DOMINION OF CANADA
DEPARTMENT OF AGRICULTURE
DOMINION EXPERIMENTAL FARMS

EXPERIMENTAL STATION

KAPUSKASING, ONT.

REPORT OF THE SUPERINTENDENT

SMITH BALLANTYNE

FOR THE YEAR 1927

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DOMINION EXPERIMENTAL STATION, KAPUSKASING ONTARIO

REPORT OF THE SUPERINTENDENT, SMITH BALLANTYNE

THE SEASON

January, February, March and April were all much milder than usual, as they were 3·6, 5·2, 10, and 2·4 degrees respectively above the average for a ten-year period. May and June, however, were cooler than normal, the former being 1·7 and the latter 0·8 degrees below the ten-year average. July, September and October were all above the average, while August, November and December were below the average.

The total precipitation for the year was 29·38 inches, which is 5·33 inches above the ten-year average of 24·05. This was the second heaviest precipitation during the last ten years, being surpassed only by 1921 when 37·68 inches were received.

The precipitation during the five growing months, May 1 to September 30, was 15·87 inches or 54 per cent of the total received during the year, while the average amount received during the same months over a ten-year period was 12·92 inches or 53·7 per cent.

The ground dried up quite early in the spring and several acres of wheat and oats were seeded on May 7, but a rainfall of 1·11 inches on May 9 prevented much further seeding for nearly a week. However, the rains during the remainder of the month were in the form of light showers, so that the seeding was not seriously interfered with again. Germination was good but owing to somewhat cool weather growth was slow until well on in June.

June received 1·79 inches of precipitation, and July 3·05, but there was a fairly dry period of 17 days between June 25 and July 12, when no rain occurred. During the latter part of this period, hay, particularly the new meadows, seemed to get a check in growth from which it did not entirely recover, even after sufficient rain did come. The other crops, however, did not appear to be so much affected and grew remarkably well. In fact, the fields produced one of the finest grain crops ever seen in this section of the province, and had there been suitable weather for curing, it would have been one of the most valuable.

During August and September, rain occurred on 23 different days and totalled 8·42 inches which made it almost impossible to cut and cure the hay and grain. Owing to long hours of sunshine and fairly high temperature most of the grain matured very well, but great difficulty was experienced in getting it sufficiently dry either to thresh or store in the barn.

During the year, 1788·1 hours of sunshine were recorded, which is 27·7 hours more than the average for a nine-year period.

Some damage was suffered from summer frost. On the morning of August 25, the thermometer dropped to 30°, which caused considerable damage to the later-sown grains. Corn, potatoes, and even sunflowers were affected on the lower-lying areas.

Fall ploughing was stopped by frost on November 8, which is about a week earlier than normal.

Month	Temperature, Degrees Fah.						Precipitation (inches)				Sunshine (hours)	
	Mean		Maximum		Minimum				Total precipitation			
	1927	Average 10 years	Highest	Mean maximum	Lowest	Mean minimum	Rain	Snow	1927	Average 10 years	1927	Average 9 years
January	1·4	−2·2	40	13·6	−42	−10·8	.....	23·0	2·30	1·20	60·3	82·2
February	7·4	2·2	43	21·0	−36	− 6·2	.....	2·5	0·25	0·81	108·4	104·1
March	23·5	13·5	54	36·6	−20	10·5	0·55	5·5	1·10	1·25	153·7	141·2
April	33·8	31·4	70	47·2	− 4	20·3	0·48	4·5	0·93	1·88	227·1	174·5
May	43·5	45·2	72	55·6	23	31·3	2·61	.....	2·61	1·61	211·8	228·3
June	56·1	56·9	95	68·9	22	43·4	1·79	.....	1·79	2·03	231·3	246·8
July	62·6	61·3	96	75·6	36	49·6	3·05	.....	3·05	3·17	242·8	237·7
August	56·4	58·7	79	68·5	30	44·2	3·50	.....	3·50	2·71	213·4	202·4
September	53·3	50·9	85	63·5	23	43·1	4·92	.....	4·92	3·40	151·8	151·3
October	40·9	38·9	64	48·7	24	33·1	2·77	.....	2·77	1·92	78·1	91·8
November	20·9	22·4	57	27·6	−10	14·1	0·91	10·5	1·96	2·16	47·3	47·5
December	3·7	5·8	35	13·9	−31	− 6·5	.....	42·0	4·20	1·91	62·1	52·6
Year	33·6	32·1	96	45·1	−42	22·2	20·58	88·0	29·38	24·05	1788·1	1760·4

ANIMAL HUSBANDRY

The season of 1927 was favourable for live stock in northern Ontario. The winter months were milder than normal and fairly uniform, so that the cattle came through the winter in excellent condition. May and June, however, were cooler than normal and on this account pasture was not plentiful until about June 10, but owing to an abundance of rainfall during most of the season, pasture was particularly good.

DAIRY CATTLE

The dairy herd totals forty-eight head, consisting of twenty-six pure-bred Ayrshires and twenty-two grades.

During the year three have qualified in the Canadian Record of Performance for pure-bred dairy cattle.

The herd is headed by Ottawa Supreme —88031—, a three-year-old bull which is giving considerable promise as a sire. A fuller description of this bull may be found in the report of this Station for 1926.

SUMMER FEEDING

Good clover pasture has been found to be the cheapest and 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 produced by each animal.

As soon as the pastures begin to dry up in the late summer and lose a part of their milk-producing quality, it is usually advisable to feed a certain amount of soiling crops such as oats, peas and vetch. Small areas of this crop sown at intervals of about one week on good rich soil will be found to be an inexpensive way of keeping up the milk flow. The dairy herd is always stable fed until June 1, or later, as this gives the pasture a chance to get started before grazing commences. As cold rains and cool nights have a great tendency to reduce milk production, it has been found a good practice fairly early in the fall to stable the milking cows during the night.

WINTER FEEDING

A plentiful supply of good-quality roughage is very essential in carrying the live stock economically through the long winter period in this part of the province.

Sunflower or O.P.V. silage forms the greater portion of the ration during the winter months. This is supplemented by a liberal feeding of good-quality clover hay and a grain allowance as required.

MILK RECORDS

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

The accompanying table shows the amount of milk produced by each cow that completed a lactation period during the calendar year of 1927, the cost of feed and the value of the milk produced. The profit column is a comparison between the cost of the feed consumed and the value of the milk produced, as the labour and the value of the calf are in all cases not included.

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

Ensilage, sunflowers, per ton	$ 4 00
Ensilage, O.P.V. per ton	6 00
Roots, per ton	1 75
Hay, per ton	15 00
Meal, per 100 pounds	2 15
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. On account of the O.P.V. silage containing a higher percentage of dry matter than the sunflower silage, it 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 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.

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 45 cents per pound	Value of skim-milk at 50 cents per 100 pounds	Total value of product	Total cost of feed	Feed cost to produce 100 pounds milk	Feed cost to produce 1 pound butter, skim-milk neglected	Profit on cow, labour and calf neglected
	Years			lb.	lb.	%	lb.	$	$	$	$	$	$	$
Pure-bred Ayrshires—														
Kapuskasing Blossom	3	Aug. 23, 1926	324·0	7,726·1	23·85	3·78	347·85	156·53	37·17	193·70	136·91	1·77	0·394	56·79
Kapuskasing Landlady	3	Oct. 6, 1926	318·5	6,337·4	19·90	4·20	317·19	142·74	30·36	173·10	129·21	2·04	0·407	43·89
Ravensdale Isabel	6	April 10, 1926	279·0	8,062·9	28·90	4·15	398·68	179·41	38·64	218·05	121·56	1·51	0·305	96·49
*Ravensdale Isabel	6	Jan. 13, 1927	297·0	5,066·4	17·06	4·06	244·85	110·18	24·30	134·48	84·35	1·67	0·344	50·13
Lady Alice	7	April 3, 1926	297·0	8,636·3	29·08	4·34	446·60	200·97	41·31	242·28	160·36	1·86	0·359	81·92
*Lady Alice	7	Jan. 28, 1927	237·5	4,335·0	18·25	3·87	199·76	89·89	20·84	110·73	67·59	1·56	0·338	43·14
Ena of Glenborough	11	Oct. 8, 1926	309·0	6,656·0	21·54	3·95	312·80	140·76	31·97	172·73	133·04	2·00	0·425	39·69
Duchess of Geneva	10	Nov. 2, 1926	258·5	6,487·4	25·10	4·04	312·07	140·43	31·13	171·56	122·60	1·89	0·393	48·96
Blossom of Glenborough	10	Oct. 13, 1926	307·5	8,451·4	27·48	3·66	368·68	165·91	40·71	206·62	134·06	1·59	0·364	72·56
Bessie 3rd	9	May 21, 1926	351·0	8,565·2	24·40	3·84	391·27	176·07	41·18	217·25	147·32	1·72	0·377	69·93
Grade Ayrshires—														
Bloomer, A. I.	4	June 23, 1926	347·0	6,783·7	19·55	3·95	318·82	143·47	32·58	176·05	126·85	1·87	0·398	49·20
Dewdrop B	4	Jan. 1, 1927	350·5	13,099·9	37·37	4·40	685·58	308·51	62·62	371·13	179·70	1·37	0·262	191·43
Phoebe A. I. B	4	Nov. 13, 1926	298·0	7,769·0	26·07	4·40	406·79	183·06	37·14	220·20	111·63	1·44	0·274	108·57
Dewdrop C	3	Nov. 17, 1926	325·5	9,560·9	29·37	3·92	445·77	200·60	45·93	246·53	128·03	1·34	0·287	118·50
Pure-bred Shorthorns—														
Prairie Red Rose 22nd	4	Sept. 5, 1926	301·5	3,216·7	10·67	3·94	150·73	67·83	15·45	83·28	81·18	2·52	0·539	2·10
Grade Shorthorns—														
No. 53	4	Dec. 16, 1926	350·0	4,726·8	13·51	3·56	200·08	90·04	22·79	112·83	99·71	2·11	0·498	13·12
No. 54	4	Dec. 12, 1926	353·5	6,425·4	18·18	3·89	297·36	133·81	30·88	164·69	116·54	1·81	0·392	48·15
No. 60	4	Nov. 17, 1926	277·0	4,223·6	15·24	3·97	199·83	89·92	20·28	110·20	94·92	2·25	0·475	15·28
No. 67	3	June 14, 1926	306·5	2,859·6	9·33	3·91	133·01	59·85	13·74	73·59	79·68	2·79	0·599	−6·09
Averages—														
Pure-bred Ayrshires	.....	.....	297·9	7,032·4	23·61	3·99	333·98	150·29	33·76	184·05	123·70	1·76	0·370	60·35
Grade Ayrshires	.....	.....	330·3	9,303·4	28·17	4·19	464·24	208·91	44·57	253·48	136·55	1·47	0·294	116·93
Pure-bred shorthorns	.....	.....	301·5	3,216·7	10·67	3·94	150·73	67·83	15·45	83·28	81·81	2·52	0·539	2·10
Grade shorthorns	.....	.....	321·8	4,458·9	14·17	3·82	207·57	93·41	21·92	115·33	97·71	2·14	0·47	17·62

FEED COST OF REARING AYRSHIRE AND SHORTHORN CATTLE

A record is kept of the feed consumed by all of the young stock from date of birth until the males are sold for breeders and the females have freshened. From these data it is possible to calculate the feed requirements to different ages and the feed cost of same. The average age at time of freshening is 2 years 7·6 months. In the calculation of these costs, the skim-milk was charged at 50 cents per 100 pounds, the whole milk at $2 per 100 pounds and the other feeds used at average farm market values.

The results in detail are presented in the following table:—

FEED COST OF REARING AYRSHIRE AND SHORTHORN CATTLE

Period	Number of animals	Whole milk	Skim-milk	Meal	Hay	Straw	Silage	Roots	Pasture	Cost
		lb.	lb.	lb.	lb.	lb.	lb.	lb.	days	$ cts.
Ayrshire Females—										
To 1 year	29	693	2,378	701	1,120	3	2,108	.....	69	56 24
To 2 years	14	651	2,595	1,302	2,934	326	7,071	40	187	99 02
To freshening	14	651	2,595	1,654	4,196	579	9,867	299	286	126 92
Ayrshire Males—										
To 6 months	10	1,029	1,695	301	395	.....	464	.....	.....	38 79
To 1 year	3	867	2,446	1,209	1,713	.....	2,454	.....	.....	71 48
Shorthorn Females—										
To 1 year	13	714	2,042	649	1,070	19	1,792	.....	78	52 97
To 2 years	7	804	2,089	1,333	3,087	229	5,821	.....	209	98 67
To freshening	4	895	1,739	1,501	3,826	401	8,213	.....	276	117 47
Shorthorn Male—										
To 18 months	1	800	1,850	1,662	3,193	.....	3,450	.....	103	92 28

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

Sunflowers and a mixture of oats, peas and vetch are the two crops most commonly grown in northern Ontario at the present time for silage purposes. 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 has been conducted for five years. In 1927, the ten cows used consisted of six pure-bred Ayrshires, one grade Ayrshire and three grade Shorthorns. The experiment commenced on November 1, 1926, and each animal received a uniform ration during the whole period, differing only in the variety of silage fed as follows:—

Period 1.—November 1 to December 1: sunflowers, 40 pounds per day.
Period 2.—December 1 to December 31: O.P.V. 40 pounds per day.
Period 3.—December 31 to January 30: sunflowers, 40 pounds per day.
Period 4.—January 30 to March 1: O.P.V. 40 pounds per day.

The first three years which this experiment was conducted, the sunflower silage was fed at the rate of 5 pounds per day more to each animal than the O.P.V. This was on account of the O.P.V. containing a higher percentage of dry matter than the sunflowers. During the last two years, however, the quantity of sunflower silage given was reduced, so that the cattle were able to consume equal quantities of each silage.

Seven days are taken to transfer from one silage to the other at the beginning of each period. The milk records are calculated on the latter twenty-one days in each thirty-day period, so that the cattle are really two full days on the unmixed silage before the milk yields are considered. Besides the silage ration, each cow got 12 pounds of hay per day, and six received 20 pounds

of roots each per day. The grain mixture consisted of bran four parts; ground oats; two parts; ground barley, two parts; and oilcake, two parts. This was fed in accordance with the individual requirements of the cows, three receiving 18 pounds; two, 16 pounds; three, 12 pounds; and two, 10 pounds each per day.

In order to take care of the natural decline in milk flow from one period to the next, the results during periods one and three are averaged and compared with the results in period two. In like manner, periods two and four are averaged and compared with period three. The average of these two is taken as the final basis of comparison. The results to date are given in the following table:—

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

Items		Average results 1927	Average results 1927	Five-year average 1923–27	Five-year average 1923–27
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.	5,797·23	5,851·95	5,214·36	5,149·76
Average milk per cow per day	"	27·61	27·87	24·83	24·52
Average per cent fat	%	3·72	3·92	3·79	3·89
Fat produced by 10 cows in 21 days	lb.	215·75	229·25	197·40	200·10
Average fat per cow per day	"	1·03	1·09	0·94	0·95
Meal consumed in 21 days	"	2,982·0	2,982·0	2,587·20	2,587·20
Hay consumed in 21 days	"	2,520·0	2,520·0	2,356·20	2,356·20
Roots (mangels) consumed in 21 days	"	2,520·0	2,520·0	504·0	504·0
Silage consumed in 21 days	"	8,400·0	8,400·0	9,030·0	8,400·0
Meal consumed per 100 pounds milk produced	"	51·44	50·96	49·62	50·24
Hay consumed per 100 pounds milk produced	"	43·47	43·06	45·19	45·75
Roots consumed per 100 pounds milk produced	"	43·47	43·06	9·67	9·79
Silage consumed per 100 pounds milk produced	"	144·90	143·54	173·18	163·11
Meal consumed per 100 pounds fat produced	"	1,382·16	1,300·76	1,310·64	1,292·95
Hay consumed per 100 pounds fat produced	"	1,168·02	1,099·24	1,193·62	1,177·51
Roots consumed per 100 pounds fat produced	"	1,168·02	1,099·24	255·32	251·87
Silage consumed per 100 pounds fat produced	"	3,893·40	3,664·12	4,574·47	4·197·90
Findings from experiment—					
Cost of meal mixture	$	64 11	64 11	50 20	50 20
Value of hay fed	$	18 90	18 90	16 73	16 73
Value of roots fed	$	2 21	2 21	0 44	0 44
Value of silage fed	$	16 80	25 20	17 39	24 19
Total cost of feed	$	102 02	110 42	84 76	91 56
Feed cost to produce 100 pounds milk	$	1 76	1 89	1 63	1 78
Feed cost to produce 100 pounds fat	$	47 29	48 17	42 94	45 76

DEDUCTIONS.—The data in these tables would seem to indicate that either sunflower or O.P.V. silage may be successfully used as a winter feed for dairy cows.

In 1927 the O.P.V. has given a little the better results in milk-production, while over a five-year period the sunflower silage is ahead in this regard.

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

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

In 1927, the calves on this test consisted of two pure-bred Shorthorns, four grade Shorthorns and four grade Ayrshires. 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.

As the calves varied some in age and size, it was found necessary to vary the amount of feed given to each to some extent, with the exception of the grain which was fed at the rate of 4 pounds each per day. The silage given ranged from 12 to 20 pounds and the hay from 5 to 8 pounds per head per day depending upon the individual requirements of the animals in the test.

The grain mixture consisted of equal parts of bran, whole oats and oilcake.

The results to date are given in the accompanying table:—

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

Items		Average results 1927	Average results 1927	Five-year average 1923-27	Five-year average 1923-27
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.	442·50	391·0	385·30	340·40
Average daily gain per calf	"	1·48	1·30	1·28	1·13
Meal consumed in 30 days	"	1,200·0	1·200·0	1,140·0	1,140·0
Hay consumed in 30 days	"	2,040·0	2,040·0	2,268 0	2,268·0
Silage consumed in 30 days	"	5,160·0	5,160·0	6,372·0	5,832·0
Meal consumed per 100 pounds gain	"	271·19	306·91	295·87	334·90
Hay consumed per 100 pounds gain	"	461·02	521·74	588·63	666·27
Silage consumed per 100 pounds gain	"	1,166·10	1,319·69	1,653·78	1,713·28
Findings from experiment—					
Cost of meal mixture	$	24 96	24 96	23 85	23 85
Value of hay	$	15 30	15 30	15 90	15 90
Value of silage	$	10 32	15 48	12 14	16 60
Total cost of feed	$	50 58	55 74	51 89	56 35
Feed cost to produce 100 pounds gain	$	11 43	14 26	13 47	16 55

DEDUCTIONS.—These results show larger gains and at a lower cost per pound for the sunflower silage.

The experiment will be repeated another year.

BEEF CATTLE

On December 31, the herd of beef cattle totalled twenty-seven head. Of this number, sixteen are pure-bred Shorthorns, and include seven cows, four heifers, two heifer calves, two bull calves and one bull. The grade Shorthorns include seven cows and four heifers.

The herd sire Comet—176360—was bred by Mr. Harry Hughes of Balderson, Ontario. He is sired by Roan Comet—156602—a bull of good type and with excellent breeding from the standpoint of production. His dam is Lady Belle—107521—with a five-year-old record of 14,754 pounds of milk in 365 days. This cow is sired by Fred which is a qualified R.O.P. bull with 5 daughters, which have production records of from 10,000 to 16,000 pounds.

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 a major portion of the winter ration for dry cattle. This test has been conducted for five years and has covered the same four periods each year as those with milking cows and growing calves.

In 1927, ten head of dry cattle were selected and weighed on November 1. 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 O.P.V. was given. Nine of the cattle got 30 pounds per day of silage and one got 20 pounds per day,

while the hay was fed at the rate of 10 pounds each per day. In addition one of the animals got 4 pounds of grain per day. The results are shown in the following table:—

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

Items		Average results 1927	Average results 1927	Five-year average 1923–27	Five-year average 1923–27
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.	288·0	412·50	282·70	248·30
Average daily gain per cow	"	0·96	1·38	0·94	0·83
Meal consumed by 10 cows in 30 days	"	120·00	120·00	252·00	252·00
Hay consumed by 10 cows in 30 days	"	3,000·0	3,000·0	3,120·0	3,120·0
Silage consumed by 10 cows in 30 days	"	8,700·0	8,700·0	9,870·0	8,970·0
Meal consumed per 100 pounds gain	"	41·67	29·09	89·14	101·49
Hay consumed per 100 pounds gain	"	1,041·67	727·27	1,103·64	1,256·54
Silage consumed per 100 pounds gain	"	3,020·83	2,109·09	3,491·33	3,612·57
Findings from experiment—					
Cost of meal mixture	$	2 58	2 58	4 74	4 74
Value of hay	$	22 50	22 50	20 32	20 32
Value of silage	$	17 40	26 10	19 07	25 92
Total cost of feed	$	42 48	51 18	44 13	50 98
Feed cost to produce 100 pounds gain	$	14 75	12 41	15 61	20 53

DEDUCTIONS.—The results for 1927 show greater gains and at a lower cost per pound for the O.P.V., while the average results over a five-year period are in favour of the sunflowers.

The experiment will be repeated another year.

SHEEP

Pure-bred Shropshire is the breed of sheep kept at this Station. At the present time the breeding flock consists of thirty-seven ewes, seventeen ewe lambs and two rams.

During the year, fifty-seven lambs were born. Thirty-eight of these were spring lambs and nineteen were fall lambs. Of the fifty-seven lambs born, forty-seven were strong and healthy.

Over a nine-year period the average number of lambs born per ewe is 1·56 and the average number raised 1·18 or 75·7 per cent.

Sheep do very well in this part of the province, the greatest difficulty being to protect them from dogs.

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 five years. In 1927, ten lambs were used and the test was commenced on December 1. The ration was exactly the same for the four thirty-day periods that the experiment covered with the exception of the kind of silage given. O.P.V. silage was fed during periods one and three, and sunflower during periods two and four.

The ration given to each lamb consisted of silage 1 pound, clover hay 2 pounds, and grain ½ pound per day. The grain mixture was 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 1927	Average results 1927	Five-year average 1923-27	Five-year average 1923-27
Experimental ration		Sunflowers	O.P.V.	Sunflowers	O.P.V.
Number of lambs in test	No.	10	10	10	10
Total gain of 10 lambs in 30 days	lb.	50·50	127·50	67·96	65·42
Average daily gain per lamb	"	0·17	0·43	0·23	0·22
Meal consumed in 30 days	"	150·0	150·0	150·0	150·0
Hay consumed in 30 days	"	600·00	600·00	600·00	600·0
Silage consumed in 30 days	"	300·0	300·0	300·0	300·0
Meal consumed per 100 pounds gain	"	297·03	117·65	220·72	229·29
Hay consumed per 100 pounds gain	"	1,188 12	470·59	882·87	917·15
Silage consumed per 100 pounds gain	"	594·06	235·29	441·44	458·58
Findings from experiment—					
Cost of meal mixture	$	2 91	2 91	2 68	2 68
Value of hay	$	4 50	4 50	4 32	4 32
Value of silage	$	0 60	0 90	0 58	0 86
Total cost of feed	$	8 01	8 31	7 58	7 86
Feed cost to produce 100 pounds gain	$	15 86	6 52	11 15	12 01

DEDUCTIONS.—The results in 1927 show greater gains and at a lower cost per pound for the O.P.V., while the average figures over a five-year period are in favour of sunflowers.

SWINE

Pure-bred Yorkshire is the breed of hogs kept at this Station. The herd of breeding stock on December 31, consisted of twenty-three sows and one boar. The boar is Ottawa Wonder 50—124276—, a really good type of bacon hog. He is sired by Pine Grove Glory 9,—107847—which was bred by J. K. Featherstone. His dam is Dalmeny Maple Leaf 5,—88841—an imported sow from the herd of Geo. Sinclair, Edinburgh, Scotland.

During the year, twenty litters were farrowed which gave 227 pigs. Of this number, 158 were raised to weaning age.

FEED COST OF MAINTAINING BROOD SOWS

Records are kept of the feed consumed by each sow during the year. A number of the sows spend the greater part of the summer out on pasture and this was charged at the rate of 75 cents per month. The skim-milk used was charged at 50 cents per 100 pounds and the other feeds at local market prices.

The accompanying table shows the figures for 1927 as well as the average for a seven-year period:—

FEED COST OF MAINTAINING BROOD SOWS

Items		1927	Seven-year average 1921-27
Number of sows	No.	11	12·14
Total grain consumed	lb.	31,209	30,665
Average grain per sow	lb.	2,837	2,526
Average grain per sow per month	lb.	236·4	210·5
Total cost of feed	$	629 31	591 41
Average cost of feed per sow	$	57 21	48 72
Average cost of feed per sow per month	$	4 77	4 06

FEED COST OF REARING PIGS TO TIME OF WEANING

A record is kept of the feed consumed by each sow from the time one litter is weaned until the next litter is ready to wean. From these data may be cal-

culated the feed cost of maintaining the sow from weaning to farrowing and the feed cost of rearing the pigs to time of weaning. The following table shows the figures for 1927 as well as the average for a four-year period:—

FEED COST OF REARING PIGS TO TIME OF WEANING

Items		1927	Four-year average 1924–27
From weaning to farrowing—			
Number of sows	No.	20	19·75
Average length of period	day	156·8	192·5
Total grain consumed	lb.	22,106·0	22,889·75
Average grain per sow	lb.	1,105·3	1,159·0
Total cost of feed	$	448 78	465 11
Average cost of feed per sow	$	22 44	23 55
Total service fee	$	40 00	39 50
Total cost	$	488 78	504 61
Average cost per sow	$	24 44	25 55
From farrowing to weaning—			
Number of sows	No.	20	19·50
Average length of period	day	47·2	57·9
Total grain consumed	lb.	11,195·0	13,565·5
Average grain per sow	lb.	559·8	695·7
Total cost of feed	$	226 45	287 13
Average cost of feed per sow	$	11 32	14 72
Deductions—			
Total number of pigs born	No.	227	208
Average number of pigs born per sow	No.	11·4	10·7
Total number of pigs raised	No.	158	158·75
Average number of pigs raised per sow	No.	7·9	8·0
Total cost	$	715 23	791 73
Total cost per sow	$	35 76	40 27
Average cost per pig to time of weaning	$	4 53	4 99

The greatest single factor affecting the cost of rearing young pigs to weaning age is whether the sows give one or two litters per year. In 1927, eight of the 12 sows gave 2 litters each and four 1 litter each. Over the four-year period there were a larger percentage of the sows which gave only one litter per year and this automatically increased the final cost per pig.

COST OF PRODUCING PORK

Considerable data have been gathered in connection with the cost of pork production both from spring and fall pigs, which cover a period of three years. In arriving at these costs the same prices have been used for feeds consumed as in the other work with swine; viz, skim-milk at 50 cents per 100 pounds and the other feeds at average market prices.

The results are presented in detail in the following table:—

COST OF PORK PRODUCTION

Items		Spring pigs	Fall pigs
Total number of pigs	No.	150	105
Total weight at finish	lb.	23,604	19,104
Average weight per pig	"	157·4	181·9
Total meal consumed	lb.	73,476	59,832
Total milk fed	lb.	7,888	13,511
Meal consumed per pig	"	489·9	569·5
Milk fed per pig	"	52·6	128·7
Meal consumed per 100 pounds weight	"	311·3	313·2
Findings—			
Total cost of pigs to time of weaning	$	770 50	533 10
Total cost of feed	$	1,517 05	1,354 46
Total cost	$	2,287 55	1,887 56
Average cost per pig at time of weaning	$	5 14	5 08
Cost of feed per pig	$	10 11	12 90
Total cost per pig	$	15 25	17 98
Cost per 100 pounds live weight	$	9 69	9 83

The most outstanding feature in this table is the comparatively small difference in the feed cost of producing pork from spring and fall pigs, indicating that, if suitable quarters are available, fall pigs may produce pork almost as economically as spring pigs.

THE EFFECT OF SUPPLEMENTARY FEEDS IN FEEDING FALL PIGS DURING THE WINTER

Many farmers find it difficult to get satisfactory results from the feeding of fall pigs during the winter, even when the same ration that develops spring pigs successfully is supplied.

The object of this experiment is to compare the results obtained from each of the following supplementary feeds: (1) skim-milk, (2) ten per cent tankage, (3) six per cent tankage plus three per cent chopped alfalfa, (4) six per cent tankage plus alfalfa hay fed in racks, (5) six per cent tankage plus mangels, and (6) a four per cent increase in the oil meal plus four per cent chopped alfalfa, but no tankage or skim-milk.

For this experiment, sixty pure-bred Yorkshire pigs ranging in age from seven to fourteen weeks were selected and weighed on November 15. These were divided equally into six lots of ten pigs each. On account of the range in age between the individual pigs, it was found advisable to sub-divide each lot into two pens, so that the pigs which were together would be nearly equal in age and size and would also have more room. These were all housed in the main hog-pen under similar conditions.

The basic meal ration was the same for each lot and during the first 60 days consisted of ground oats 2 parts, and 1 part each of ground barley, shorts and middlings plus 3 per cent oil meal. After the first 60 days the meal ration was composed of 2 parts each of ground oats and barley, and 1 part of shorts plus 3 per cent oil meal.

Each lot was fed until the average weight per pig was between 190 and 200 pounds except lot 6 which averaged only 182 pounds when the experiment was closed.

In calculating the cost of producing pork in this experiment the skim-milk was charged at 50 cents per 100 pounds and the other feeds at average market prices which are as follows:—

	Per cwt.
Ground oats	$ 2 08
Ground barley	2 25
Shorts	1 62
Middlings	1 82
Oil meal	2 82
Tankage	4 38
Alfalfa	1 00
Mangels	0 10

THE EFFECT OF SUPPLEMENTARY FEEDS IN FEEDING FALL PIGS DURING THE WINTER

Items		Lot 1 Milk	Lot 2 10 per cent tankage	Lot 3 6 per cent tankage plus 3 per cent chopped alfalfa	Lot 4 6 per cent tankage plus alfalfa hay in racks	Lot 5 6 per cent tankage plus mangels	Lot 6 Oil meal increased to 7 per cent plus 4 per cent chopped alfalfa
Number of pigs in each lot	No.	10	10	10	10	10	10
Total weight of 10 pigs on Nov. 15	lb.	331	332	332	329	335	332
Average weight of each pig	"	33·1	33·2	33·2	32·9	33·5	33·2
Final weight of 10 pigs	"	1,954	1,976	1,945	1,998	1,969	1,821
Average weight of each pig	"	195·4	197·6	194·5	199·8	196·9	182·1
Total gain of each lot	"	1,623	1,644	1,613	1,669	1,634	1,489
Average gain of each pig	"	162·3	164·4	161·3	166·9	163·4	148·9
Average number of days fed per pig	"	140·0	142·5	142·9	139·1	141·5	147·2
Average daily gain per pig	"	1·16	1·15	1·13	1·20	1·15	1·01

THE EFFECT OF SUPPLEMENTARY FEEDS IN FEEDING FALL PIGS DURING THE WINTER—*Concluded*

Items		Lot 1 Milk	Lot 2 10 per cent tankage	Lot 3 6 per cent tankage plus 3 per cent chopped alfalfa	Lot 4 6 per cent tankage plus alfalfa hay in racks	Lot 5 6 per cent tankage plus mangels	Lot 6 Oil meal increased to 7 per cent plus 4 per cent chopped alfalfa
Feed consumed—							
Ground oats to each lot	"	2,088	2,206	2,099	2,150	2,096	2,201
Ground barley to each lot	"	1,830	1,946	1,838	1,889	1,836	1,941
Shorts to each lot	"	1,044	1,102	1,049	1,075	1,049	1,101
Middlings to each lot	"	260	260	260	260	260	260
Oil meal to each lot	"	157·3	165·0	159·3	161·5	157·5	385·5
Tankage to each lot	"	.....	547·85	322·1	330·0	321·1	.....
Alfalfa to each lot	"	.....	.....	160·2	471·0	.....	233·3
Mangels consumed per lot	"	.....	.....	.....	.....	1,065	.....
Milk fed per lot	"	13,511	.....	.....	.....	.....	.....
Total grain ration per lot (tankage included)	"	5,379·30	6,226·85	5,727·4	5,865·5	5,719·6	5,888·5
Average grain ration per pig per day	"	3·84	4·37	4·01	4·22	4·04	4·00
Average alfalfa per pig per day	"	.....	.....	0·11	0·34	.....	.....
Average mangels per pig per day	"	.....	.....	.....	.....	0·75	.....
Average milk per pig per day	"	9·65	.....	.....	.....	.....	.....
Amount of meal per 100 pounds gain	"	331·44	378·72	355·08	351·44	350·04	395·47
Total cost of feed per lot	$	178 25	140 90	126 94	133 08	126 20	125 22
Cost of feed to produce 100 pounds gain	$	10 98	8 57	7 87	7 97	7 72	8 41

DEDUCTIONS.—Comparing lots one and two, it is found that the gains made are almost identical, but in cost of production the tankage has $2.41 per 100 pounds advantage, which seems to indicate that when this product can be purchased at $4.38 per cwt., the skim-milk is not worth 50 cents per 100 pounds. In fact, these results would show it to have a value of only 21 cents per 100 pounds. In meal required to produce 100 pounds of gain, however, it is worthy of note that the skim-milk has actually reduced this, showing that it does replace the meal requirements to a certain degree.

When lots three and four are compared with lot two, it is found that the gains made are not materially affected, but the cost to produce 100 pounds of gain has been quite noticeably reduced in both cases, which would seem to indicate that a part of the tankage fed to lot two could have been profitably replaced with either chopped alfalfa or alfalfa fed as hay from racks.

The alfalfa as fed to lot four in racks has given slightly larger daily gains than when chopped and mixed in the meal as fed to lot three; but the cost per 100 pounds gain has been slightly increased owing to the greater amount of alfalfa consumed.

Lot five, which was given mangels in place of alfalfa has made slightly larger gains than lot three, but a little lower than lot four. In actual cost to produce 100 pounds of gain, however, this lot has made the best showing of any in the test.

With lot six, where the animal protein as furnished in the skim-milk or tankage was replaced with vegetable protein by increasing the oil meal from 3 to 7 per cent and also increasing the chopped alfalfa from 3 to 4 per cent, it is found that a marked reduction in gain occurred. However, the cost of producing 100 pounds of gain is still below that of lots one and two. From observation it could easily be seen that lot six did not thrive like the other lots.

HORSES

At the present time twenty-one horses are kept at this Station. Seventeen of these are heavy work horses. Three are pure-bred French-Canadians, two mares and a yearling colt, and one is a driving horse.

Records are kept of the feed consumed and the number of hours work performed by each horse and from these data are calculated the feed cost of maintenance and the feed cost of horse labour per hour.

In arriving at these figures the hay was charged at local farm prices—that is, the amount it would sell for on the farm without being pressed or hauled—while the grain was charged at local market prices. The results in detail are presented in the following table:—

FEED COST OF MAINTENANCE AND HORSE LABOUR

Items		1927	Five-year average
Average number of horses fed	No.	15·8	14·4
Total hours worked	No.	44,061	37,541·6
Average hours per horse	No.	2,789	2,615·8
Average hours per horse per day	No.	9·3	8·7
Total hay fed	lb.	113,450	99,624·0
Total grain fed	lb.	94,403	81,276·0
Total days on pasture	day	.....	51·0
Average hay per horse	lb.	7,180	6,918·3
Average grain per horse	lb.	5,975	5,644·2
Average days on pasture per horse	day	.....	3·5
Average hay per horse per day	lb.	19·6	19·0
Average grain per horse per day	lb.	16·3	15·5
Findings—			
Cost of hay consumed	$	850 88	678 93
Cost of grain consumed	$	1,963 58	1,571 74
Cost of pasture	$	.....	5 12
Total cost of feed	$	2,814 46	2,255 79
Average cost of feed per horse	$	178 13	156 65
Average cost of horse labour per hour	cts.	6·4	6·0

FIELD HUSBANDRY

ROTATION OF CROPS

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

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

The area on which these rotations are established is a clay-loam soil which is apparently fairly uniform, although a few narrow strips of shallow muck are present. These are running crosswise of the rotations, however, and therefore should not materially affect the accuracy of the test.

All these rotations have completed one full cycle, and some of the shorter ones nearly two.

In arriving at 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 by 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 arrived at by multiplying the value of the land by the current rate of interest on first mortgage plus taxes; the charge for machinery includes 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 saleable. For the silage and root crops, it is assumed that 300 pounds of ensilage containing 25 per cent dry matter and 600 pounds of roots containing 10 per cent dry matter are each equal to 100 pounds of cured hay.

The prices and return values used in the 1927 report are as follows:—

PRICES USED IN FIGURING COST OF PRODUCING CROPS

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
Tractor and operator	per hour	1 35
Potatoes	per bushel	2 10
Turnip seed	per pound	0 70
Barley	per bushel	2 48
Wheat (spring)	per bushel	3 97
Wheat (fall)	per bushel	4 05
Oats	per bushel	1 80
Peas	per bushel	3 58
Vetch	per bushel	3 50
Sunflower seed	per pound	0 13
Corn	per pound	0 12
Timothy	per bushel	6 50
Red Clover	per bushel	22 80
Alsike	per bushel	21 00
Twine	per cwt.	15 50

Return Values

Barley	per bushel	$ 1 00
Wheat	per bushel	1 80
Oats	per bushel	0 85
Potatoes (marketable)	per bushel	1 34
Potatoes (unmarketable)	per ton	3 00
Hay	per ton	17 00
Straw (barley, oats)	per ton	6 80
Straw (wheat)	per ton	3 40
Sunflower silage	per ton	4 85
O.P.V. silage	per ton	5 80

Following is a brief description of each rotation under test and the results obtained in 1927:—

ROTATION A (THREE YEARS' DURATION)

This rotation includes sunflowers, oats, and clover hay. The clover sod is manured at the rate of 12 tons per acre and fall-ploughed for sunflowers. The land is again fall-ploughed in preparation for seeding to grass and clover, using oats as a nurse-crop. The results in 1927 from the different crops are as follows:—

ROTATION A (THREE YEARS' DURATION)—RESULTS IN 1927

Rotation year	Crop	Yield per acre		Value of crop, 1927	Cost of production	Profit or loss per acre	
		1927	Average 2 years			1927	Average 2 years
				$ cts.	$ cts.	$ cts.	$ cts.
1	Sunflowers ton	10·41	9·35	50 49	48 69	1 80	−0 75
2	Oats (Alaska) straw ton	0·76	0·78				
	grain bush.	34·00	31·60	34 07	31 41	2 66	−3 34
3	Clover hay ton	1·04	1·23	17 68	19 89	−2 21	−1 16
	Average per acre			34 08	33 33	0 75	−4 75

ROTATION B (FOUR YEARS' DURATION)

This rotation includes sunflowers as a hoed crop, oats, clover hay and timothy hay. The timothy sod is manured at the rate of 16 tons per 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 for the grass and clover seed. The results in 1927 from the different crops are as follows:—

ROTATION B (FOUR YEARS' DURATION)—RESULTS IN 1927

Rotation year	Crop	Yield per acre		Value of crop, 1927	Cost of production	Profit or loss per acre	
		1927	Average 2 years			1927	Average 2 years
				$ cts.	$ cts.	$ cts.	$ cts.
1	Sunflowers ton	10·95	10·92	53 11	50 33	2 78	−6 95
2	Oats (Alaska) straw ton	0·75	0·66				
	Oats (Alaska) grain bush.	33·10	32·60	33 24	33 46	−0 22	−5 94
3	Clover hay ton	0·94	1·06	15 98	19 16	−3 18	−2 83
4	Timothy hay ton	1·29	1·37	21 98	15 96	5 97	5 47
	Average per acre			31 07	29 74	1 33	−2 56

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 per acre and fall-ploughed for sunflowers. After the sunflowers are removed, the land is again fall-ploughed for barley which is the nurse-crop for the grass and clover. After the clover hay is cut, a top dressing of manure is applied at the rate of 8 tons per acre. The results in 1927 from the different crops are as follows:—

ROTATION C (FIVE YEARS' DURATION)—RESULTS IN 1927

Rotation year	Crop	Yield per acre		Value of crop, 1927	Cost of production	Profit or loss per acre	
		1927	Average 2 years			1927	Average 2 years
				$ cts.	$ cts.	$ cts.	$ cts
1	Oats (Alaska) straw ton	1·15	1·03				
	Oats (Alaska) grain bush.	42·10	37·90	43·61	30 30	13 31	2 13
2	Sunflowers ton	10·86	9·72	52 67	50 25	2 42	−6 69
3	Barley straw ton	0·91	0·89				
	Barley grain bush.	33·20	34·80	39 39	31 09	8 30	6 40
4	Clover hay ton	1·10	1·21	18 70	18 18	0 52	0 47
5	Timothy hay ton	1·50	1·71	25 50	21 38	4 12	5 32
	Average per acre			35 97	30 24	5 73	1 53

ROTATION D (SIX YEARS' DURATION)

This rotation 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 the nurse-crop for seeding out with. The new seeding is given a top dressing of manure at the rate of 8 tons per acre after the barley is harvested. The results in 1927 from the different crops are as follows:—

ROTATION D (SIX YEARS' DURATION)—RESULTS IN 1927

Rotation year	Crop	Yield per acre		Value of crop, 1927	Cost of production	Profit or loss per acre	
		1927	Average 2 years			1927	Average 2 years
				$ cts.	$ cts.	$ cts.	$ cts.
1	Potatoes {unmarketable..... ton	0·29	0·49	.....	.....	.....	.....
	{marketable..... bush.	181·77	156·44	244 44	127 12	117 32	97 70
2	Wheat (Carnet) {straw..... ton	1·47	1·28	.....	.....	.....	.....
	{grain..... bush.	27·30	19·70	54 14	36 10	18 04	2 51
3	Barley {straw..... ton	1·11	1·04	.....	.....	.....	.....
	{grain..... bush.	33 20	33·20	40 75	29 87	10 88	6 99
4	Clover hay..... ton	1·33	1·24	22 61	21 40	1 21	−1 92
5	Timothy hay..... ton	1·10	1·23	18 70	17 46	1 24	1 77
6	Timothy hay..... ton	1·18	1·34	20 06	15 00	5 06	5 86
	Average per acre.....	.....	.....	66 78	41 16	25 62	18 82

ROTATION E (FIVE YEARS' DURATION)

Oats, summer-fallow, fall wheat, clover hay and timothy hay are included in this rotation.

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 is a fair height, when it is ploughed under together with an application of manure at the rate of 12 tons per 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 1927, Kharkov fall wheat was the variety used, and although this is an extremely hardy variety, it suffered to such an extent from winter killing that it was thought advisable to reseed it with Garnet spring wheat, hence the crop this year was a mixture of these two sorts.

The results in 1927 from the different crops grown are as follows:—

ROTATION E (FIVE YEARS' DURATION)—RESULTS IN 1927

Rotation year	Crop	Yield per acre		Value of crop, 1927	Cost of production	Profit or loss per acre	
		1927	Average 2 years			1927	Average 2 years
				$ cts.	$ cts.	$ cts.	$ cts.
1	Oats (Alaska) {straw..... ton	0·65	0·72	.....	.....	.....	.....
	{grain..... bush.	32·10	35·00	31 71	32 41	−0 70	−5 17
2	Summer-fallow.....	.....	.....	.....	.....	.....	.....
3	Wheat {straw..... ton	1·01	1·03	.....	.....	.....	.....
	{grain..... bush.	18·10	15·70	36 01	52 97	−16 96	−21 26
4	Clover hay..... ton	1·45	1·24	24 65	28 20	−3 55	−7 97
5	Timothy hay..... ton	1·70	1·60	28 90	23 78	5 12	1 42
	Expense of seeding Fall wheat.....	.....	.....	.....	.....	.....	−3 46
	Average per acre.....	.....	.....	24 25	27 47	−3 22	−7 29

COST OF PRODUCING FARM CROPS

Records are kept on the cost of production for the various 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 FALL WHEAT (KHARKOV)

The figures on the cost of producing fall wheat are obtained from 1 acre in the six-year rotation and 7 acres on new land. These were seeded on August 14, 1926, at the rate of 2 bushels per acre. The germination was good and the stand on the seven-acre field came through with only a small percentage of winter-killing, but the one acre was partly killed out, so that it was thought advisable to reseed this thinly in the spring with Garnet, consequently, the resultant crop from this acre is really a mixture of fall and spring wheat. Fortunately, these two varieties ripen at about the same time. The grain matured well on both areas and the seven acres were harvested on August 25, and 26, and the 1 acre on September 6. The cost of production is as follows:—

Total cost per acre	$40 36
Yield of grain per acre.....bush.	29·9
Yield of straw per acre.....ton	1·31
Value of crop per acre	$58 27
Profit per acre	17 91
Cost per bushel	1 20
Cost per ton of straw	2 26

COST OF PRODUCING SPRING WHEAT (GARNET)

The figures used in determining the cost of producing spring wheat represent 1 acre in the six-year rotation, and 4·9 acres on new land, all of which were seeded on May 7, at the rate of 2 bushels per acre. The germination was very good and nice even stand developed. Garnet, being an early variety, the crop matured well and the grain would have been of good quality had it not been for the unfavourable weather which existed for curing. The cost of production is as follows:—

Total cost per acre	$28 65
Yield of grain per acre.....bush.	24·5
Yield of straw per acre.....ton	1·12
Value of crop per acre	$47 91
Profit per acre	19 26
Cost per bushel	1 08
Cost per ton of straw	2 03

COST OF PRODUCING BANNER OATS

The area from which these figures are obtained includes 5·3 acres which were seeded on new land on May 7, at the rate of 2½ bushels per acre. The crop developed very well but was rather seriously affected with rust. It was harvested on September 9, and was fairly well matured. The cost of production is as follows:—

Total cost per acre	$24 48
Yield of grain per acre.....bush.	42·1
Yield of straw per acre.....ton	0·74
Value of crop per acre	$40 61
Profit per acre	15 33
Cost per bushel	0 58
Cost per ton of straw	4 25

COST OF PRODUCING VICTORY OATS

These data are derived from 27·6 acres which were sown with this variety; 7·6 acres of which were grown on fall-ploughed sod following night pasture, and 20 acres, a part of which had produced sunflowers in 1926 and part O.P.V. for which crops the land had been given an application of manure at the rate of 16 tons per acre. The 7·6 acres were sown on May 14, and the 20 acres on May 16, at the rate of 2½ bushels per acre. A fair stand of straw developed but the yield of grain was materially reduced by rust. Both fields were harvested from September 12 to 17. The cost of production is as follows:—

Total cost per acre		$29 19
Yield of grain per acre	bush.	34·8
Yield of straw per acre	ton	0·79
Value of crop per acre		$34 95
Profit per acre		5 76
Cost per bushel		0 71
Cost per ton of straw		5 68

COST OF PRODUCING ALASKA OATS

The area in Alaska oats included 15·5 acres, 4 of which were in the rotations, 9 in the cultural experiments, and 2·5 in the regular field crop area. These were seeded from May 7 to 17, at the rate of 2½ bushels per acre. Being an early variety the grain matured well and was harvested from September 1 to 9. This variety was not as seriously affected with rust as the later maturing sorts, consequently, the grain was of a better quality. The cost of production is as follows:—

Total cost per acre		$30 34
Yield of grain per acre	bush.	35·7
Yield of straw per acre	ton	0·92
Value of crop per acre		$36 64
Profit per acre		6 30
Cost per bushel		0 70
Cost per ton of straw		5 63

COST OF PRODUCING BARLEY

The figures on the cost of producing barley are based on 8 acres grown in the rotations and cultural experiments. These were sown from May 21 to 27, at the rate of 2 bushels per acre. O.A.C. No. 21 was the variety used. A very nice stand developed and the crop was harvested from September 2 to 10. The average cost of production is as follows:—

Total cost per acre		$25 82
Yield of grain per acre	bush.	26·2
Yield of straw per acre	ton	1·07
Value of crop per acre		$33 46
Profit per acre		7 64
Cost per bushel		0 77
Cost per ton of straw		5 25

COST OF PRODUCING HAY

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

The cost of production figures for hay include 22 acres in the rotations and cultural experiments, and 129·8 acres in the large field areas. Haying com-

menced on July 28, and the cutting was completed on August 26. The average cost of production is as follows:—

Total cost per acre		$14 14
Yield per acre	ton	0·85
Value per acre		$14 45
Profit per acre		0 31
Cost per ton		16 64

COST OF PRODUCING SUNFLOWERS

Fourteen acres of sunflowers were grown in 1927. Four of these were on the rotations and cultural experiments and 10 on the tile drainage experiment. The latter area was planted on May 27, in rows 36 inches apart. The germination was good and a very fair yield was obtained. The crop was harvested on September 1, 2 and 3. The average cost of production is as follows:—

Total cost per acre		$50 46
Yield per acre	ton	9·37
Value per acre		$45 45
Loss per acre		5 01
Cost per ton		5 38

COST OF PRODUCING OATS, PEAS AND VETCH MIXTURE

The area from which these data have been secured includes 1 acre in the rotations and 17·9 acres under field crop. The latter 17·9 acres were grown on fall-ploughed land without manure, 12·9 acres of which were on sod and 5 acres on new land. The crop grew very well and was harvested and ensiled on August 29 and 30. The cost of production is as follows:—

Total cost per acre		$32 19
Yield per acre	ton	5·32
Value per acre		$30 86
Loss per acre		1 33
Cost per ton		6 06

COST OF PRODUCING POTATOES

The 1·9 acres of potatoes from which these figures were obtained include 1 acre in the rotations and 0·9 acre under field crop. The land was all fall-ploughed and the 1 acre was manured at the rate of 16 tons per acre, while the other area was on a rich night pasture. The seed was planted on May 20 and 28, and the crop was harvested on October 5, 10 and 11. The cost of production is as follows:—

Total cost per acre		$120 22
Yield of marketable potatoes	bush.	185·77
Yield of unmarketable potatoes	ton	0·23
Value of crop per acre		$249 62
Profit per acre		129 40
Cost per bushel of marketable potatoes		0 65
Cost per ton of unmarketable potatoes		1 44

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 1926 the seed was sown on six different dates at intervals of seven days commencing on August 18, in quadruplicate one-fortieth-acre plots at the rate of 1½ bushels per acre. Common fall rye was the variety used. The results are as follows:—

DATE OF SEEDING FALL RYE

	Date Sown											
	Aug. 18		Aug. 25		Sept. 1		Sept. 8		Sept. 15		Sept. 22	
	bush.	lb.	bush.	lb.	bush.	lb.	bush.	lb.	bush.	lb.	bush.	lb.
Yield per acre.....	35	50	37	48	35	40	31	44	38	2	33	32

The figures in this table are somewhat conflicting and no conclusions can be deducted therefrom. In past seasons, however, the early seeding has usually given the higher returns but this year there is no consistent difference between the early and late seedings.

DATE OF SEEDING FALL WHEAT

The object of this experiment is to determine what date or dates of seeding will give the best results. In 1926 the seed was sown on eight different dates at intervals of seven days commencing on August 11, in quadruplicate one-fortieth-acre plots, at the rate of 2 bushels per acre. Kharkov was the variety used. The results are as follows:—

DATE OF SEEDING FALL WHEAT

	Date Sown													
	Aug. 11		Aug. 18		Aug. 25		Sept. 1		Sept. 8		Sept. 15		Sept. 22		Sept. 29	
	bush.	lb.	bush.	lb.	bush.	lb.	bush.	lb.	bush.	lb.	bush.	lb.	bush.	lb.	bush.	lb.
Yield per acre.....	43	50	39	50	36	40	40	50	33	30	28	0	30	40	22	40

The figures in this table indicate that there is a marked tendency for the earlier seedings to give the better results. It was also observed that the quality of the grain was much superior from the earlier sown plots.

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 1927, twelve different rates were under test. The seed was sown on May 20, 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 good growth 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 1927		Dry weight 1927		Average green weight 1924–27		Average dry weight 1924–27	
Inch.	inch.	sq. feet	tons	lb.	tons	lb.	tons	lb.	tons	lb.
24	6	1·0	15	1,120	2	61	12	1,258	1	1,638
24	12	2·0	14	400	1	1,438	11	515	1	1,053
24	18	3·0	11	1,790	1	948	10	458	1	859
30	6	1·25	11	1,550	1	1,134	12	90	1	1,366
30	12	2·50	11	220	1	775	10	1,695	1	933
30	18	3·75	11	1,520	1	794	10	213	1	726
36	6	1·50	16	670	1	1,677	12	1,128	1	1,219
36	12	3·0	13	1,580	1	933	11	860	1	966
36	18	4·50	12	1,590	1	807	10	448	1	755
42	6	1·75	16	50	1	1,417	12	1,400	1	1,431
42	12	3·50	13	250	1	1,097	10	828	1	814
42	18	5·25	11	1,410	1	704	9	633	1	411

The figures in this table would seem to indicate that the yield of sunflowers may be affected more 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 four-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 has been a comparatively small decrease in the 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:—

RATE OF SEEDING SUNFLOWERS. ROWS AND PLANTS AT DIFFERENT DISTANCES APART

Distance	Yield per acre							
	Green weight 1927		Dry weight 1927		Average green weight 1924–27		Average dry weight 1924–27	
	tons	lb.	tons	lb.	tons	lb.	tons	lb.
Rows 24 inches apart	13	1,770	1	1,482	11	744	1	1,183
Rows 30 inches apart	11	1,097	1	901	10	1,999	1	1,008
Rows 36 inches apart	14	613	1	1,139	11	810	1,	980
Rows 42 inches apart	13	1,237	1	1,073	10	1,620	1	885
Plants 6 inches apart	14	1,848	1	1,572	12	969	1	1,414
Plants 12 inches apart	13	113	1	1,061	10	1,975	1	942
Plants 18 inches apart	12	78	1	813	9	1,937	1	688

This table brings out more vividly than the former the greater tendency for the yields to lessen, as the plants are more widely spaced within the row, than where the rows are spaced at greater width.

While 24 inches between the rows has given the largest yield, this is not a 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 prove 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 1927, twenty different mixtures and rates of seeding were under test. These 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 21, and the corn on May 23. The sunflowers were harvested on September 7, the O.P.V. on September 8, and the corn on September 19. Mammoth Russian sunflowers, Northwestern Dent corn, O.A.C. No. 72 oats, Mackay peas and Common vetch are the varieties used. The germination was very good and fairly large yields were obtained. The results are as follows:—

DISTANCES BETWEEN ROWS AND RATE OF SEEDING ENSILAGE CROPS

Distances between rows		Rate of seeding				Yield per acre							
						Green weight 1927		Dry weight 1927		Average green weight 1924–27		Average dry weight 1924–27	
Sunflowers	Corn	Oats	Peas	Vetch	Clover								
inch.	inch	lb.	lb.	lb.	lb.	tons	lb.	tons	lb.	tons	lb.	tons	lb.
24						22	1,120	2	183	18	1,200	2	511
30						21	660	2	155	17	878	2	92
36						18	1,530	1	1,357	16	1,623	2	190
42						15	1,160	1	826	14	501	1	1,444
	24					4	1,540	0	1,182	4	1,963	0	1,168
	30					4	1,310	0	1,147	4	1,303	0	1,117
	36					3	1,190	0	901	3	1,844	0	964
	42					2	1,550	0	709	3	309	0	762
		34	60			12	1,380	2	1,794	10	1,688	2	1,119
		51	60			12	10	2	1,753	10	1,375	2	1,124
		68	60			11	420	2	1,028	10	979	2	1,267
		34	60	28		12	1,210	2	891	11	1,142	2	1,024
		51	60	28		12	1,090	2	1,640	12	117	2	1,502
		68	60	28		12	1,960	2	1,949	11	1,422	2	1,313
		34	60		10	12	1,210	3	88	10	1,397	2	1,068
		51	60		10	11	1,570	2	1,696	10	1,529	2	1,173
		68	60		10	11	1,030	2	1,684	10	1,108	2	1,257
		34	60	28	10	12	990	2	1,558	11	1,281	2	1,048
		51	60	28	10	12	90	2	1,709	11	1,022	2	1,147
		68	60	28	10	11	660	2	1,379	11	1,194	2	1,438

The average figures in this table show that the largest yield has been obtained from rows 24 inches apart and the smallest yield from rows 42 inches apart with both sunflowers and corn. Rows 24 inches apart, however, are a little too close to admit of convenient cultivation and harvesting, consequently, either 30 or 36 inches is to be recommended in preference to either of the other two.

In order to make possible a more direct comparison between the different rates of seeding the O.P.V. the following table has been prepared:—

AVERAGE OF THE DIFFERENT RATES OF O.P.V.

Plots averaged	Yield per acre			
	Average green weight 1924–27		Average dry weight 1924–27	
	tons	lb.	tons	lb.
Where 34 pounds of oats are included (4 plots)	11	377	2	1,065
Where 51 pounds of oats are included (4 plots)	11	511	2	1,237
Where 68 pounds of oats are included (4 plots)	11	176	2	1,319
Where oats and peas are sown (3 plots)	10	1,347	2	1,170
Where oats, peas and vetch are sown (3 plots)	11	1,560	2	1,280
Where oats, peas and clover are sown (3 plots)	10	1,345	2	1,168
Where oats, peas, vetch and clover are sown (3 plots)	11	1,166	2	1,211

The figures in this table indicate that there is a tendency for the yield to increase as the amount of oats included in the mixture has been increased.

The figures also show some advantage where the vetch is present but the yields are really lower where the clover is included. In fact it is remarkable the very excellent yields that have been obtained even with what might be considered as a rather light seeding of oats and peas.

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. Mammoth Russian sunflowers, Quebec 28 corn, O.A.C. No. 72 oats, Mackay peas and Common vetch were the varieties used.

In 1927, the seed was sown on six different dates at intervals of seven days commencing on May 21, 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 sunflowers and O.P.V. gave good germination and good yields were obtained, but the corn failed to germinate and, consequently, no yields were obtained from this crop. The results are as follows:—

DATE OF SEEDING ENSILAGE CROPS

Crop	Date of seeding 1927	Yield per acre							
		Green weight 1927		Dry weight 1927		Average green weight 1924–27		Average dry weight 1924–27	
		tons	lb.	tons	lb.	tons	lb.	tons	lb.
Sunflowers	May 21	18	1,690	2	889	17	1,888	2	864
Sunflowers	May 28	17	1,160	2	249	17	1,173	2	481
Sunflowers	June 4	17	580	1	1,704	17	175	2	300
Sunflowers	June 11	14	100	1	1,095	15	1,130	1	1,642
Sunflowers	June 18	12	270	1	549	14	53	1	1,288
Sunflowers	June 25	8	1,060	0	1,551	11	1,825	1	720
O.P.V.	May 21	10	200	2	1,122	10	1,878	2	1,625
O.P.V.	May 28	10	620	2	1,261	11	668	2	1,530
O.P.V.	June 4	10	700	2	832	11	221	2	1,048
O.P.V.	June 11	9	1,370	1	1,933	11	25	2	538
O.P.V.	June 18	8	1,910	1	1,967	10	1,415	2	49
O.P.V.	June 25	7	270	1	1,227	10	640	2	82

The figures in this table indicate that there is a general tendency for the earlier seedings of both sunflowers and O.P.V. to give the better results. In fact, over a four-year period the very first seeding has given the largest yield. In this connection, however, it is interesting to note that these crops may be seeded until quite late and still give fairly good results. This may often prove a distinct convenience, particularly on an area of low lying land which may be slow in drying up in the spring.

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 by 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 grain in 1927 instead of hay.

The results from these crops are as follows:—

ENSILAGE AND ROOT EXPERIMENT—RESULTS IN 1927

Crop	Yield per acre	Cost per acre	Value of crop per acre	Profit or loss (−) per acre	Cost per ton
	tons	$ cts.	$ cts.	$ cts.	$ cts.
O.P.V.	7·17	54 30	41 59	−12 71	7 57
Sunflowers	8·20	50 98	39 77	−11 21	6 22

The turnips were eaten off by the turnip fly a few days after they came through the ground and the corn gave poor germination and was afterwards partly frozen, consequently there were no results from these two crops this year.

In 1927 the area which was in silage and hoed crops in 1926 was sown to Alaska oats on May 16. They were harvested on September 8. The results are as follows:—

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

Previous Crop	Yield per acre	
	Grain	Straw
	bush.	tons
O.P.V.	32·4	0·53
Sunflowers	40·1	0·88
Corn	41·8	1·18
Turnips	36·0	1·02

The corn and sunflowers both gave a very light crop in 1926, and this fact may partly explain the high yield of the oats on these two areas in 1927, compared with the other two.

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 has attained a fair growth it is ploughed under, after which the land is cultivated occasionally throughout the remainder of the season. The first cycle of this rotation was completed in 1926, so that 1927 is the first year of the second cycle. The results from the different crops are as follows:—

RESULTS IN 1927

Rotation year	Crops and treatment	Yield per acre		Cost of summer-fallowing, 1927	Value of crop minus cost of summer-fallowing	
		1927	Average 2 years		1927	Average 2 years
				$ cts.	$ cts.	$ cts.
1	Oats (Alaska) straw ton	0·64	0·53	.....	.....	.....
	grain bush.	17·90	18·40	.....	19 57	16 72
2	Sweet clover ploughed and summer-fallowed	.....	.....	.....	.....	.....
3	Barley straw ton	1·57	1·19	.....	.....	.....
	grain bush.	20·10	28·40	9 11	21 67	26 74
4	Clover hay ton	0·92	0·98	4 56	11 08	11 76
5	Timothy hay ton	0·54	0·80	.....	9 18	12 47
	Average per acre	.....	.....	.....	12 30	13 54

The cost of the sweet clover seed and the expense of summer-fallowing are 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 to grass and clover the next year, using barley as a nurse-crop. This rotation completed the first cycle in 1926, so that 1927 is the first year of the second cycle. The results from the different crops are as follows:—

PLOUGHING DOWN SWEET CLOVER AND BUCKWHEAT—RESULTS IN 1927

Rotation year	Crops and treatment	Yield per acre		Cost of summer-fallowing, 1927	Value of crop minus cost of summer-fallowing	
		1927	Average 2 years		1927	Average 2 years
				$ cts.	$ cts.	$ cts.
1	Oats (Alaska) straw ton	0·85	0·69	.....	.....	.....
	grain bush.	28·80	23·80	.....	30 26	22 30
2	Sweet clover and buckwheat ploughed down	.....	.....	.....	.....	.....
3	Barley straw ton	1·14	0·90	.....	.....	.....
	grain bush.	13·30	18·00	14·01	7 04	9 84
4	Clover hay ton	0·54	0·64	7 00	2 18	3 64
5	Timothy hay ton	0·44	0·81	.....	7 48	12 52
	Average per acre	.....	.....	.....	9 39	9 66

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

The cost of the sweet clover seed and the summer-fallowing operations are charged 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. In 1927, however, it was decided to replace the oat crop in this rotation by barley in order to make possible a more direct comparison between this and the other experiments. The timothy sod is fall-ploughed for peas. After the pea crop is harvested, the land is again fall-ploughed in preparation for seeding to grass and clover using oats as a nurse-crop. The results from the different crops are as follows:—

No Green Manure Crop Ploughed Down—Results in 1927

Rotation year	Crop		Yield per acre	Value of crop
				$ cts.
1	Peas straw	ton	1·14	.....
	Peas grain	bush.	25·00	82 75
2	Barley straw	ton	1·25	.....
	Barley grain	bush.	28·10	36 60
3	Clover hay	ton	0·47	7 99
4	Timothy hay	ton	0·70	11 90
	Average per acre		.....	34 81

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 to compare all the other experiments. 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 from the different crops are as follows:—

Effect of Growing Non-Legumes—Results in 1927

Rotation year	Crop		Yield per acre		Value of crop	
			1927	Average two years	1927	Average two years
					$ cts.	$ cts.
1	Oats (Alaska) straw	ton	0·45	0·51	.....	.....
	Oats (Alaska) grain	bush.	22·10	24·30	21 85	20 56
2	Barley straw	ton	0·61	0·55	.....	.....
	Barley grain	bush.	18·60	16·80	22 75	19 60
3	Clover hay	ton	0·75	0·91	12 75	14 40
4	Timothy hay	ton	0·55	0·86	9 35	13 45
	Average per acre		.....	.....	16 68	17 00

FARM MANURE EXPERIMENT

The object of this experiment is to compare the effect of an application of manure at the rate of 16 tons per acre once in the rotation, with green manure ploughed down and with no manure 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 next spring using barley as a nurse-crop. The results from the different crops are as follows:—

FARM MANURE EXPERIMENT—RESULTS IN 1927

Rotation year	Crop and treatment	Yield per acre		Cost of manure	Value of crop minus cost of manure	
		1927	Average two years		1927	Average two years
				$ cts.	$ cts.	$ cts.
1	Oats (Alaska) straw ton	0·85	0·78	.....	.....	.....
	Oats (Alaska) grain bush.	32·90	35·80	12 80	20 95	17 79
2	Barley straw ton	0·93	0·83	.....	.....	.....
	Barley grain bush.	31·00	32·00	9 60	27 72	26 10
3	Clover hay ton	1·00	1·39	6 40	10 60	15 45
4	Timothy hay ton	1·15	1·40	3 20	16 35	18 95
	Average per acre	.....	.....	.....	18 91	19 57

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 per 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 from the different crops are as follows:—

LIME EXPERIMENT—RESULTS IN 1927

Rotation year	Crop and treatment	Yield per acre		Cost of manure	Value of crop minus cost of manure	
		1927	Average two years		1927	Average two years
				$ cts.	$ cts.	$ cts.
1	Oats (Alaska) straw ton	0·85	0·85	.....	.....	.....
	Oats (Alaska) grain bush.	30·40	35·10	12 80	18 82	17 44
2	Barley straw ton	1·05	0·94	.....	.....	.....
	Barley grain bush.	31·90	33·20	9 60	29 44	27 91
3	Clover hay ton	0·85	1·12	6 40	8 05	11 25
4	Timothy ton	1·45	1·53	3 20	21 45	21 13
	Average per acre	.....	.....	.....	19 44	19 43

No charge was made for the lime applied.

DRAINAGE EXPERIMENT

The object of this experiment is to compare the results from tile-drained land with that 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	Sunflowers or O.P.V.
Second year	Oats
Third year	Clover hay
Fourth year	Timothy hay

The results in 1927 from the sunflowers are as follows:—

DRAINAGE EXPERIMENT—RESULTS IN 1927

Items		Drained	Undrained
Total cost per acre	$	50 82	50 39
Yield per acre	tons	10·48	7·68
Value of crop per acre	$	50 82	37 23
Profit or loss per acre	$	.....	−13 16
Cost per ton	$	4 85	6 56

Over a two-year period, the average yield of sunflowers per acre is 11·85 tons for the drained area and 7·48 tons for the undrained area. The cost of drainage is not included in figuring the above cost of production.

SURFACE DRAINAGE EXPERIMENT

The object of this experiment is to compare the results 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, the rotation was changed to sunflowers or O.P.V., oats, clover hay and timothy hay. The results from the oat crop in 1927 are as follows:—

SURFACE DRAINAGE EXPERIMENT—RESULTS IN 1927

Width of lands	Yield per acre	
	Grain	Straw
	bush.	ton
Lands 18 feet in width	37·1	0·83
Lands 24 feet in width	31·9	0·91
Lands 36 feet in width	26·0	0·76
Lands 48 feet in width	39·9	0·69

HORTICULTURE

Although the month of May was cooler than normal by 1·7 degrees, the ground dried up quite early in the spring. The fall versus spring planting with vegetables was seeded on May 7, and had it not been for a heavy rain of 1·11 inches which occurred on May 9, seeding would have been quite general by May 10. However, very little seeding in the garden was done until about the middle of the month. Germination was good but owing to cool weather growth was rather slow until well on in June. Precipitation was plentiful during the remainder of the season and the small fruit and vegetable crops grew particularly well. In fact the results are among the best ever obtained at this Station. A light frost on June 23, destroyed some of the more tender sorts such as melons, pumpkins, cucumbers and squash and then a rather severe frost on August 25, did considerable damage to tomatoes, corn, beans, flowers, etc.

ORCHARD

The orchard which was set out in 1918 has been making rather slow progress. Many of the trees get frozen back each winter and some are killed entirely. Several trees had blossoms on this year and five bore some fruit.

One hundred and forty-eight new trees were set out this spring to replace those that have died consisting of apples, plums, cherries and hybrids as follows: Apples—Osman, 25; Columbia, 25; Dolgo, 5; Plums—Native, 25; Pembina, 5; Mammoth, 5; Ojibwa, 5; Assiniboine, 2; Aitkin, 2; Cheney, 2; Yuteca, 2; Earliest, 2; Mankato, 2; Hybrids—Champa, 5; Sapa, 5; Compass Cherry, 5; Zumbra, 5; and Native Sand Cherry, 25.

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 particularly well in 1927, giving the following yields in pounds from six bushes: London Red, 46·3; Red Grape, 42·6; Long Bunch Holland, 37·3; Simcoe King, 37·2; Victoria, 33·1; Red Cross, 28; and Red Dutch, 20·3.

It is worthy of note that the yield this year has been the largest ever obtained, although the bushes have been set out for a period of 7 years.

White Currants.—Two varieties were set out in 1920, in rows 6 feet apart and 5 feet between the bushes in the row. For some reason the white currants have never given very large yields. In 1927 White Grape gave 16·7 pounds, and White Cherry 8·1 pounds from six bushes.

Black Currants.—Fourteen varieties are under test. They were set out at the same time and in a similar manner as the red and white currants. They commenced bearing in 1922, and have been giving fairly good results each year since. In 1927 the results in pounds from six bushes are as follows: Topsy, 44; Saunders, 41; Climax, 36; Eclipse, 34·3; Ontario, 32; Kerry, 31; Eagle, 30; Magnus, 29; Beauty, 25; Buddenborg, 21·3; Collins Prolific, 20·3; Clipper, 18·3; Victoria, 18; and Lee Prolific, 14.

Gooseberries.—Fifteen varieties were set out in 1920 in rows 6 feet apart and 5 feet between the bushes in the row. These have never developed very well and the yields have always been very light. In 1927 only one variety gave any yield worth while, namely, Smith Improved, which yielded 9·8 pounds.

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 all yielded fairly well since 1921. The results in 1927 in pounds are as follows: Herbert, 21·1; Brighton, 13·1; Early June, 12·4; Newman 23, 12·4; Cuthbert, 11·3; King, 10·4; St. Regis, 7·1; and Sunbeam, 5·3.

VEGETABLES

VARIETY TESTS

BEANS.—Twenty-three varieties and strains 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 1927, the results in quarts from the ten highest yielding varieties are as follows: Dwarf French, 17·8; Challenge Black Wax, 15; Davis White Wax, 13·5; Wardwell Kidney Wax, 13; Grennel Rustless, 12·8; Round Pod Kidney Wax, 12·7; Yellow Eye Yellow Pod, 12·3; Masterpiece, 12·3; Hidasta, 12, and Plentiful French, 11·3.

BROAD BEANS.—Four varieties were under test. The seed was planted on May 17, in 30-foot rows, 3 feet apart, and the plants 3 inches apart in the row. In 1927 the results in quarts are as follows: Long Pod Green, 26; Long Pod Masterpiece, 23·3; Johnson Wonder, 20·3; and Early Mazagan, 20.

BEET.—Twelve varieties and strains were under test. The seed was sown on May 14, in drills 30 feet in length, 18 inches apart, and the plants were thinned to 2 inches apart in the row. In 1927 the results in pounds are as follows: Crimson Globe, 60·3; Detroit Dark Red, McD., 49·8; Flat Egyptian, Moore, 49·6; Detroit Dark Red, Graham, 48·7; Cardinal Globe, 46·9· Eclipse Frith, 46·7; Eclipse, McD., 44·8; Crosby Egyptian, 43·9; Flat Egyptian, Frith, 40·4; Early Wonder, 38·2; Detroit Dark Red, Moore, 29·3; and Black Red Ball, 21·8.

Uniformity and good quality are of even greater importance with table beets than large yields. Detroit Dark Red, Crosby Egyptian, Black Red Ball, Cardinal Globe, and Crimson Globe are among the best tried for quality.

CABBAGE.—Twelve varieties were under test. The seed was sown in the hotbed on April 30, and the plants were transplanted to the garden on June 13. The early varieties were set 18 inches, and the late varieties 24 inches apart in the row. The rows were 30 feet in length and 30 inches apart. The results in pounds in 1927 are as follows: Enkhuizen Glory, 96·5; Early Jersey Wakefield, 89·8; Dala, 88; Danish Ballhead, 81; Golden Acre, 72·4; Babyhead, 63·6; Etampes, 59·3; Kildonan, 56·6; Copenhagen Market, 55·4; Mammoth Red Rock, 39; Drumhead Savoy, 28·3; and Early Paris Market, 21·2.

Golden Acre is one of the newer and earlier sorts introduced. It should be particularly valuable where the seasons are short and rapid growth is essential.

CAULIFOWER.—Two varieties were under test. The seed was sown in the hotbed on April 30, and the plants were transplanted to the garden on June 14, in 30-foot rows with 18 inches between the plants. Dwarf Erfurt gave a yield of 33·9 pounds, and Early Snowball, 28·3 pounds per 30-foot row.

CELERY.—Nine varieties and strains were under test. The seed was sown in the greenhouse on April 12, and the plants were transplanted to the garden on June 27, with the exception of Evans Triumph, which was not transplanted until July 4. 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, 113·5; French Success, 102; Easy Blanching, Stokes, 97·5; White Plume, 96·5; Giant Pascal, 90; Easy Blanching, McD., 89; Golden Self Blanching, 86·5; Paris Golden Yellow, 86; and Evans Triumph, 58.

The Evans Triumph variety, which is usually one of the best yielders, seemed to lack vigour this year, apparently caused by poor weak seed.

CARROT.—Nine varieties were under test. The seed was sown on May 14, 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: Early Nantes, 101; Danvers, 92·4; Nantes Half Long, 88·5; Early Scarlet Horn, 80·3; Oxheart, 78·8; Maux, 72·8; Improved Danvers, 62·6; Chantenay, 58·4; and Garden Gem, 52·5.

Uniformity, smoothness and quality are of equal or greater importance than yield, with table carrots. Chantenay and Danvers are among the best of those tried from this standpoint.

ENDIVE.—One variety, Fine Green Curled, was under test. The seed was sown on May 16, in a 30-foot row, and the plants thinned to 6 inches apart in the row. The yield was small this year as only 11·5 pounds were obtained, while the average yield over a five-year period is 25 pounds.

KOHL RABI.—Two varieties were under test. The seed was sown on May 16, in rows 30 feet in length, and the plants were thinned to 8 inches apart in the row. White Vienna gave a yield of 47·5 pounds, and Purple Vienna, 24·5 pounds.

KALE or BORECOLE.—Two varieties were under test. The seed was sown in the hotbed on April 30, and the plants were set out in the garden on June 14, in 30-foot rows, with the plants 24 inches apart in the row. Tall Scotch gave a yield of 39·5 pounds and Dwarf Green Curled, 36 pounds.

LEEKS.—Two varieties were under test. The seed was sown in the hotbed on May 7, and the plants were transplanted to the garden on June 24, in 30-foot rows, the plants being set 6 inches apart in the row. Musselburgh gave a yield of 14·5 pounds, and Carentan 13·5 pounds.

LETTUCE.—Eleven varieties were under test. The seed was sown on May 16, 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 eleven varieties was 44·8 pounds.

A large yield is really not as important with lettuce as are crispness and good quality, although with the head and cos types, in particular, a fair size is demanded. The popularity of the head and cos lettuce is increasing and all three types do remarkably well in this district.

ONIONS.—Twelve varieties and strains were under test. The seed was sown on May 14, 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 are as follows: Ailsa Craig, 36.5; Yellow Globe Danvers, Steel Briggs, 34.8; Giant Prizetaker, 34; Southport Yellow Globe, 33.5; Southport Red Globe, 32.5; Yellow Globe Danvers, Graham, 32; Giant Yellow Prizetaker, 32; White Barletta, 31.5; Australian Brown, 31; Southport White Globe, 31; Early Flat Red, 29.5; and White Spanish Sweet, 27.5.

Two varieties grown from sets were also under test. These were planted on May 14, in rows 18 inches apart and the sets were placed 2 inches apart in the row. Yellow Globe Danvers gave a yield of 38.1 pounds, and Large Red Wethersfield, 26.4 pounds per 30-foot row.

PARSNIP.—Three varieties were under test. The seed was sown on May 14, 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, 81.5; Guernsey XXX, 76; and Elcombe Improved Hollow Crown, 68.

The seed-bed needs special preparation for the production of parsnips, as the roots demand a deep, rich, friable, well-drained soil for best results in size, smoothness, and quality.

GARDEN PEAS.—Nine varieties and strains were under test. The seed was sown on May 17, 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: Stratagem,

25.3; McLean Advancer, Harris, 24.3; Thomas Laxton, 24; Gregory Surprise X English Wonder, 23.5; Gradus X American Wonder, 22.5; McLean Advancer, Ferry, 22; Laxtonian, 21; American Wonder, 20.8; and English Wonder, 20.5. Over a six-year period the average yield from the four leading varieties are: McLean Advancer, Harris, 17; Stratagem, 15.8; American Wonder, 14.4; and McLean Advancer, Ferry, 14.

POTATOES.—Two varieties were under test. The tubers were planted on May 31, in quadruplicate one-eightieth-acre plots, the sets being placed 15 inches apart in the row. The Irish Cobbler variety gave a yield of 301 bushels and 20 pounds of marketable and 30 bushels of unmarketable per acre, and the Green Mountain 277 bushels and 44 pounds of marketable and 23 bushels and 20 pounds of unmarketable per acre.

The vines of these potatoes suffered some from frost on August 25, which gave them quite a setback, and the Cobbler variety seemed to recover from this injury somewhat quicker than the Green Mountain.

RADISH.—Seven varieties and strains were under test. The seed was sown on May 16, in drills 30 feet in length and 18 inches apart. The results in pounds are as follows: Round Scarlet Oval, 23; Chartier, 20; French Breakfast, Frith, 19.5; French Breakfast, Patmore, 18.5; Scarlet Turnip White Tipped, 16.5; Icicle, 11.5; and French Breakfast, James, 10.5.

Radish are always of the best quality when grown rapidly and without check in growth. All the common sorts do particularly well in this climate and the quality is unsurpassed.

SPINACH.—Four varieties were under test. The seed was sown on May 16, in 30-foot rows 18 inches apart. The results in pounds are as follows: Victoria, 18.5; Viroflay, 18.5; Broad Flanders, 17.5; and Long Standing, 17.3.

SALSIFY.—Two varieties were under test. The seed was sown on May 16, in 30-foot rows, 18 inches apart. The plants were thinned to 1½ inches apart in the row. Mammoth Sandwich Island gave a yield of 93 pounds and Long Black 23 pounds.

TURNIP.—Four varieties were under test. The seed was sown on May 16, 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 Straf Leaf, 52.8; Golden Ball, 40.9; and Early Purple Top Milan, 35.6. The Champion Swede variety gave 81.5 pounds.

TOMATOES.—Five varieties were under test. The seed was sown in the greenhouse on April 12, and the plants were transplanted to the garden on June 30, in 30-foot rows 3 feet apart. The plants were set 3 feet apart in the row. Owing to the frost which occurred on August 25, no ripe fruit was obtained this year, but each variety gave some green fruit suitable for pickling. The results in pounds are as follows: Select Earliana, 4.3; Early Mascot, 3.9; Prosperity, 3; Chalk Early Jewel, 2.4; and Bonny Best, 1.6.

CULTURAL EXPERIMENTS

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 1927	Four inches 1927	Six inches 1927	Four-year average two inches	Four-year average four inches	Four-year average six inches
	quart	quart	quart	quart	quart	quart
Round Pod Kidney Wax	12·5	10·4	8·0	11·0	9·4	6·9
Stringless Green Pod	12·0	10·4	6·8	11·9	9·6	7·2

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 18, 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 1927	Two inches 1927	Three inches 1927	Three-year average one inch	Three-year average two inches	Three-year average three inches
	quart	quart	quart	quart	quart	quart
English Wonder	14·5	12·0	11·3	14·6	12·5	11·9
Thomas Laxton	15·8	13·3	12·5	15·1	13·1	11·5
Stratagem	15·0	12·3	11·8	15·8	13·6	13·9

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 1927 the first date of seeding was on May 14. The seed was sown in rows 30 feet in length and 18 inches apart for the beets and carrots, and 30 inches for the 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, 1927	Yield per thirty-foot row									
	Beet				Carrot				Parsnip			
	1927		Five-year average		1927		Five-year average		1927		Five-year average	
	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.
May 14	49	7	31	15	104	0	49	9	78	8	42	8
May 23	42	8	27	1	86	0	41	1	56	8	27	7
June 2	36	8	21	12	58	0	23	2	43	8	17	12
June 13	33	8	14	14	40	8	14	9	29	8	12	6
June 23	17	0	9	0	9	0	5	0	0	0	2	6

The results in this table indicate in a very vivid manner the advisability of planting these three vegetables as early in the spring as the condition of the soil will permit.

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 1927, the seed was sown in the greenhouse on April 19, and the plants were transplanted to the garden on June 27. The rows were 15 feet in length and 4 feet apart, and the plants were set 6 inches apart in the row. The results are as follows:—

METHODS OF BLANCHING CELERY

Treatment	Yield from 25 plants		Quality
	1927	Five-year average	
	lb.	lb.	
Double row alternated blanched with roofing paper	49	28·9	Medium
Grown on level and earthed up	34	26·2	Good
Grown in trench and earthed up	16	24·0	Very good
Grown on level, blanched with boards	13	18·9	Medium

The results from this experiment over a five-year period would seem to indicate that celery may be fairly well blanched by either ready roofing, boards, earthing up on the level or planting in trenches and filling these and afterwards earthing up. That grown in the double alternated row and blanched with roofing paper has given the largest yield, but it is very much surpassed in quality by both that produced in trenches and that earthed up on the level, particularly the former. That planted on the level and blanched with boards has given the lowest yield and the quality has also been rather poor. The use of boards and tar paper or roofing material has the decided advantage of requiring less labour, and the rows may also be planted much closer together. If the best quality is desired, however, the blanching must be done by earthing up preferably in trenches.

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 tubers were planted in quadruplicate rows, 66 feet in length, 30 inches apart, and the sets were placed 1 foot apart in the row. In 1927 they were planted on May 30, and harvested on September 22 and 23. The results are as follows:—

SPROUTING EXPERIMENT WITH POTATOES

Variety	How treated	Yield per acre							
		Marketable 1927		Unmarketable 1927		Four-year average marketable		Four-year average unmarketable	
		bush.	lb.	bush.	lb.	bush.	lb.	bush.	lb.
Irish Cobbler	Sprouted	445	30	97	54	322	34	46	45
Irish Cobbler	Unsprouted	437	48	91	18	303	36	48	24
Green Mountain	Sprouted	662	12	29	42	411	24	40	50
Green Mountain	Unsprouted	636	54	41	48	382	31	45	22

SPRAYING EXPERIMENT WITH POTATOES.—The object of this experiment is to compare the results from sprayed and unsprayed potatoes, using Bordeaux mixture. In 1927 the first spraying occurred on July 16. Seven sprayings were applied at intervals of seven days. The variety used was Irish Cobbler, which was planted on May 31, in quadruplicate one-eightieth-acre plots, and harvested on October 10. The results are as follows:—

SPRAYING EXPERIMENT WITH POTATOES

Treatment	Yield per acre							
	Marketable 1927		Unmarketable 1927		Four-year average marketable		Four-year average unmarketable	
	bush.	lb.	bush.	lb.	bush.	lb.	bush.	lb.
Sprayed	218	40	34	40	224	15	27	21
Unsprayed	250	42	30	40	222	10	28	0

In 1927 the unsprayed plots happened to be on a little lower lying land than those that were sprayed, and owing to the wet season this may have been the cause of the lower yield.

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 1927, was May 17. The tubers were planted in quadruplicate 66-foot rows, and the sets were placed 1 foot apart in the row. The results are as follows:—

DATE OF PLANTING POTATOES

Variety	Date planted 1927	Date ready for use 1927	Yield per acre							
			Marketable 1927		Unmarketable 1927		Four-year average marketable		Four-year average unmarketable	
			bush.	lb.	bush.	lb.	bush.	lb.	bush.	lb.
Irish Cobbler	May 18	Aug. 12	380	36	86	54	295	4	48	57
Irish Cobbler	May 31	Aug. 12	328	54	91	18	274	27	54	27
Irish Cobbler	June 14	Aug. 22	277	12	106	42	232	55	60	46
Irish Cobbler	June 28	Sept. 9	268	24	94	36	189	45	55	16
Irish Cobbler	July 12	Sept. 23	134	12	103	24	104	13	49	13
Green Mountain	May 17	Aug. 16	418	0	111	6	300	51	57	45
Green Mountain	May 31	Aug. 16	429	0	85	48	308	0	53	37
Green Mountain	June 14	Aug. 22	267	18	122	6	230	10	67	22
Green Mountain	June 28	Sept. 9	275	0	145	12	190	34	68	28
Green Mountain	July 12	Sept. 23	111	6	94	36	75	21	51	25

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, 1926, and on May 7, 1927. The results are as follows:—

FALL VERSUS SPRING SEEDING OF VEGETABLES

Crop	Variety	Date ready for use		Yield per thirty-foot row			
		Fall seeding 1927	Spring seeding 1927	Fall seeding 1927	Spring seeding 1927	Four-year average fall seeding	Four-year average spring seeding
				lb. oz.	lb. oz.	lb. oz.	lb. oz.
Beet	Detroit Dark Red	Aug. 15	Aug. 23	4 0	9 0	4 12	24 1
Carrot	Chantenay	Aug. 16	Aug. 16	5 8	9 8	22 2	30 14
Cabbage	Copenhagen Market	.....	.....	.....	.....	.....	.....
Lettuce	Grand Rapids	July 4	July 4	26 0	27 0	30 8	31 8
Onion	Red Wethersfield	July 9	.....	4 0	.....	6 4	.....
Radish	Scarlet White Tip	June 20	June 20	10 0	25 0	7 4	33 0
Turnip	Purple Milan	July 14	July 14	10 0	33 0	.....	38 4

PRUNING EXPERIMENT WITH TOMATOES.—The object of this experiment is to compare the results in yield, quality and maturity of fruit produced from various methods of pruning tomato plants to a single stem. Two varieties were used. The seed was sown in the greenhouse on April 12, and the plants set out in the garden on June 29, in rows 2 feet apart, and the plants 1 foot apart in the row. The results are as follows:—

PRUNING EXPERIMENT WITH TOMATOES

Variety	Method of pruning to single stem	First ripe fruit	Yield from 25 plants	
			Ripe	Green
			lb. oz.	lb. oz.
Bonny Best	Not headed back	Sept. 1	11 8	32 0
Bonny Best	Stopped at third truss of fruit	Aug. 29	17 13	17 0
Bonny Best	Stopped at second truss of fruit	Aug. 29	14 14	5 0
Bonny Best	Stopped at first truss of fruit	Aug. 29	11 14	1 0
Alacrity	Not headed back	Sept. 1	3 9	40 0
Alacrity	Stopped at third truss of fruit	Sept. 6	1 10	26 0
Alacrity	Stopped at second truss of fruit	Sept. 6	0 12	32 8
Alacrity	Stopped at first truss of fruit	Sept. 6	2 7	31 0

The Bonny Best variety was grown in pots and, therefore, when transplanted, did not receive any check in growth which may account for the difference in yield of ripe fruit.

NITRATE OF SODA FOR VEGETABLES.—The object of this experiment is to compare the results from vegetables which are treated with nitrate of soda versus those which received only the usual application of manure. The nitrate was applied on one-half of each row at the rate of 300 pounds per acre divided into three applications of 100 pounds each. The first application was given on June 28, and the other two at intervals of 10 days. The results are as follows:—

Vegetables	Yield per 30-foot row			
	Nitrate		No Nitrate	
	lb.	oz.	lb.	oz.
Beet	44	4	42	3
Cabbage	73	9	51	1
Carrot	83	9	68	8
Cauliflower	37	8	24	4
Kohl Rabi	39	0	33	0
Lettuce	44	9	44	8
Onion Sets	37	0	27	4
Parsnip	87	7	62	7
Peas	22	6	22	7
Salsify	62	5	53	5
Garden turnip	44	0	42	2
Swede turnip	90	4	72	6

FLOWERS

The annual flowers grown in 1927 did very well indeed. A few sorts were slightly injured by the frost on August 25, but no serious damage occurred and numerous flowers were produced. In fact the bloom was profuse and continuous from early summer until late autumn.

Fifty-eight distinct types or kinds of annual flowers were under test. Several of these were represented by many varieties and colours. Thirty-four were sown in the greenhouse on April 13 and 19. These were transplanted to the borders on June 21.

Among those which are started in the greenhouse and have been found to give the best results over a period of years are the following: Astor, Chrysanthemum (Bridal Robe), Cosmos, Gaillardia, Helichrysum, Marigold, Nicotiana, Phlox Drummondii, Stock, Salpiglossis, Tagetes, Verbena, and Zinnia.

Twenty-four sorts were sown direct in the open on June 1 and 2, with the exception of the Sweet Peas which were seeded on May 20. Among the best for growing in this manner are the following: Alyssum, Browallia, Calendula, Candytuft, Cornflower, Clarkia, Eschsholtzia, Gypsophilia, Larkspur, Lavatera, Virginian Stock, Linaria, Mignonette, Nasturtium, Poppy, Sunflower, Sweet Sultan, and Sweet Peas.

Bulbs have been used quite extensively 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 the majority of these have been proving very hardy, and giving excellent results.

PERENNIAL FLOWERS

Twenty-one species of herbaceous perennials have been under test. The seed was sown in a cold frame on May 23, 1925, with the exception of Paeonia and Iris, which came from Ottawa in the form of roots, and Phlox which was sown in the autumn of 1925. The latter failed to germinate, but the others germinated well. They were transplanted to the nursery rows, which were 1 foot apart and 1 foot between the plants, on June 24, 1925. They all grew well during the summer of 1925 and were wintered in the nursery rows, being covered lightly with straw just previous to the freeze up.

Only fourteen species were alive in the spring of 1926. These were planted out into the border which had previously been well prepared. Splendid growth was made during 1926, but there was no bloom.

Annual flowers were grown between the perennials to fill in the vacant spots and make a show of bloom, and the foliage of these together with their own foliage was the only protection the perennials had during the winter of 1926-27. It might be mentioned, however, that these are protected by a very heavy covering of snow. They came through in good condition and made an excellent show of bloom in 1927 from early summer until late autumn. Some of these are represented by several varieties.

Following will be found the different species under test: Hardy.—Anemone; Aquilegia; Campanula; Chrysanthemum; Coreopsis; Delphinum; Dianthus; Papaver; Paeonia; Platycoden; Rudbeckia; Spiraea; Tritoma; and Iris.

Died in nursery rows first winter.—Althea; Clematis; Dictamnus; Garania; Hemerocallis; Helianthus; and Trollius.

TREES, SHRUBS AND LAWNS

The judicious planting of hardy trees and shrubs is one of the most effective means of adding beauty and comfort to the home surroundings. The past year has been very favourable to the growth and development of this class of material. A good covering of snow formed ample protection during the winter and the abundant moisture during the summer favoured heavy foliage and a healthy appearance.

The laurel-leaved willow and Russian poplar are very rapid growers, and the former may be used either for individual trees or hedge purposes. The Caragana is also one of the best tried as a deciduous hedge. A start has also been made with white spruce for evergreen hedges, and the trees are doing very well.

For ornamental clumps, the lilac, Caragana, Japanese rose, Japanese barberry, Golden currant, Tartarian honeysuckle, Viburnam lantana and Mountain ash are all proving hardy and suitable.

CEREALS

The ground dried up quite early in the spring, and the variety test of peas was seeded on May 9. A rainfall of 1·11 inches on the afternoon and evening of May 9, however, prevented further seeding being done until May 13, when the variety tests of spring wheat and spring rye were sown. The oats and barley were seeded on May 16. The rains during the remainder of the month were in the form of light showers which did not delay further seeding to any extent, but owing to the weather being somewhat cool, growth was rather slow until well on in June. Although June and July received abundant rainfall, there was one period of 17 days between June 25, and July 12, when no rain occurred. The ground got quite dry during the latter part of this period, and, although the hay suffered a check in growth, the cereals did not appear to be much affected and grew remarkably well. Wet weather continued throughout August and September, which caused a considerable amount of rust and made it very difficult to cure the grain crops.

Owing to long hours of sunshine and fairly high temperatures, the cereal grains matured very well, except field peas, and these continued to send out new growth from the end of the vines in place of becoming fully mature. Even after they were harvested, the weather was such that the grain failed to properly cure or harden up.

SPRING WHEAT

Four varieties were under test. The seed was sown on May 13, 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	Number of days maturing	Average length of straw including head	Strength of straw on scale of ten points	Actual yield of grain per acre		Number of days to mature 8-year average 1920-27	Yield of grain per acre 8-year average 1920-27	
			inch		bush.	lb.		bush.	lb.
Huron, Ottawa 3	Sept. 17	127	40	·3	38	40	121	28	38
Marquis, Ottawa 15	" 16	126	39	9·3	34	0	120	26	35
Garnet, Ottawa 652	" 9	119	32	9·0	33	50	.....	.....	
Ruby, Ottawa 623	" 10	120	33	9·0	29	10	110	20	52

The Huron variety is the largest yielder both this year and in the eight-year average. The quality of the flour produced by this variety, however, is not equal to that of the others.

The Garnet has given a very good yield and in view of its earliness may prove to be a very useful variety in this section of the province. Even though it is an early wheat it seems to be very susceptible to rust.

OATS

Seven varieties were under test. The seed was sown on May 16, 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	Number of days maturing	Average length of straw including head	Strength of straw on scale of ten points	Actual yield of grain per acre		Number of days maturing, 6-year average 1922-27	Yield of grain per acre, 6-year average 1922-27	
			inch		bush.	lb.		bush.	lb.
Alaska	Aug. 31	107	42	8·5	63	28	113	52	27
Gold Rain	Sept. 14	121	41	9·0	58	8	120	60	10
Victory	" 16	123	48	8·0	55	10	122	62	25
O.A.C. No. 72	" 15	122	45	8·0	52	2	.....	.....	
Banner, O. 49	" 14	121	47	8·0	50	30	123	59	26
Laurel, O. 477	" 8	115	33	10·0	38	8	.....	.....	
Liberty, O. 480	" 8	115	40	9·0	36	26	115	38	15

The Alaska variety has made a particularly good showing this year in comparison with the others under test. The quality of the grain produced by this variety is also superior to any of the other hulled varieties tried. Victory is ahead in the six-year average followed closely by Gold Rain and Banner. Liberty and Laurel are both hulless varieties.

BARLEY

Seven varieties were under test. The seed was sown on May 16, in quadruplicate one-fortieth-acre plots, at the rate of 2 bushels per acre. The results are as follows:—

VARIETY TEST WITH BARLEY

Variety	Date of ripening	Number of days maturing	Average length of straw including head	Strength of straw on scale of ten points	Actual yield of grain per acre	Number of days maturing, 7-year average 1921–27	Yield of grain per acre, 7-year average 1921–27
			inch		bush. lb.		bush. lb.
Gold	Sept. 16	123	36	8·0	51 22	.....	.....
Duckbill, O. 57	" 14	121	39	10·0	51 12	118	40 18
O.A.C. No. 21	" 10	117	40	9·5	50 0	110	41 15
Manchurian, O. 50	" 10	117	41	9·5	47 4	112	40 15
Charlottetown 80	" 17	124	40	10·0	44 18	.....	.....
Chinese, Ottawa 60	" 12	119	41	9·3	42 14	.....	.....
Himalayan, O. 59	" 2	109	29	10·0	40 20	108	32 35

Gold, Duckbill and O.A.C. No. 21 have given practically the same yields this year. The first two are two-rowed varieties, while O.A.C. No. 21 has six rows. Over a seven-year period, the O.A.C. No. 21 is ahead but is followed closely by Duckbill and Manchurian.

FIELD PEAS

Five varieties were under test. The seed was sown on May 9, 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	Number of days maturing	Average length of plant	Actual yield of grain per acre	Number of days to mature 4-year average 1924–27	Yield of grain per acre, 4-year average 1924–27
			inch	bush. lb.		bush. lb.
Chancellor, O. 26	Sept. 10	124	60	39 40	129	34 18
Arthur, O. 18	" 15	129	49	32 50	132	34 50
Early Raymond	" 12	126	61	32 10	.....	.....
Golden Vine	" 15	129	72	29 20	128	34 25
Mackay, O. 25	" 30	144	90	24 0	140	30 45

The results with field peas this year were somewhat disappointing, in that owing to excessive rainfall they did not entirely mature. That is, all of the varieties continued to send out new growth from the end of the vines. Even after harvesting, the weather was such that they did not properly cure. The Chancellor is a small pea, and, therefore, seemed to harden up a little better than any of the others.

COMMON VETCH

One variety of vetch, namely, Common vetch, was sown on May 9, in quadruplicate one-fortieth-acre plots, at the rate of 1½ bushels per acre. An average yield of 30 bushels to the acre was obtained, but the grain was not sufficiently matured to be suitable as seed.

SPRING RYE

One variety, namely, common spring rye was under test. The seed was sown on May 13, in quadruplicate one-fortieth-acre plots at the rate of 1½ bushels per acre. It matured in 127 days and gave a yield of 27 bushels and 38 pounds per acre. Over a six-year period the average yield is 25 bushels and 27 pounds, and the number of days to mature, 122.

FALL WHEAT

Seven varieties and strains were under test. The seed was sown on August 14, 1926, 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.
Kanred	10	38	50	40
Kharkov (Lethbridge)	10	41	46	10
Kharkov M.C. 22	10	43	44	0
Dawson's Golden Chaff	10	44	42	10
Kharkov (Nobleford)	10	41	40	50
O.A.C. 104	10	44	38	40
Minhardi	10	38	34	50

The quality of the fall wheat produced is particularly good and the results are very encouraging indeed, as these plots were located on new land which had been ploughed less than a month previous to seeding.

FALL RYE

Two varieties were under test. The seed was sown on August 18, 1926, 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.
Dakold	10	54	44	46
Common	10	56	42	18

ROD-ROW PLOTS

In 1927, twenty-five varieties and strains of spring wheat, thirty-four of oats and thirty-four of barley were under test in rod-rows. The seed germinated well and a nice stand developed.

This has been found to be a very excellent method of testing out numerous varieties and strains of the various cereals which could not be included in the larger plots, but which might include something really important and of value for this district.

FORAGE CROPS

The season of 1927 was fairly favourable for the production of most of the common forage crops. The variety test of sunflowers was seeded 5 days earlier than in 1926, but the yield was somewhat lighter. The annual hay crops were seeded a few days later than in 1926 and the yields were about the same on the average. The root crops, with the exception of carrots, were seeded a few days earlier than in 1926 and on the average have given larger yields. The results from the hay and clover crops did not differ materially from those in the previous year, but the clover seed was a complete failure, in that the weather was such that it was absolutely impossible to get the crop sufficiently cured to permit threshing.

ENSILAGE CROPS

VARIETY TEST WITH SUNFLOWERS

Five varieties were under test. The seed was sown on May 23, in quadruplicate one-fortieth-acre plots, on fall-ploughed sod which was manured at the rate of 16 tons per acre previous to disking.

The rows were 30 inches apart, and the plants were thinned to from 6 to 12 inches apart in the row.

Germination was good and a very nice stand developed, although some of the plots were slightly damaged by frost on August 25. They were harvested on September 7. The results are as follows:—

VARIETY TEST WITH SUNFLOWERS

Variety	Source of seed	Average height, 1927	Per cent in bloom when cut, 1927	Yield per acre			
				1927		Average 1924–27	
				Green weight	Dry weight	Green weight	Dry weight
		inch		tons lb.	tons lb.	tons lb.	tons lb.
Mam. Russ	McDonald	66	0	11 1,790	1 527	13 1,588	1 1,510
Giant Russ	D.I.S. Co	61	2	10 1,890	1 198	13 1,695	1 1,533
Early O. 76	C.E.F	53	50	8 1,490	0 1,907	10 1,473	1 938
Mennonite	Rosthern	45	96	6 1,270	0 1,743	.....	.....
Manchurian	McKenzie	56	42	7 1,470	0 1,654	10 727	1 989

Mammoth Russian is the variety used in the field areas on this Station.

VARIETY TEST WITH CORN

Twenty-three varieties were under test. The seed was planted on May 23, in quadruplicate one-eightieth-acre plots on fall-ploughed clay land which was manured at the rate of 16 tons per acre previous to disking. The corn was put in hills 30 inches apart each way with 4 to 6 kernels in a hill. Some of the seed did not germinate very well and it was found necessary to reseed a percentage of the hills in several of the varieties at a later date. Owing to excessive rainfall and quite a lot of cool weather, the corn made rather slow growth, and on August 25, it was badly damaged by frost. No further frost occurred for several weeks, however, and it made a partial recovery, but the yields are essentially light. The plots were not harvested until September 19. The average yield per acre of green material from the twenty-three varieties is 4 tons 516 pounds, and for dry material 962 pounds. The ten highest-yielding varieties gave an average yield of 5 tons 1,320 pounds of green material and 1,292 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; Hybrid, Wimple; Long-

fellow, Dakota Improved Seed Company; Quebec 28, Dr. Todd; Barr Leaming, Carter; Northwestern Dent, Brandon; Ninety-Day White Dent, Dakota Improved Seed Company; Yellow Dent, Wimple; Twitchell's Pride, Fredericton; and Northwestern Dent, Crookston Strain, 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 1927 thirteen varieties of oats were under test. There were also two varieties of barley, Feeder and Alberta Beardless, included. Three of the varieties—Alaska, Daubeney, and O.A.C. No. 3—were seeded on May 23, but rain which occurred the next day prevented further seeding until May 27. The seed was sown in quadruplicate one-fortieth-acre plots on fall-ploughed clay land, which was manured at the rate of 16 tons per acre previous to disking. The rate of seeding was 2½ bushels per acre. The germination was good and very 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							
	1927				Average 1924–27			
	Dry weight		Cured hay containing 15 per cent moisture		Dry weight		Cured hay containing 15 per cent moisture	
	tons	lb.	tons	lb.	tons	lb.	tons	lb.
Late varieties—								
Leader	2	1,341	3	284	2	544	2	1,346
20th Century	2	1,203	3	121	2	363	2	1,133
Alta. Beardless (barley)	2	1,071	2	1,966	.....		.....	
O.A.C. No. 72	2	1,031	2	1,919	2	536	2	1,336
Sensation	2	615	2	1,429	2	171	2	907
Abundance	2	594	2	1,405	2	833	2	1,686
Victory	2	282	2	1,038	2	789	2	1,634
Gold Rain	2	257	2	1,008	2	251	2	1,001
Ligowa	2	190	2	929	2	323	2	1,086
Banner	2	120	2	847	2	485	2	1,276
Early varieties—								
Feeder (barley)	1	1,467	2	79	.....		.....	
Liberty	1	708	1	1,186	1	1,629	2	269
Alaska	1	535	1	982	1	1,698	2	351
O.A.C. No. 3	1	398	1	821	1	1,835	2	512
Daubeney	1	81	1	448	1	1,592	2	226

It may be noted that the late varieties have all given about equal yields, which are significantly greater than those obtained from the early varieties. There is also practically no difference in yield among the early varieties. However, in point of quality the early varieties which are finer in the straw are superior to the others.

When well cured, oat hay makes a very satisfactory feed and is relished by nearly all kinds of live stock, particularly cattle.

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			
	1927		Average 1924–27	
	Dry weight	Cured hay containing 15 per cent moisture	Dry weight	Cured hay containing 15 per cent moisture
	tons lb.	tons lb.	tons lb.	tons lb.
When in bloom	1 1,255	1 1,829	1 1,990	2 694
When turning	2 331	2 1,095	2 481	2 1,272
When nearly ripe	2 265	2 1,018	2 232	2 979

The figures in this table indicate that oats contain a comparatively large amount of dry matter, even in the very green stage. The greatest weight of dry matter has been obtained when the crop is turning, and at this stage the palatability is particularly good. For best results it would appear that when oats are going to be used as a hay-crop they should be cut when from 10 to 20 per cent have turned.

PEAS AS ANNUAL HAY

Four varieties were under test. The seed was sown on May 28, in quadruplicate one-fortieth-acre plots on fall-ploughed clay-loam soil. The average rate of seeding was 3 bushels per acre. The plots were harvested on September 9. The results are as follows:—

VARIETY TEST WITH PEAS AS ANNUAL HAY

Variety	Yield per acre			
	1927		Average 1924–27	
	Dry weight	Cured hay containing 15 per cent moisture	Dry weight	Cured hay containing 15 per cent moisture
	tons lb.	tons lb.	tons lb.	tons lb.
Arthur	2 1,197	3 114	2 584	2 1,393
Mackay	2 387	2 1,161	.....	.....
Golden Vine	2 49	2 764	2 234	2 981
Canadian Beauty	1 1,488	2 104	2 529	2 1,328

The figures in this table show that 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 sown largely in a mixture with oats or oats and vetch, as under this condition they improve both the yield and quality of the crop on account of their rank growth and high protein content.

VETCH AS ANNUAL HAY

Common vetch was under test as an annual hay. The seed was sown on May 28, in quadruplicate one-fortieth-acre plots, on fall-ploughed clay-loam soil, at the rate of 1½ bushels per acre. The plots were harvested on September 9. The results are as follows:—

VETCH AS ANNUAL HAY

Variety	Yield per acre							
	1927				Average 1924-27			
	Dry weight		Cured hay containing 15 per cent moisture		Dry weight		Cured hay containing 15 per cent moisture	
	tons	lb.	tons	lb.	tons	lb.	tons	lb.
Common	1	1,174	1	1,734	1	1,624	2	264

As may be noted from this table, vetch gives a fair yield of dry matter. If used at all, it is better sown in a mixture with oats or oats and peas. Probably the most serious objection to this crop is the high cost of the seed.

SWEET CLOVER AS ANNUAL HAY

Three varieties were under test. In 1927 the seed was sown on June 2, in quadruplicate one-fortieth-acre plots at the rate of 20 pounds per acre. The crop was harvested on October 22. The results are as follows:—

VARIETY TEST WITH SWEET CLOVER AS ANNUAL HAY

Variety	Yield per acre							
	1927				Average 1924-27			
	Dry weight		Cured hay containing 15 per cent moisture		Dry weight		Cured hay containing 15 per cent moisture	
	tons	lb.	tons	lb.	tons	lb.	tons	lb.
White Blossom	1	1,593	2	227	1	1,836	2	513
Yellow Blossom	1	1,463	2	74	1	472	1	908
Hubam	2	1,585	3	571	2	377	2	1,149

The Hubam, which is an annual sweet clover, has given the largest yield both this year and in the four-year average. The White Blossom variety, however, has also given very good yields and considering that it gives a good yield the second year without further seeding it may prove the best paying variety to use.

BIENNIAL VERSUS ANNUAL SWEET CLOVER

The object of this experiment is to compare the results from biennial sweet clover during the second year with annual sweet clover. The two biennial

varieties were sown on June 5, 1926, in quadruplicate one-fortieth-acre plots, on fall ploughed clay-loam soil which had been in hoed crop the previous year. The rate of seeding was 20 pounds per acre. The Hubam, which is the annual variety, was sown on June 2, 1927, in a similar manner. The biennial varieties were harvested on July 30, and the Hubam on October 21. The results are as follows:—

BIENNIAL VERSUS ANNUAL SWEET CLOVER

Variety	Average height 1927	Yield per acre			
		1927		Average 1924-27	
		Dry weight	Cured hay containing 15 per cent moisture	Dry weight	Cured hay containing 15 per cent moisture
	inch	tons lb.	tons lb.	tons lb.	tons lb.
Biennial—					
White Blossom	49	2 338	2 1,104	2 784	2 1,628
Yellow Blossom	35	1 1,869	2 552	2 225	2 971
Annual—					
Hubam	36	1 1,592	2 226	1 1,419	2 22

Both the White and Yellow Blossom varieties 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. The A and B series of the variety test of swede turnips, fall turnips, and mangels, as well as the date of seeding mangels and carrots, were seeded on a range of fall-ploughed sod which was manured at the rate of 16 tons per acre just previous to disking, while the C and D series were seeded on a range of sod which had been manured and ploughed in the early summer and disked occasionally until late autumn when it was again ploughed. It is worthy of note that there was a distinct difference in the suitability of these two ranges from the standpoint of growing roots. The plots which were planted on the early ploughed range were a more even stand, a better colour, contained fewer weeds and gave a much better yield, which indicates the desirability of the thorough preparation of land for root production.

MANGELS

Thirty-three varieties were under test. The seed was sown on May 21, and the plants were thinned to 8 inches apart in the row. The plots were harvested from September 30 to October 5. The results are as follows:—

VARIETY TEST WITH MANGELS

Variety	Source of seed	Per cent true to type 1927	Yield per acre					
			1927				Average 1925–27	
			Green weight		Dry weight		Green weight	Dry weight
			tons	lb.	tons	lb.	tons lb.	tons lb.
White Green Top Half Sugar	Hartmann	85	12	1,840	1	1,317	10 400	1 648
Gate Post	Bruce	98	12	1,960	1	1,314	.....	.....
Danish Sludstrup	McDonald	92	13	1,100	1	1,308	10 233	1 521
Barres Half Long	G. Swedish	60	12	1,500	1	1,275	10 47	1 678
Stryno Barres	Hartmann	92	14	600	1	1,237	11 1,000	1 830
Giant Red Sugar	Bruce	90	12	1,240	1	1,215	10 1,187	1 772
Svalof Original Rubra	G. Swedish	98	11	1,980	1	1,208	.....	.....
Yellow Intermediate	C.E.F.	98	12	680	1	1,203	.....	.....
Eckendorfer Yellow	Hartmann	85	13	380	1	1,021	11 320	1 594
Giant White Feeding	Bruce	75	12	620	1	1,011	10 1,927	1 741
Barres Oval	G. Swedish	98	13	280	1	884	11 1,973	1 905
Danish Sludstrup	D. & F.	95	14	80	1	869	9 1,767	1 339
Prize Mammoth Long Red	Steele Briggs	96	11	960	1	852	.....	.....
Ferritslev Barres	Hartmann	98	13	20	1	759	10 1,447	1 619
Red Globe	Ewing	97	11	0	1	721	9 507	1 416
Yellow Leviathan	Steele Briggs	98	12	1,140	1	715	10 640	1 763
Eclipse	McKenzie	98	13	860	1	686	.....	.....
Yellow Globe	Bruce	96	12	1,420	1	679	9 1,473	1 284
Giant White Feeding Sugar	Steele Briggs	80	10	1,920	1	652	10 1,953	1 711
Eluethan Mammoth	Hartmann	90	11	260	1	600	10 400	1 893
Svalof Original Alfa	G. Swedish	95	11	940	1	598	9 653	1 331
Yellow Eckendorfer	G. Swedish	100	12	1,440	1	585	11 1,747	1 600
Rosted Barres	Hartmann	85	11	1,660	1	531	14 920	1 1,655
New Ideal	S. Briggs	95	11	360	1	507	9 1,100	1 266
Royal Giant Sugar Beet	Steele Briggs	95	9	1,700	1	492	.....	.....
Red Eckendorfer	G. Swedish	95	13	0	1	487	10 833	1 380
White Red Top Half Sugar	Hartmann	95	10	540	1	471	9 1,033	1 540
Giant Yellow Globe	Steele Briggs	96	11	280	1	408	10 393	1 330
Red Globe	Bruce	99	9	1,940	1	380	8 1,240	1 66
Golden Tankard	Bruce	85	9	1,620	1	367	8 773	1 208
Eckendorfer Red Tankard	Hartmann	90	11	1,000	1	246	10 1,173	1 335
Giant Yellow Intermediate	Steele Briggs	96	9	1,420	0	1,998	9 1,680	1 566
Yellow Leviathan	Bruce	94	9	380	0	1,881	9 193	1 230

DATE OF SEEDING MANGELS

The object of this experiment is to compare the results from different dates of seeding. The variety used was Yellow Intermediate. The seed was sown at intervals of seven days, commencing May 21. The roots were harvested on October 6. The results are as follows:—

DATE OF SEEDING MANGELS

Date of Seeding	Yield per acre, 1927			
	Green weight		Dry weight	
	tons	lb.	tons	lb.
May 21	16	60	1	1,686
May 28	15	1,440	2	40
June 4	12	200	1	771
June 11	10	380	1	485
June 18	7	340	0	1,641
June 25	3	640	0	760

It may be noted that after the second seeding there was a gradual decrease in yield as the seedings became later.

SWEDE TURNIPS

Twenty-seven varieties were under test. The seed was sown on May 20, and the plants were thinned to 12 inches apart in the row. The plots were harvested on September 29 and October 7. The results are as follows:—

VARIETY TEST WITH SWEDE TURNIPS

Variety	Source of seed	Yield per acre							
		1927				Average 1924–27			
		Green weight		Dry weight		Green weight		Dry weight	
		tons	lb.	tons	lb.	tons	lb.	tons	lb.
Improved Yellow	Gen. Swedish	26	1,800	1	1,701	14	730	1	454
Hartley's Bronze Top	Graham	19	1,920	1	1,471	.....		.....	
Bangholm	Kentville	17	500	1	1,258	.....		.....	
Swede Cornings	Yarmouth	17	520	1	1,233	.....		.....	
Canadian Gem	Steele Briggs	21	340	1	1,113	.....		.....	
Bangholm	Gen. Swedish	20	1,520	1	1,075	12	1,860	1	250
Ditmars	McNutt	22	1,960	1	1,053	13	525	1	84
Kangaroo	Steele Briggs	17	1,900	1	1,027	10	1,310	0	1,969
Olsgaard Bangholm	Hartmann	18	1,400	1	1,009	.....		.....	
Hall's Westbury	Bruce	17	1,020	1	920	.....		.....	
Selected Purple Top	Steele Briggs	20	860	1	893	13	110	1	326
Bangholm	Nappan	16	1,320	1	847	.....		.....	
White Swede	Bruce	17	380	1	775	11	1,295	1	271
New Perfect	Bruce	18	80	1	730	11	1,300	1	1
Magnum Bonum	Bruce	15	40	1	567	11	755	1	92
Bangholm	Charlottetown	14	1,500	1	514	.....		.....	
Shepherd Golden Globe	Hartmann	17	480	1	486	.....		.....	
Jumbo	Steele Briggs	17	1,460	1	461	10	1,530	0	1,844
Derby Green Top	Bruce	14	240	1	414	10	745	0	1,938
Bangholm	Ewing	15	220	1	385	10	1,665	0	1,952
Hartley's Bronze Top	Bruce	12	1,040	1	326	9	1,250	0	1,865
Canadian Gem	Bruce	14	1,580	1	320	10	1,405	0	1,911
Elephant or Monarch	Bruce	13	1,720	1	278	.....		.....	
Kangaroo	Bruce	14	1,240	1	196	9	1,875	0	1,691
Elephant or Monarch	Ewing	15	500	1	174	.....		.....	
Good Luck	Steele Briggs	14	1,900	1	43	10	595	0	1,832
Hazards Improved	Steele Briggs	13	920	0	1,931	9	635	0	1,645

Swede turnips do very well in this district, owing to their ability to grow during damp weather when the mean temperature is low.

DATE OF SEEDING SWEDE TURNIPS

The object of this experiment is to compare the results from different dates of seeding. Bangholm was the variety used. The seed was sown at intervals of seven days commencing on May 21. The roots were harvested on September 19. The results are as follows:—

DATE OF SEEDING SWEDE TURNIPS

Date of Seeding	Yield per acre, 1927			
	Green weight		Dry weight	
	tons	lb.	lb.	
May 21	5	600	1,314	
May 28	7	800	1,741	
June 4	6	620	1,587	
June 11	3	1,640	985	
June 18	0	1,760	227	
June 25	1	500	368	

FALL TURNIPS

Fourteen varieties were under test. The seed was sown on May 20, and the plants were thinned to 12 inches apart in the row. They were harvested on September 27. The results are as follows:—

VARIETY TEST WITH FALL TURNIPS

Variety	Source of seed	Yield per acre							
		1927				Average 1924–27			
		Green weight		Dry weight		Green weight		Dry weight	
		tons	lb.	tons	lb.	tons	lb.	tons	lb.
Hardy Green Round	Sutton	29	800	1	1,588	17	223	1	201
Yellow Tankard	D.L.F.	30	240	1	1,579	.....	.....	.....	.....
Red Paragon	Sutton	29	1,620	1	1,180	18	805	1	358
White Globe	Ewing	30	380	1	1,171	17	890	1	201
Pomeranian White Globe	Steele Briggs	27	200	1	1,002	17	372	1	438
Early Six Weeks	Sutton	29	760	1	945	17	1,678	0	1,987
Purple Top Mammoth	Sutton	31	1,320	1	935	18	1,255	1	176
Green Top Yellow Aberdeen	Ewing	24	540	1	903	14	610	1	179
Fynsk Bortfelder	D.L.F.	28	1,960	1	901	.....	.....	.....	.....
Dales	D.L.F.	26	200	1	844	.....	.....	.....	.....
Aberdeen Purple Top	Steele Briggs	22	960	1	783	16	1,460	1	412
Purple Top Aberdeen	Sutton	21	1,860	1	702	.....	.....	.....	.....
Devonshire Greystone	Steele Briggs	29	1,180	1	590	19	445	1	317
Purple Top Mammoth	Steele Briggs	23	1,340	0	1,939	17	965	1	141

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 grow better on muck land than swedes and are very seldom damaged by cutworms.

DATE OF SEEDING FALL TURNIPS

The object of this experiment is to ascertain what date or dates of seeding will give the largest yields and be the most satisfactory generally. The variety used is Hardy Green Round. The seed was sown at intervals of seven days, commencing on May 21. The roots were harvested on September 28. The results are as follows:—

DATE OF SEEDING FALL TURNIPS

Date of seeding	Yield per acre							
	1927				Average 1924–27			
	Green weight		Dry weight		Green weight		Dry weight	
	tons	lb.	tons	lb.	tons	lb.	tons	lb.
May 21	21	480	1	480	20	1,380	1	760
May 28	19	1,480	1	396	17	1,600	1	356
June 4	14	1,840	0	1,691	13	1,615	1	8
June 11	13	220	0	1,350	10	470	0	1,397
June 18	10	1,660	0	1,149	8	1,540	0	1,169
June 25	8	1,060	0	897	5	685	0	717

Even though 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 by the figures in the above table.

FIELD CARROTS

Sixteen varieties were under test. The test was sown on June 8, on fall ploughed clay-loam soil which produced a crop of field peas the previous year. The plants were thinned to about 4 inches apart in the row. They were harvested on October 19, 20 and 21. The results are as follows:—

VARIETY TEST WITH FIELD CARROTS

Variety	Source of seed	Yield per acre			
		1927		Average 1924–27	
		Green weight	Dry weight	Green weight	Dry weight
		tons lb.	lb.	tons lb.	lb.
Improved Short White	Steele Briggs	8 1,440	1,553	6 610	1,155
Mammoth Intermediate Smooth White	Bruce	7 1,680	1,535	5 1,780	1,172
White Belgian	Hartmann	7 900	1,519	5 1,060	1,180
White Belgian	Trifolium	6 840	1,396	5 960	1,168
Large White Belgian	Steele Briggs	5 1,760	1,208	4 1,470	995
Danish Champion	C.E.F	5 720	1,153	4 1,020	999
Large White Vosges	Bruce	5 1,500	1,141	.....	.....
White Belgian	D. & F	5 960	1,139	4 1,390	1,010
Half Long White	G. Swedish	5 40	1,137	4 190	950
Long Orange Belgian	Bruce	4 740	1,116	4 10	952
Champion	G. Swedish	5 260	1,075	.....	.....
White Belgian	Bruce	5 900	1,067	5 245	1,051
Champion	Hartmann	4 1,340	1,021	3 1,985	886
James	D.L.F	3 320	795	.....	.....
Long Orange	Bruce	2 1,860	745	2 1,950	731
White Intermediate	Summerland	3 580	625	.....	.....

DATE OF SEEDING FIELD CARROTS

The object of this experiment is to ascertain what date or dates of seeding would give the best results. Improved Short White was the variety used. The seed was sown at intervals of seven days commencing on May 21. The roots were harvested on October 8. The results are as follows:—

DATE OF SEEDING FIELD CARROTS

Date of seeding	Yield per acre 1927	
	Green weight	Dry weight
	tons lb.	tons lb.
May 21	10 980	0 1,841
May 28	12 400	1 51
June 4	9 900	0 1,703
June 11	6 1,320	0 1,194
June 18	2 1,080	0 466
June 25	0 1,740	0 165

LEGUMES AND GRASSES

HAY PRODUCTION FROM GRASSES ALONE AND IN COMBINATION WITH CLOVERS

The objects of this experiment are to compare the results 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 1925 this experiment was seeded in quadruplicate one-fortieth-acre plots, using barley as a nurse-crop. In 1926 it was again seeded in a similar manner. The results in 1927 from these two seedings and also the average results from the 1923-25 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									
					Second-year meadow, 1927				First-year meadow, 1927				Average first and second-year meadow, 1924–27			
					Dry weight		Cured hay containing 15 per cent moisture		Dry weight		Cured hay containing 15 per cent moisture		Dry weight		Cured hay containing 15 per cent moisture	
Red clover	Alsike clover	Timothy	Meadow fescue	Orchard grass	tons	lb.	tons	lb.	tons	lb.	tons	lb.	tons	lb.	tons	lb.
lb.	lb.	lb.	lb.	lb.												
10	.....	8	.....	.....	1	658	1	1,127	1	627	1	1,091	1	1,465	2	76
10	.....	.....	15	.....	0	1,886	1	219	1	1,012	1	1,544	1	1,005	1	1,535
10	.....	.....	.....	15	0	1,671	0	1,966	1	914	1	1,428	1	561	1	1,013
10	.....	6	10	.....	0	1,999	1	352	1	1,324	1	1,911	1	991	1	1,519
10	.....	6	.....	10	0	1,870	1	200	1	918	1	1,433	1	869	1	1,375
10	.....	.....	10	10	0	1,556	0	1,831	1	1,090	1	1,635	1	502	1	944
.....	6	8	.....	.....	1	103	1	474	1	1,418	2	21	1	1,166	1	1,725
.....	6	.....	15	.....	0	1,796	1	113	1	1,394	1	1,993	1	602	1	1,061
.....	6	.....	.....	15	0	1,963	1	309	1	1,110	1	1,659	1	399	1	822
.....	6	6	10	.....	1	373	1	792	1	1,108	1	1,656	1	933	1	1,451
.....	6	6	.....	10	1	248	1	645	1	700	1	1,176	1	703	1	1,180
.....	6	.....	10	10	0	1,788	1	104	1	882	1	1,391	1	500	1	941
8	2	8	.....	.....	1	452	1	885	1	822	1	1,320	1	1,056	1	1,595
8	2	.....	15	.....	0	1,998	1	351	1	613	1	1,074	1	884	1	1,393
8	2	.....	.....	15	1	69	1	434	1	530	1	976	1	551	1	1,001
8	2	6	10	.....	1	503	1	945	1	917	1	1,432	1	1,046	1	1,584
8	2	6	.....	10	1	757	1	1,244	1	954	1	1,475	1	1,154	1	1,711
8	2	.....	10	10	1	409	1	834	1	1,206	1	1,772	1	951	1	1,472
.....	.....	12	.....	.....	1	125	1	500	1	696	1	1,172	1	947	1	1,467
.....	.....	.....	30	.....	0	1,409	0	1,658	1	84	1	452	1	115	1	488
.....	.....	.....	.....	30	0	1,317	0	1,549	0	1,157	0	1,361	0	1,733	1	89
.....	.....	8	15	.....	0	1,509	0	1,775	0	1,722	1	26	1	347	1	761
.....	.....	8	.....	15	0	1,537	0	1,808	0	1,563	0	1,839	1	326	1	736
.....	.....	.....	15	15	0	1,387	0	1,632	0	1,768	1	80	1	227	1	620

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	Average yield per acre from first- and second-year meadow, 1924–27			
	Dry weight		Cured hay containing 15 per cent moisture	
	tons	lb.	tons	lb.
Where red clover is the base (6 plots)	1	899	1	1,411
Where alsike clover is the base (6 plots)	1	717	1	1,196
Where red and alsike mixed are the base (6 plots)	1	940	1	1,459
Where no clover is used (6 plots)	1	283	1	686
Where timothy is included (4 plots)	1	1,159	1	1,716
Where meadow fescue is included (4 plots)	1	652	1	1,120
Where orchard grass is included (4 plots)	1	311	1	719
Where timothy and meadow fescue are included (4 plots)	1	889	1	1,338
Where timothy and orchard grass are included (4 plots)	1	763	1	1,251
Where meadow fescue and orchard grass are included (4 plots)	1	545	1	994

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 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 both red and alsike clover have given the largest yields, followed by those containing red clover alone and alsike alone. The mixtures where no clover is used have given the lowest yields.

TIMOTHY AND CLOVERS FOR HAY PRODUCTION

The objects of this experiment are to compare the results 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 1925 this experiment was seeded in quadruplicate one-fortieth-acre plots, using barley as a nurse-crop. In 1926 it was repeated in a similar manner. The results in 1927 from these two seedings, and also the average results from the 1923-25 seedings, are shown in the following table:—

TIMOTHY AND CLOVERS FOR HAY PRODUCTION

Seed sown per acre			Yield per acre									
			Second-year meadow 1927				First-year meadow 1927				Average first- and second-year meadow, 1924-27			
Timothy	Red clover	Alsike clover	Dry weight		Cured hay containing 15 per cent moisture		Dry weight		Cured hay containing 15 per cent moisture		Dry weight first- and second-year crop		Cured hay containing 15 per cent moisture	
lb.	lb.	lb.	tons	lb.	tons	lb.	tons	lb.	tons	lb.	tons	lb.	tons	lb.
8	10	.....	1	910	1	1,424	1	190	1	576	1	1,238	1	1,809
8	8	2	1	1,477	2	91	1	663	1	1,133	1	1,339	1	1,928
8	6	3	1	868	1	1,374	1	445	1	876	1	1,321	1	1,907
8	4	4	1	596	1	1,054	1	702	1	1,179	1	1,096	1	1,642
8	2	5	1	956	1	1,478	1	676	1	1,148	1	940	1	1,459
6	10	.....	1	1,040	1	1,576	1	724	1	1,205	1	1,077	1	1,620
6	8	2	1	1,301	1	1,884	1	686	1	1,160	1	1,309	1	1,893
6	6	3	1	1,119	1	1,669	1	476	1	913	1	1,120	1	1,671
6	4	4	1	905	1	1,418	1	373	1	792	1	1,008	1	1,539
6	2	5	1	1,062	1	1,602	1	522	1	967	1	1,047	1	1,585

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 hay mixture without materially affecting the yield obtained. It may be noted, however, that at least 2 pounds of the red clover may be profitably replaced with 2 pounds of alsike.

LATE AND EARLY CLOVER WITH LATE AND EARLY GRASS

The object of this experiment is to compare the results 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 1925 in quadruplicate one-fortieth-acre plots, using barley as a nurse-crop. In 1926 it was repeated in a similar manner. The results to date are as follows:—

LATE AND EARLY CLOVER WITH LATE AND EARLY GRASS

Seed sown per acre				Yield per acre									
				Second-year meadow 1927				First-year meadow 1927				Average first and second-year meadow 1924-27	
				Dry weight		Cured hay containing 15 per cent moisture		Dry weight		Cured hay containing 15 per cent moistute		Dry weight	Cured hay containing 15 per cent moisture
Timothy	Meadow fescue	Early red clover	Late red clover										
lb.	lb.	lb.	lb.	tons	lb.	tons	lb.	tons	lb.	tons	lb.	tons lb.	tons lb.
8	.....	10	.....	1	847	1	1,349	1	133	1	509	1 1,375	1 1,971
.....	15	10	.....	1	68	1	433	0	1,991	1	342	1 1,225	1 1,794
8	.....	.....	10	1	977	1	1,502	0	1,978	1	327	1 1,499	2 116
.....	15	.....	10	1	416	1	842	0	1,901	1	236	1 1,086	1 1,631

There does not appear to be much difference between the yielding ability of the two clovers, but the timothy has been giving somewhat better results than the meadow fescue.

LATE VERSUS EARLY CLOVER IN STANDARD HAY MIXTURE

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

In 1925 this experiment was seeded in quadruplicate one-fortieth-acre plots, using barley as a nurse-crop. In 1926 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									
				Second-year meadow 1927				First-year meadow 1927				Average first and second-year meadow 1924-27	
				Dry weight		Cured hay containing 15 per cent moisture		Dry weight		Cured hay containing 15 per cent moisture		Dry weight first and second year crop	Cured hay containing 15 per cent moisture
Timothy	Alsike clover	Common red clover	Late red clover										
lb.	lb.	lb.	lb.	tons	lb.	tons	lb.	tons	lb.	tons	lb.	tons lb.	tons lb.
8	2	8	.....	1	599	1	1,058	1	348	1	762	1 1,103	1 1,651
8	2	.....	8	1	664	1	1,134	1	279	1	681	1 1,084	1 1,628

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 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 1926 twelve varieties were sown in quadruplicate and one variety in duplicate one-fortieth-acre plots, using barley as a nurse crop.

The results in 1927 from the plots seeded in 1926, together with the four-year average for first-year meadow, are given in the following table:—

VARIETY TEST WITH RED CLOVER

Variety	Yield per acre from first-year meadow			
	1927		Average 1924-27	
	Dry weight	Cured hay containing 15 per cent moisture	Dry weight	Cured hay containing 15 per cent moisture
	tons lb.	tons lb.	tons lb.	tons lb.
Kapuskasing	1 1,774	2 440	1 1,174	1 1,734
Oxdrift	1 1,579	2 211	.....	.....
Chateauguay	1 1,532	2 155	1 1,032	1 1,567
St. Clet	1 1,034	1 1,569	1 1,340	1 1,929
Chilean	1 872	1 1,379	.....	.....
C. E. Farm	1 765	1 1,253	1 1,242	1 1,814
Emilia	1 500	1 941	.....	.....
Alta Swede	1 451	1 884	1 1,262	1 1,838
Romagnera	0 1,748	1 56	.....	.....
Venito	0 1,735	1 41	.....	.....
Early Swedish	0 1,391	0 1,636	1 865	1 1,371
Marohe	0 895	0 1,053	.....	.....
English Wild Red	.....	.....	.....	.....

From observation on this experiment it has been noted that there is a very great tendency for the Italian sorts to kill out rather badly and yet the yields of these in some cases compare favourably with the other varieties, but this can be explained by the fact that a volunteer crop of alsike clover and in some cases timothy may often replace the red clover where it has killed out.

The wild red variety is low growing with running root stocks and did not grow sufficiently tall to permit cutting.

VARIETY TEST WITH TIMOTHY

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

In 1925, three varieties were sown in quadruplicate one-fortieth-acre plots, using barley as a nurse-crop. In 1926 the experiment was repeated in a similar manner.

The results in 1927 from these two seedings are as follows:—

VARIETY TEST WITH TIMOTHY

Variety	Yield per acre, 1927			
	Second-year meadow		First-year meadow	
	Dry weight	Cured hay containing 15 per cent moisture	Dry weight	Cured hay containing 15 per cent moisture
	tons lb.	tons lb.	tons lb.	tons lb.
Ermine	1 1,141	1 1,695	.....	.....
Commercial	1 768	1 1,256	1 1,097	1 1,644
Ohio	1 718	1 1,198	1 992	1 1,520
Boon	.....	.....	1 797	1 1,291

METHODS OF SEEDING ALFALFA FOR HAY PRODUCTION

The objects of this experiment are to compare the results 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 when seeded with and without a nurse-crop.

In 1925 this experiment was seeded in quadruplicate one-fortieth-acre plots, using barley as a nurse-crop. In 1926 it was repeated in a similar manner. The results are as follows:—

METHODS OF SEEDING ALFALFA FOR HAY PRODUCTION

Method	Yield per acre											
	Second-year meadow 1927				First-year meadow 1927				Average, first- and second-year meadow 1924–27			
	Dry weight		Cured hay containing 15 per cent moisture		Dry weight		Cured hay containing 15 per cent moisture		Dry weight		Cured hay containing 15 per cent moisture	
	tons	lb.	tons	lb.	tons	lb.	tons	lb.	tons	lb.	tons	lb.
With a Nurse-crop—												
In drills 12 inches apart	2	1,435	3	394	0	1,962	1	308	2	130	2	859
Broadcast 20 lb. per acre	3	2	3	1,061	1	267	1	667	2	229	2	975
Without a Nurse-crop—												
In drills 12 inches apart	3	369	3	1,493	1	1,599	2	234	2	757	2	1,596
Broadcast 20 lb. per acre	3	1,184	4	452	1	1,854	2	534	2	1,119	3	22

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

There is quite a difference between the plots seeded with and without a nurse-crop, in favour of the latter method. This varies considerably from year to year, depending on the season and other conditions such as stand of nurse-crop, etc. It is always most marked in the first cut of the new meadow. Considering the average results, however, it is doubtful if the increase in yield is sufficiently large to justify the adoption of this practice on a large scale, because it means the loss of one season's crop and there is also greater tendency for weeds to become established.

NITRO-CULTURE ON ALFALFA

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

In 1925 this experiment was seeded in quadruplicate one-fortieth-acre plots at the rate of 20 pounds per acre without a nurse-crop. In 1926 it was repeated in a similar manner. The results are as follows:—

NITRO-CULTURE ON ALFALFA

Treatment	Yield per acre											
	Second-year meadow 1927				First-year meadow 1927				Average, first- and second-year meadow 1924–27			
	Dry weight		Cured hay containing 15 per cent moisture		Dry weight		Cured hay containing 15 per cent moisture		Dry weight		Cured hay containing 15 per cent moisture	
	tons	lb.	tons	lb.	tons	lb.	tons	lb.	tons	lb.	tons	lb.
Treated	2	1,969	3	1,022	0	1,372	0	1,614	2	39	2	752
Untreated	3	290	3	1,400	0	1,101	0	1,295	2	43	2	756

The figures in this table do not show any significant difference between the treated and untreated seed. This may be explained by the fact that the various farm implements cultivating the experimental grounds have distributed the bacteria from other alfalfa areas. During the early years of the test, however, there was quite a marked advantage in favour of the treated seed and farmers would be well advised not to neglect this feature when sowing alfalfa, particularly if none has been previously grown.

VARIETY TEST WITH ALFALFA

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

In 1926 eight varieties were seeded on May 28, in quadruplicate one-fortieth-acre plots, using barley as a nurse-crop.

The results in 1927 are as follows:—

VARIETY TEST WITH ALFALFA

Variety	Yield per acre 1927			
	Dry weight		Cured hay containing 15 per cent moisture	
	tons	lb.	tons	lb.
Baltic, D.I.S. Co	1	324	1	734
Grimm, Alta. Seed Growers	1	58	1	421
Grimm, A.B. Lyman	0	1,736	1	42
Variegated, Peel County	0	1,625	0	1,912
Cossack, Par. Alfalfa Farm	0	1,545	0	1,818
Cossack, D.I.S. Co	0	1,450	0	1,706
Medicago falcata, par. Alfalfa Farm	0	855	0	1,006
Grimm, Kap. Grown	.....		.....	

The seed grown at Kapuskasing failed to germinate.

NITRO-CULTURE ON RED CLOVER

The object of this experiment is to compare the results from red clover when seeded with and without nitro-culture treatment. In 1926 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 from first-year meadow			
	1927		Average 1924-27	
	Dry weight	Cured hay containing 15 per cent moisture	Dry weight	Cured hay containing 15 per cent moisture
	tons lb.	tons lb.	tons lb.	tons lb.
Treated	1 846	1 1,348	1 1,018	1 1,551
Untreated	1 1,324	1 1,911	1 1,100	1 1,647

There is apparently no advantage in treating red clover seed with nitro-culture in this district. As red clover grows so readily, it would appear as though the soil is already sufficiently well inoculated with the proper bacteria for this plant.

TIMOTHY SEED PRODUCTION

The object of this experiment is to compare the results 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 1925 this experiment was seeded in quadruplicate one-fortieth-acre plots, using barley as a nurse-crop. In 1926 it was repeated in a similar manner; but the stand from the latter seeding was too uneven to use for experimental purposes, so that the yields in 1927 are from the 1925 seeding. The results to date are as follows:—

TIMOTHY SEED PRODUCTION

Method of seeding	Yield per acre			
	Seed sown per acre	Seeded 1925 yield 1927	Three-year average first-year crop	Four-year average second-year crop
	lb.	bush. lb.	bush. lb.	bush. lb.
Broadcast, timothy	10	.....	.....	.....
" red clover	8	7 34	.....	4 34
Broadcast, timothy	10	6 2	4 23	5 19
Rows 12 inches apart	.....	5 20	3 43	5 3
Rows 24 inches apart	.....	5 20	3 25	5 32

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 this makes it impossible to obtain pure seed.

The average results show that there is not much difference between that seeded broadcast and in rows, but 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 would appear as though the broadcast method is to be preferred.

FERTILIZER EXPERIMENTS

The object of this experiment is to determine to what extent commercial fertilizers including nitrate of soda, superphosphate, muriate of potash and basic slag may be economically employed for the growing of grain, hay and silage crops on clay soil in northern Ontario. The various fertilizer materials used were applied to the first crop under the following rotation: First year, O.P.V.; second year, barley; 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. This was sown to O.P.V. in 1926 and after this crop was harvested the land was again fall-ploughed in preparation for the barley, which was seeded on May 28, 1927, in duplicate one-fortieth-acre plots at the rate of two bushels per acre. Germination was good and a nice even stand developed on all plots. O.A.C. No. 21 is the variety which was used and the crop was harvested on September 14.

The second area in this experiment was ploughed in the autumn of 1926, in preparation for the silage crop in 1927. The O.P.V. was seeded on May 28, 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 and a very nice stand developed on all plots.

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 one month apart.

This experiment will have to be continued for a number of years before any reliable conclusions can be drawn.

POULTRY

The Barred Plymouth Rock is the only breed of hens which has been kept at this Station, and it seems to meet the requirements of a general purpose breed very well.

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, $3; oats, $1.99; barley, $2.40; corn, $2.58; bran, $1.34; middlings, $1.82; meat meal, $5.61; beef scrap, $5.33; skim-milk, $0.50; oyster-shell, $2.20; grit, $1.80; charcoal, $2.50; clover leaves, $1.

SKIM-MILK VERSUS BEEF SCRAP

The object of this experiment is to compare the results from the use of skim-milk and beef scrap as a source of animal protein for winter egg production. In 1926-27 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 was made up 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. Mineral matter and green feed were also supplied to each lot. The results are as follows:—

SKIM-MILK VERSUS BEEF SCRAP

Items		Skim-milk 1927	Beef scrap 1927	Skim-milk three-year average	Beef scrap three-year average
Number of birds	No.	50	50	50	50
Weight at beginning Nov. 1	lb.	234	230	223·3	220·7
Weight at finish April 30	lb.	307	282	284·0	273·0
Pounds of scratch	lb.	1,861	1,805	1,679·3	1,684·7
Pounds of mash	lb.	814	747	619·7	617·7
Pounds of green feed	lb.	336	309	334·7	327·0
Pounds of milk	lb.	1,520	.....	1,532·0	.....
Pounds of meat scrap	lb.	.....	85	.....	102·7
Pounds of grit	lb.	25	20	21.5	20·0
Pounds of oyster shell	lb.	99	77	89·0	67·3
Pounds of charcoal	lb.	10	10	9·0	9·3
Number of eggs laid	No.	5,987	6,010	4,605·3	4,586·0
Cost of animal feed	$	7 60	4 53	7 66	5 18
Total cost of feed	$	81 82	74 82	78 17	75 19
Value of eggs laid	$	299 35	300 50	230 27	229 30
Cost per doz	$	0 16	0 15	0 20	0 20
Profit	$	217 53	225 68	152 10	154 11

In 1927, the pen getting beef scrap has given 23 eggs more than the pen on skim-milk, but in the three-year average the skim-milk pen is ahead. However, the cost per dozen and profit are practically equal over the three-year period, which 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 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 and clover leaves when used as a green feed. This test has covered a period of five years, using 100 pullets each year. In 1926-27 it was commenced on November 1, and continued until April 30, covering 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

—		Sprouted oats 1927	Clover 1927	Sprouted oats five-year average	Clover five-year average
Number of birds	No.	50	50	50	50
Weight at beginning	lb.	223	221	223·4	221·6
Weight at finish	lb.	290	293	272·1	270·2
Pounds of scratch	lb.	1,788	1,788	1,637·6	1,671·8
Pounds of mash	lb.	716	857	603·0	656·8
Pounds of green feed	lb.	471	363	328·2	302·8
Pounds of milk	lb.	428	440	509·2	530·2
Pounds of meat scrap	lb.	60	81	114·2	117·8
Pounds of grit	lb.	16	16	17·5	17·9
Pounds of oyster shell	lb.	87	82	82·8	77·4
Pounds of charcoal	lb.	10	7·5	7·7	7·7
Number of eggs laid	No.	6,210	5,894	3,732·4	3,664·0
Cost of green feed	$	9 37	3 63	6 52	3 03
Total cost of feed	$	80 87	79 57	72 63	71 42
Value of eggs laid	$	310 50	294 70	186 62	183 20
Cost per doz	$	0 16	0 16	0 23	0 23
Profit	$	229 63	215 13	113 99	111 78

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 should be noted, however, that no charge has been included for labour. It takes quite a lot more time and labour to sprout the oats than it does to prepare 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 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 four years, using 100 pullets in each year. The first two years covered a period of six months only, from November 1, to April 30, but the last two years the pens have been kept separated for the full twelve 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 divided equally as to weight, general development and breeding, into two pens of 50 each. All conditions were made 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 from November 1 to April 30				Results from May 1 to October 31			
	Lights, 1927	No lights, 1927	Lights, four-year average	No lights, four-year average	Lights, 1927	No. lights, 1927	Lights, two-year average	No lights, two-ysar average
Number of birds.....No.	50	50	50	50	50	50	50	50
Weight at beginning.....lb.	208	212	217·5	219·3	280	270	279·0	275·0
Weight at finish..... "	280	270	266·8	262·8	.....	.....	.....	.....
Pounds of scratch..... "	1,674	1,811	1,592·5	1,623·3	1,621	1,783	1,696·5	1,744·0
Pounds of mash..... "	701	618	551·5	486·0	192	176	316·0	335·0
Pounds of green feed..... "	327	335	294·5	303·0	.....	.....	68·0	62·0
Pounds of milk..... "	483	413	527·3	524·3	916	1,138	458·0	569·0
Pounds of meat scrap..... "	67	68	97·5	100·3	64	53	88·5	76·0
Pounds of grit..... "	20	20	18·1	17·6	35	42	32·0	36·0
Pounds of oyster shell..... "	75	76	70·8	67·8	42	55	50·5	65·5
Pounds of charcoal..... "	9	9	12·8	9·2	9	10	10·0	10·5
Number of eggs laid.....No.	5,486	5,330	3,937·3	3,541·0	4,682	5,270	4,342·0	5,025·0
Total cost of fesd..... $	71 89	73 22	68 20	67 44	56 42	61 19	62 00	63 88
Value of eggs laid..... $	274 30	266 50	196 87	177 05	175 58	197 63	162 83	188 44
Cost per dozsn..... $	0 16	0 16	0 21	0 23	0 14	0 14	0 17	0 15
Profit..... $	202 41	193 28	128 67	109 61	119 16	136 44	100 83	124 56

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

(1) Lights do not materially effect the body-weight of laying pullets during the winter months.

(2) Lights have an effect on the number of eggs laid during the winter months, as the four-year average shows an advantage of nearly 400 eggs for the pen on lights, and also an advantage of 2 cents per dozen in cost.

(3) In 1927 and in the two-year average over the whole year, the pen with lights has laid fewer eggs than the pen without lights.

(4) The main advantage to be gained from the use of lights would appear to be 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 120 eggs for hatching and three weeks later with 60 hatched chicks. In this way a comparison could be made between the cost of obtaining baby chicks by purchasing the eggs and hatching them and purchasing day-old chicks direct. This experiment has been conducted for a period of three years. The results are as follows:—

HATCHING EGGS VERSUS DAY-OLD CHICKS

Items		Hatching eggs 1927	Day-old chicks 1927	Hatching eggs three-year average	Day-old chicks three-year average
Date received	Date	April 21	May 20	.....	.....
Number received	No.	120	60	80	60
Price	$	12 00	15 00	8 00	15 00
Express	$	1 15	0 75	0 88	0 91
Cost of hatching	$	2 00	.....	1 33	.....
Total cost	$	15 15	15 75	10 22	15 91
Number of chicks alive	No.	45	58	35·0	58·7
Cost per chick	$	0 34	0 27	0 29	0 27
Total cost including labour	$	17 65	15 75	11 88	15 91
Cost per chick including labour	$	0 39	0 27	0 34	0 27

The figures in this table indicate that day-old chicks at 25 cents each come cheaper than purchasing hatching eggs at 10 cents each and incubating them at home.

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 including 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 100 pedigreed hens were divided into ten pens of ten 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. For the pen receiving both the cod liver oil and raw liver 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 41 days and the second period 30 days. Separate records were kept for each of the two periods.

In the two-year average the number of eggs required per chick at three weeks for each of the pens under test is as follows: raw liver, 2·1; cod liver oil and liver, 2·4; bone meal, 2·6; ordinary ration, 2·7 and cod liver, 3·3.

According to these figures, the raw liver has given the best results, followed by a mixture of raw liver and cod liver oil, with the bone meal third. However, no definite conclusions should be drawn until after the test has been conducted for a number of years.

HATCHING RESULTS FROM DIFFERENT DATES OF SETTING

Every year the hatching season covers a period of around three months and includes settings made during the months of March, April and May.

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.	p.c.	p.c.	p.c.	p.c.	No.	No.
March 1927	931·0	88·2	58·8	66·6	89·8	1·7	1·9
Average 4 years	648·5	86·7	41·4	47·7	93·2	2·4	2·6
April 1927	565·0	94·3	53·5	56·7	90·7	1·9	2·1
Average 4 years	1,070·8	93·1	45·9	49·3	91·8	2·2	2·4
May 1927							
Average 4 years	698·5	90·2	46·5	51·6	86·9	2·1	2·5

COST OF ARTIFICAL INCUBATION

With the object of determining the amount of fuel required and consequently the cost of hatching in various sized machines, records were kept of the amounts used by three different machines, two of which burn coal oil and one coal. The following table gives the details of the test:—

COST OF ARTIFICIAL INCUBATION

Items	Buckeye No. 5 capacity 600 eggs		Buckeye No. 4 capacity 350 eggs		Candee capacity 1,200 eggs
	1927	Average 2 years	1927	Average 2 years	
Number of settings ..... No.	4	4·5	1	2·5	3
Number of eggs ..... "	2,255	2,545	380	910	3,041
Oil used ..... gal.	22·9	26·9	4·3	9·8	.....
Coal used ..... lb.	.....	.....	.....	.....	1,076
Cost of fuel ..... $	8 02	9 42	1 51	3 43	10 76
Cost per 100 eggs ..... $	0 36	0 37	0 40	0 38	0 35

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 when 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

Items	1927			Two-year average		
	April	May	June	April	May	June
Coal used per month..... lb.	378·5	269·0	229·0	409·5	289·9	266·5
Coal used per day..... lb.	12·6	8·7	7·6	13·7	9·4	8·9
Value of coal used..... $	3 79	2 69	2 29	4 10	2 90	2 67
Capacity of brooder..... No.	500	500	500	500	500	500
Cost of 100 chicks per month..... $	0 76	0 54	0 46	0 82	0 58	0 54

The average figures for two years show that when operated at the full capacity, the monthly cost per 100 chicks for coal has been, April 82 cents, May 58 cents and June 54 cents. If, however, as is more often the case only about one-half this number were brooded, the cost would automatically be doubled.

RATIONS

It has always been the practice of this Station to feature the home grown grains such as wheat, oats and barley to as large an extent as would be consistent in a good ration. The standard scratch ration in use is 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.

Clover or alfalfa leaves make a very convenient form of green feed and give excellent results, but mangels or sprouted oats may also be used to good advantage.

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 have pedigrees showing high production and are also of desirable type. 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 a number of 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 entire flock. This fact is very vividly shown in the following table which gives the total number of birds on hand on December 31 for the last five 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 FIVE 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	.....	40	40	23	14	5	.....	122
1927	.....	.....	41	57	33	5	2	138

Another method of illustrating the effect of pedigree breeding and selection in increasing the production records is shown in the following table which gives the monthly production of the flock of pullets during the winter months for the last four years:—

NUMBER OF EGGS PER BIRD PER MONTH FOR FOUR YEARS, 1924, 1925, 1926, 1927

Year	November	December	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
1927.....	12·9	21·4	21·7	20·0	20·2	20·2	116·4

BEES

The season of 1927 from the standpoint of honey production was only fair. The winter was milder than usual and quite uniform, and the bees came through in excellent condition, with a loss of only one colony out of thirty-four, but the summer season was of such a nature, particularly during the actual honey-flow period, that the bees were unable to gather even an average crop. The yields obtained this year have been lower than in the three preceding years and also lower than the average for the last eight years. High winds were quite prevalent during the greater part of the honey-flow period, which apparently prevented the bees from gathering the nectar when it was available.

RETURNS FROM APIARY

During the season of 1927 fourteen colonies were used for the production of extracted honey. The remaining colonies were used in connection with the queen-mating yard. No increases were made from any of these fourteen colonies during the season. The results obtained are as follows:—

FINANCIAL STATEMENT OF APIARY IN 1927

Total weight of honey extracted from 14 colonies	lb.	810·5
Average weight produced per colony	lb.	57·9
Selling price of honey per pound		$ 0 15
Total value of honey produced		$121 57
Average value of honey produced per colony		$ 8 68

COMB VERSUS EXTRACTED HONEY

Two colonies were used for the production of comb honey. One gave a yield of 46 sections and the other 36, making an average production of 41 sections. These sold at 30 cents each, making an average revenue of $12.30. The average revenue from the 14 colonies producing extracted honey was $8.68, which shows that the colonies producing comb honey gave the larger returns this year. In 1926, however, the colonies producing extracted honey gave the larger returns. The average returns per colony for the two years are $13.95 for those on comb honey production and $13.81 for those producing extracted honey. There is always a very keen demand for the comb honey and it may assist in increasing the amount of honey consumed by the general public.

A STUDY OF HONEY-FLOW

With the object of obtaining data relative to the effect of weather conditions on the daily honey-flow, one colony of average strength was placed on scales. This colony, however, turned out to be the largest producing colony in the yard, so that the gains as presented in connection with this experiment are really much larger than the average for the season.

RECORD OF HIVE ON SCALES IN 1927

—	May	June	July	Aug.	Sept.	Total
Gain	.....	.....	165	26	40	212
Loss	12·5	6·5	.....	.....	.....	.....

July gave a very heavy yield, but August was away below the average, largely owing to unfavourable weather for flying.

The White Dutch clover commenced to bloom on June 15, and the alsike on June 20. The greatest gain occurred on July 22, when 15 pounds of nectar were gathered. From July 8 to 12 inclusive, a period of only five days, a gain of 62 pounds was made, which is a record for this district. No increase of any account occurred until the 1st of July, which is abnormally late. There was, however, a slight increase as early as May 13, the source apparently being the common poplar. The last increase occurred on September 10, which was later than usual. This was supplied by fireweed (*Epilobium angustifolium* L.), which grows abundantly in burnt-over areas.

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 1926, thirty-four colonies were placed in winter quarters. Twenty-six of these were packed in the bee-yard on September 20, in the following manner: 20 in quadruple cases, 4 in double cases and 2 in single cases. Two of those packed in the double cases had two queens each.

The packing consisted of 6 inches of well-dried planer shavings on the sides and underneath, and about 12 inches on top. Of the twenty-six colonies wintered outside, twenty-five came through alive and had on the average 4·2 frames of bees each. One colony was queenless and another queen developed into a drone-layer. These were united with the two other colonies, leaving twenty-three colonies, spring count. The bees wintered outside built up quite rapidly in the spring, indicating that outdoor wintering is a good method in this climate, providing the bees are given ample stores and are properly packed with a sufficient quantity of well-dried packing material. Each colony wintered outside was fed with a sugar-syrup made of 2 pounds of sugar to 1 of water, to a weight of 75 pounds or over.

Eight colonies were placed in the office cellar on November 9. These were fed to 70 pounds weight or better early in the autumn. The eight colonies all came through alive and had on the average 4·3 frames of bees each.

The bees were removed from the cellar on April 22, which was about three weeks earlier than in past years, the idea being to give them an opportunity to have a cleansing flight as early as possible. The brood chamber of each colony was packed with three inches of planer shavings, which was left on until after the cool spring weather was over.

The cellar wintered bees appeared to compare more favourably with those wintered outside in the matter of building up in the spring, than they have in former years, indicating that it is a good practice to remove the colonies from the cellar fairly early in the spring and give them some protection until the warm weather sets in.

When wintering outside, it is always necessary to provide a good windbreak.

FOUR-COLONY VERSUS TWO-COLONY VERSUS SINGLE-COLONY WINTERING CASES

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

Twenty of the colonies wintered outdoors were packed in quadruple wintering-cases, four in double, and two in single wintering-cases. The amount of packing in each case was the same. Of the twenty in quadruple cases nineteen came through alive, and had on the average 4·2 frames each of bees. The four colonies wintered in double cases were all alive with an average of 4·5 frames each of bees, and the two in single cases were also both alive with an average of 4·3 frames each of bees. These results would seem to indicate that bees may be successfully wintered in all three types of case. The double and single cases, however, could not be recommended over the quadruple method where there were a number of colonies to winter, because they are more expensive, as it costs nearly as much to construct a double or single case as a quadruple. The double and single cases, however, might be used to very good advantage by settlers who had less than four colonies during the first winter.

WINTERING TWO QUEENS IN ONE HIVE

The object of this experiment is to ascertain the possibility of over-wintering a number of surplus queens to be used the next spring for introduction to colonies that have lost their queens during the winter, or to replace weak and failing queens in the spring.

In the autumn of 1926, two hives were equipped with tight-fitting division boards, and a double entrance provided to each hive. Both sides of each hive were made quite strong with bees and each half was given a good young queen. These two twin colonies were packed in the usual manner in the bee-yard in a double packing-case. In the spring, three of the four queens were alive. This made available one extra queen, which could be used to good advantage. The results obtained indicate that it is possible to winter-over some extra queens in this manner.

COMPARING DIFFERENT SIZES OF HIVES

In this experiment the only hives compared are the standard ten-frame Langstroth and ten-frame Jumbo. Of the twenty colonies wintered in quadruple cases, fifteen were Langstroth and five were Jumbo. Of the fifteen Langstroth fourteen came through alive and had on the average 4·2 frames each of bees. The five Jumbo hives were all alive with an average of 4·1 frames each of bees. During the season, the four Langstroth hives which were used for honey production gave an average yield of 44 pounds each, while the four Jumbo hives which were used for honey production gave an average yield of 31 pounds each.

It may be noted that the Langstroth hives gave the larger yield, but it should be explained that two of the Jumbo hives superseded their queens, when there were no laying queens available and this interfered materially with the honey production. Ordinarily there is very little difference in the quantity of honey produced by Langstroth and Jumbo colonies. The Jumbo brood-chamber has the advantage of being sufficiently large so that it is not usually necessary to give additional egg-laying space, while on the other hand the Langstroth hives appear to be the more convenient of the two to handle.

PREVENTION OF SWARMING

DEQUEENING AND REQUEENING.—This method is used some 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. This method is employed when it is desired to use the old queen in establishing a new colony. In case, however, the old queen is not considered worth retaining, she is destroyed but the hive is treated as above. Three colonies were treated in this manner in 1927 and gave very satisfactory results. If a new hive is established with the old queen, it generally develops into a good strong colony for winter and the honey production of the hive treated is usually not much affected.

SEPARATION OF BROOD AND QUEEN.—One hive was treated by this method in 1927, 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 quite satisfactory, and the queen commenced laying in the empty combs immediately.

PACKAGE BEES AS A MEANS OF STARTING COLONIES

The object of this experiment is to determine the relative value of 2- versus 3-pound packages of bees as a means of starting colonies, and also the best time they should arrive to give maximum results and to compare them with over wintered colonies.

On May 13, 1927, the first shipment of package bees arrived and consisted of two 2-pound, and two 3-pound packages. On arrival they were fed by painting the screening of the cage with a very thin sugar syrup. They were then put in a cool place until evening.

In the evening they were introduced to new hives having at least one comb of honey and the rest empty drawn comb, in the following manner: The cage containing the queen was first removed from the package and introduced by removing the covering over the candy hole and suspending the cage between the top bars of the prepared hive. The screening was then removed from one side of the package, after which a few bees were shaken into the hive and the cage placed in the hive next to the frames.

The second shipment arrived on June 1. It consisted of the same number and kind of packages as the first which were treated in a similar manner.

Two of these colonies, a 2-pound package from the first shipment and a 3-pound package from the second shipment lost their queens shortly after arrival, and one other colony superseded its queen later on. This leaves five of the original eight queens still on hand.

Very little difference could be observed in the rate of building up between the 2- and 3-pound packages. It did appear, however, as though the last shipment built up more rapidly than the first.

The average yield of honey in pounds obtained from each of the different colonies are as follows: The first shipment 34; the second shipment 41; the 2-pound packages 50; the 3-pound packages 25; and the whole eight colonies 37·6. The average yield from these eight hives was 20 pounds less than the average yield from the regular apiary of over-wintered colonies.

While no conclusions can be drawn from one year's figures, the above results indicate that colonies can be quite successfully established by securing either 2- or 3-pound package bees.

CARNIOLAN BEES

In the past, no other breed of bees had been tried out at this Station except Italians.

This year, however, it was decided to establish a small out-apiary of Carniolans in order to make observations on their adaptability to this climate and to raise some pure queens for supplying to other Stations. A site was arranged for and a small yard enclosed with a board fence at Kitigan Station, which is 6·4 miles east of Kapuskasing.

On June 17, four laying queens arrived from New Jersey, U.S., and on June 22, two nuclei from Ottawa. Each of these was used to establish a new colony. One of the queens died and later on another was destroyed as she had apparently been mismated. These colonies built up fairly rapidly. Two increases were made, making seven colonies available for winter quarters.

During the season 118 pounds of extracted honey was produced and two mated queens were shipped to Ste-Anne de La Pocatiere.

The observations to date would seem to indicate that Carniolan bees are fairly well adapted to this climate and are not particularly difficult to handle, although the swarming impulse seems more marked than in the Italians.

QUEEN-REARING

As there are no other apiaries within flying distance of this Station, it is possible to carry on controlled mating of queens. The very best queens are selected and used as drone breeders and queen mothers, and in this way the purity of the strain as well as the colour and other desirable features are maintained.

Queen-rearing was again carried on in 1927. Queenless and broodless colonies were used in which to start the queen-cells, and the first grafting was done on June 21.

The virgin queens were introduced to the mating-boxes as mature cells. 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.

The windy and otherwise unfavourable weather which existed for nectar secretion and honey production made it very difficult to carry on queen rearing with any degree of success. The bees would not accept and finish the queen-cells in large numbers. There was also considerable delay from the time the mature cells were introduced to the mating-boxes until the virgin became mated and commenced to lay. In all only 27 queens were successfully mated.

Thirty-six colonies were packed in the bee-yard for winter on October 4 and 5, in the following manner: 28 in quadruple cases, 6 in double cases, and 2 in single cases. One of those packed in double cases has two queens. Ten colonies were placed in the office cellar on November 15. One of the colonies placed in the cellar has two queens also.

The seven colonies of Carniolans at the Kitigan yard were packed outdoors in a quadruple, a double and a single-colony packing case on October 6, with well-dried planer shavings, in a similar manner to those at Kapuskasing.

FIBRE CROPS

VARIETY TEST WITH FLAX.—Four varieties were under test. The seed was sown on May 23, in triplicate one-fortieth-acre plots, at the rate of 1½ bushels per acre. The crop was pulled during the period from September 16 to 19. The results are as follows:—

VARIETY TEST WITH FLAX—RESULTS IN 1927

Variety	Average height	Yield per acre of dry matter	
	inch	tons	lb.
Longstem	25	1	1,806
J.W.S.	36	1	1,633
Pure Line No. 6	33	1	1,215
Riga Blue	27	1	1,180

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 23, 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 FLAX—RESULTS IN 1927

Date of seeding	Average height	Yield per acre of dry matter	
	inch	tons	lb.
May 23	27	1	1,180
May 30	28	1	1,399
June 6	29	1	1,683
June 13	32	2	98

DATE OF SEEDING HEMP.—The object of this experiment is to compare the results from different dates of seeding. The first sowing occurred on May 14, and was repeated at intervals of seven days until four different dates were under test. The plots were harvested on September 17. The results are as follows:—

DATE OF SEEDING HEMP—RESULTS IN 1927

Date of seeding	Average height	Yield per acre of dry matter	
	inch	tons	lb.
May 14	66	1	1,578
May 21	66	1	1,307
May 28	68	1	1,098
June 4	68	1	1,761

ILLUSTRATION STATIONS

Eight Illustration Stations were operated under the supervision of this Station during the year. The operators and locations of the Stations are as follows: H. Labreche, Val Gagne; E. D. Carrere, Cochrane; Olivier Genier, Genier; A. Beaudry, Verner; F. Roussel, Noelville; E. Strain, Gore Bay; Wm. McColeman, Spring Bay; and Wm. A. Hare, Mindemoya.

On six of these Stations a four-year rotation has been established as follows:—

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

While on the other two the following six-year rotation is under test:—

First year—Grain.
Second year—Clover seed.
Third year—Hoed crop.
Fourth year—Grain.
Fifth year—Clover hay.
Sixth year—Mixed hay.

After the mixed hay is harvested, the land is immediately ploughed, and cultivated occasionally until the freeze-up. This leaves the soil in excellent condition for the hoed crops in the one rotation and for seeding out to clover, using grain as a nurse crop in the other.

Records are kept of the yields and cost of production of the various crops grown. Registered seed grain, certified potatoes, and pure-bred poultry are produced and made available to settlers at reasonable prices. The varieties of cereals that have been found to give the best results on the Experimental Station are given further test on these Stations and in this way the value of these varieties for different sections are determined. The Illustration Station is proving to be an excellent means of demonstrating improved farm practices to the farmer.

A detailed report on these Stations may be found in the 1927 report of the Chief Supervisor (Eastern Stations).

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