oats and barley make up as large a proportion of the poultry feed as would be consistent in a good ration. The standard scratch ration in use at the present time is made of two parts each of whole wheat and cracked corn, 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. Oyster-shell, grit, charcoal and in some cases beef scrap are available in hoppers at all times.

During the winter months the birds are given a warm wet mash at noon, in troughs, as much as they will clean up readily.

The green feed may be mangels, sprouted oats, clover or alfalfa leaves. The leaves make the most convenient form of green feed and give very satisfactory results.

PEDIGREE WORK

The trap-nest is used as a means of determining the exact egg production of each individual hen. This together with the individuality and general type of the birds are used as the basis for utility selection. In this way only those birds are used for breeding purposes which are of desirable type and have pedigrees showing high production. Particular attention is given to the selection of the males used and those whose sisters and daughters prove to be high producers are retained and used for several years.

The selection of the breeding stock on the basis of production is probably the greatest single factor in increasing the production of the individual birds and consequently the average of the flock, as may be noted from the following table which gives the total number of birds on hand on December 31, for the last four years with production records of 150 eggs or over.

TABLE SHOWING THE NUMBER OF HENS ON HAND WITH RECORDS OF 150 EGGS OR OVER FOR THE LAST FOUR YEARS

Date Dec. 31	150 eggs or over	175 eggs or over	200 eggs or over	225 eggs or over	250 eggs or over	275 eggs or over	300 eggs or over	Total
1923	19	11	7	.....	.....	.....	.....	37
1924	44	24	10	.....	.....	.....	.....	78
1925	44	32	24	13	2	.....	1	116
1926	00	40	40	23	14	5	0	122

Another very vivid way of bringing out the effect of pedigree breeding and selection in increasing the production records is shown in the following table which indicates the monthly production of the flock of pullets during the winter months for the last three years:—

NUMBER OF EGGS PER BIRD PER MONTH FOR THREE YEARS, 1924, '25, '26

Year	Nov.	Dec.	January	February	March	April	Total
1924	1·7	2·9	5·4	7·6	7·4	7·3	32·3
1925	5·3	12·1	13·6	9·9	12·5	15·0	68·4
1926	9·0	17·4	17·2	16·7	20·0	18·2	98·5

This table shows that from November 1, 1923, to April 30, 1924, each pullet laid on the average 32.3 eggs, while the two following years the average production per pullet was 68.4 and 99.2 eggs respectively for the same period.

This increase in production of over 300 per cent in three years could not have been accomplished in any other way than by rigid selection.

BEES

The season of 1926, from the standpoint of honey production, has been very good indeed. The winter was mild and quite uniform, and the bees came through in excellent condition, with a loss of only one colony out of thirty. The yields of honey obtained have surpassed all other years since the apiary was started in 1920 except the years 1921 and 1924, the latter year surpassing 1926 by only 1 pound per colony. The spring was rather late, as both May and June had a mean temperature below the average, which retarded nectar secretion. July and August, however, which months generally give the best flow in this section were both quite favourable, each with a mean temperature somewhat above the average. The precipitation was also favourable during these two months, being below normal, but occurring in the form of many showers.

Each year that the apiary work is being carried on it is showing more conclusively that northern Ontario is reasonably well adapted to bee-keeping.

RETURNS FROM APIARY

During the season of 1926, sixteen colonies were used for the production of extracted honey. The other colonies were used to supply brood and bees for the making of nuclei for the queen-mating yard. Two increases were made from these sixteen colonies. The results obtained are as follows:

FINANCIAL STATEMENT OF APIARY IN 1926

Total weight of honey extracted from sixteen colonies.....pounds	1,683
Average weight produced per colony.....pounds	105
Selling price of honey per pound.....	$ 0 18
Total value of honey produced.....	302 94
Average value of honey produced per colony.....	18 93

COMB VERSUS EXTRACTED HONEY

One hive was used for comb-honey production. It gave a yield of 52 sections which sold for 30 cents each, making a total revenue of $15.60, which when compared with the average of $18.93, made by each of the sixteen colonies producing extracted honey, indicates that the production of extracted honey pays the better of the two. However, these figures are from only one hive and one year's work and should not be taken as conclusive. Comb honey is a particularly good seller and might sometimes be used in creating a demand for honey and thereby increasing the quantity used.

A STUDY OF HONEY FLOW

In order to gather data relative to the effect of weather conditions on honey-flow, a colony of average strength was placed on scales. Unfortunately, however, this colony had to be requeened which materially lowered the honey production. The results obtained are as follows:—

RECORD OF HIVE ON SCALES IN 1926

—	May	June	July	Aug.	Sept.	Total
	lb.	lb.	lb.	lb.	lb.	lb.
Gain	.....	.....	37·5	71	.....	92·5
Loss	6	.....	.....	.....	10	.....

August gave the largest gain this year; July is usually the month giving the heaviest flow.

White Dutch and alsike clover commenced to bloom on June 15. The first gain made by this hive occurred on June 7, which is about the average date. The heaviest gain made in one day was 7 pounds and occurred on two different occasions, viz. July 14, and August 11. This is a very light maximum flow. The latest gain recorded was on August 27.

OUTDOOR VERSUS CELLAR WINTERING

The object of this experiment is to compare the results obtained from bees wintered outdoors with those wintered in a cellar.

In the autumn of 1925 thirty colonies of bees were placed in winter quarters. Sixteen of these were packed in quadruple wintering-cases, and four in two-colony cases in the bee-yard. The packing consisted of 6 inches of well-

dried planer shavings on the sides and underneath, and 12 inches on top. Of the twenty colonies wintered outside, nineteen came through alive, and had on the average 5.5 frames of bees each. One was queenless, however, but was requeened from one of the colonies having two queens. The colonies wintered outside built up quite rapidly in the spring and indicate that outdoor wintering is a good method under this climate, providing the bees are given ample stores and properly protected with a sufficient quantity of well-dried packing material. Each colony wintered outside was brought to a weight of 70 pounds or over with a sugar-syrup made of 2 pounds sugar to 1 of water.

Ten colonies were placed in the office cellar on November 7. These were fed to 60 pounds weight or better early in the autumn. The ten colonies came through alive, but two were queenless. They had on the average 4.6 frames of bees each, which was 0.9 less than those wintered outside.

The bees were removed from the cellar on May 14, and the brood-chamber of each colony was packed with three inches of planer shavings, but they did not seem to build up as rapidly as those wintered outdoors.

The results obtained to date from this experiment would indicate that bees may be successfully wintered in northern Ontario, either properly packed outdoors or in a cellar; but on account of those wintered outdoors coming through a little stronger and also building up more rapidly in the spring, it would appear as though the outdoor method is to be preferred. When wintering outside, however, it is necessary to provide a good wind-break.

FOUR-COLONY VERSUS TWO-COLONY WINTERING CASES

The object of this experiment is to compare the results obtained from wintering bees in four-colony versus two-colony wintering-cases.

Sixteen of the colonies wintered outdoors were packed in quadruple wintering-cases and four in double wintering-cases. The amount of packing in each case was the same. Of the sixteen in quadruple cases, fifteen came through alive and had on the average 5.8 frames each of bees. The four colonies wintered in double cases were all alive, with an average of 5 frames each of bees, indicating that bees may be successfully wintered in either type of case. The double case is intended to meet the need of a settler who might not have any more than two colonies during the first winter. It could not be recommended, however, over the quadruple method where there were a number of colonies to winter, because it is more expensive, as it costs nearly as much to construct a double case as a quadruple.

WINTERING TWO QUEENS IN ONE HIVE

The object of this experiment is to ascertain the possibility of wintering-over a number of surplus queens to be used the next spring for introduction to colonies that may have lost their queens during the winter or to replace weak and failing queens in the spring. In the autumn of 1925 four hives were equipped with tight-fitting division boards, and the entrances were closed in the centre to provide a double entrance to each hive. Both sides of each hive were made quite strong with a plentiful supply of bees and each half given a queen. Two of the twin colonies were placed in the usual manner in the bee-yard and the other two placed in the cellar. The four queens packed outside all came through alive and three of the four placed in the cellar came through alive. This made available three extra queens in the spring, which were used to good advantage. The results obtained indicate that it is quite possible to winter-over some extra queens.

COMPARING DIFFERENT SIZES OF HIVES

In this experiment the only hives compared are the Langstroth and Jumbo. Of the sixteen colonies wintered in quadruple cases eleven were Langstroth and five were Jumbo. Of the eleven Langstroth ten came through alive and had on the average 6.3 frames of bees. The five Jumbo hives all came through alive and on the average 5 frames of bees. During the season the eight Langstroth hives which were used for honey production gave an average yield of 101 pounds each, while the five Jumbo hives gave an average yield of 99 pounds each.

Assuming that the type of hive was not responsible for the death of the one colony, it may be noted from the results that there was practically no difference in the yield obtained. From observation it might be added that the Langstroth hive appears to be the more convenient of the two to handle.

PREVENTION OF SWARMING

DEQUEENING AND REQUEENING.—This method is the one most generally used at this Station for swarm control, and consists of removing the queen and one or two frames of emerging brood and adhering bees as soon as the colony shows signs of swarming, by having larvae in queen-cells, and placing them in a new hive on a new stand; at the same time destroying all queen-cells present. Nine or ten days later the queen-cells are again destroyed and a young laying queen is introduced. Two colonies were treated in this manner in 1926 and the results were very satisfactory. The new hive started with the old queen generally develops into a good strong colony for winter and the hive treated is not materially affected from the standpoint of honey production.

SEPARATION OF BROOD AND QUEEN.—One hive was treated by this method which is as follows: At first appearance of larvae in queen-cells all brood from brood-chamber was removed to upper super, leaving the queen below on a full set of empty combs, with a few young bees. The brood was left to emerge over the old hive. The results obtained were fairly satisfactory, but it was observed that the queen was somewhat discouraged for a few days.

QUEEN-REARING

At this Station it is possible to carry on controlled mating of queens for the reason that there are no other bees within flying distance of the apiary. No drones are allowed to develop in any colonies other than those selected as drone breeders and in this way the purity of the strain is maintained.

Queen-rearing was again carried on in 1926. Queenless and broodless colonies were used in which to start the queen-cells, and the first grafting was done on July 3.

The virgin queens were introduced to the mating-boxes as mature cells, or as young queens from nursing-cages. When mated and laying they were sent to the other Experimental Farms and Stations or used in the Station apiary.

The young queens were carefully selected, so that only the most promising were retained.

Owing to unfavourable weather conditions during the early part of queen-breeding, it was found difficult to get the bees to accept and finish queen-cells in large numbers. Hence the number reared was much lower than that of previous years. In addition, there was considerable delay from the time the young queens were introduced to mating-boxes to the time they became mated. This was due to the same cause. In all, 42 queens were successfully mated.

After the queen-rearing season was over the bees from the mating-boxes were united into strong colonies for wintering.

Twenty-six colonies were packed in the bee-yard for winter on September 20, in the following manner: 20 in quadruple cases, 4 in double cases and two in single cases. Two of those packed in double cases have two queens each. Eight colonies were placed in the office cellar on November 9. All those placed in the cellar are single colonies.

FIBRE CROPS

VARIETY TEST OF FLAX.—Three varieties were under test. The seed was sown on May 18, in triplicate one-fortieth-acre plots, at the rate of 1½ bushels per acre. The crop was pulled during the period from August 25 to 31. The results are as follows:—

Variety	Average height	Yield per acre	
		Green weight 1926	Dry weight 1926
	inches	tons lb.	tons lb.
Pure Line No. 6	44	5 540	2 1,068
J. W. S.	47	6 533	2 860
Riga blue	37	5 100	2 548

DATE OF SEEDING FLAX.—The object of this experiment is to determine the date or dates of seeding which will give the best results. The first seeding was done on May 18, and was repeated at intervals of seven days until four different dates were under test. Riga Blue was the variety used. The results are as follows:—

Date of Seeding	Average height 1926	Yield per acre	
		Green weight 1926	Dry weight 1926
	inches	tons lb.	tons lb.
May 18	37	5 100	2 548
May 25	35	4 973	1 135
June 1	36	5 280	2 007
June 8	35	4 800	1 111

VARIETY TEST OF HEMP.—Two varieties were under test. The seed was sown on May 15, in triplicate one-fortieth-acre plots at the rate of 1½ bushels per acre. The seed germinated fairly well, but for some reason the crop did not develop as it should. The Russian variety was a complete failure and the Kentucky variety gave a yield of 2 tons 880 pounds per acre of green material and 1 ton 476 pounds per acre of dry material.

DATE OF SEEDING HEMP.—The object of this experiment is to compare the results obtained from different dates of seeding. The first sowing occurred on May 15, and was repeated at intervals of seven days until four different dates were under test. Kentucky was the variety used. The results are as follows:—

Date Sown	Average height 1926	Yield per acre	
		Green weight 1926	Dry weight 1926
	inches	tons lb.	tons lb.
May 15	29	2 880	1 476
May 22	29	2 1,813	1 510
May 29	28	3 160	1 669
June 5	28	2 680	0 1,903

OTTAWA: Printed by F. A. ACLAND, Printer to the King's Most Excellent Majesty, 1927.