DOMINION OF CANADA

DEPARTMENT OF AGRICULTURE

DOMINION EXPERIMENTAL FARMS

EXPERIMENTAL STATION

LA FERME, P.Q.

REPORT OF THE SUPERINTENDENT

PASCAL FORTIER

FOR THE YEARS 1922 AND 1923

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EXPERIMENTAL STATION, LA FERME, P.Q.

REPORT OF THE SUPERINTENDENT, PASCAL FORTIER, AGR.

THE SEASON—1922

The season of growth in 1922 in Northern Quebec was less favourable than in 1921. There were 101 frostless days in 1921 and only 85 in 1922, not including the slight frost of August 5 which damaged the fodder corn on low land. From May 1 to October 31 there were 18.44 inches of rain as against 19.61 inches for the average of the four previous years, and 1,229.2 hours of sunshine as compared with an average of 1,201.8 hours for the same period during the two previous years.

The mean temperature from May 1 to October 31 was 52.8 degrees, exactly the same temperature as the average of the four preceding years; however, the mean temperature was 54.8 degrees in 1921. The thermometer fell below freezing on ten days during May, June, and September. The last spring frost, on June 13, did considerable damage to the clover and vegetables and although the thermometer registered 34 degrees on June 26 and 37 degrees on August 5 and September 6, the corn on muck soil suffered some damage.

There were 6.24 inches of rain in July; this is the highest precipitation recorded at this Station in four years. The fall was fairly favourable for all crops. The first snowfall occurred on October 12.

WEATHER RECORDS, 1922

Month	Temperature			Precipitation			Hours Bright Sunshine
	Mean	Maximum	Minimum	Rain	Snow	Total	
	Degrees	Degrees	Degrees	Ins.	Ins.	Ins.	
Jan	−0·76	30	−25	.....	20·0	2·0	83·5
Feb	2·0	34	−35	.....	25·0	2·5	102·7
March	19·4	48	−16	0·19	8·0	0·99	165·0
April	34·5	57	5	4·41	12·7	5·68	136·1
May	52·87	82	28	1·73	.....	1·73	256·6
June	58·43	89	29	2·66	.....	2·66	250·2
July	60·77	81	37	6·24	.....	6·24	236·4
Aug	59·0	88	37	3·85	.....	3·85	227·2
Sept	53·3	79	31	0·40	.....	0·4	163·9
Oct	33·1	77	12	2·71	8·5	3·56	94·9
Nov	25·68	53	−6	0·66	15·0	2·16	34·5
Dec	3·23	45	−34	1·02	19·9	3·01	72·8
Total	.....	.....	.....	23·87	109·1	34·78	1823·8

Precipitation from May 1 to Oct. 31, 18·44 inches.
Hours sunshine from May 1 to Oct. 31, 1229·2 hours.

1923 SEASON

On the whole, the year 1923 was cold, compared to the average of the five preceding years. The months of January, February, March, April, and May were particularly cold. On the other hand, the latter part of September and the months of October, November and December were much more moderate. The total precipitation was 8 inches less than the average of the five preceding years; there were 106 hours of sunshine more than the average of the last two

years. The total precipitation between May 1 and October 31 was 15.38 inches, compared with an average of 19.37 inches, and the total number of hours of sunshine was 1,218.4 compared with 1,210.9. These quantities of rain and hours of sunshine are considered sufficient for a good growth and for the ripening of the crops.

The first seeding, which is generally done from the 5th to the 15th of May, could not be done before the 25th of May this year. Four inches of snow fell on the 10th, and rain fell until the 24th, preventing any work on the land until the 25th. Clay land, such as we have on this Station, cannot be worked when wet, if good results are to be obtained. Not a single drop of rain fell from May 24 to June 13, and the germination of grain was greatly delayed. The first part of July was comparatively dry, but from August 1 to September 15 there were 28 rainy days, giving a total of 7.88 inches of rain. There was a second growth of grain during this period, and this explains why a large part of the crop did not ripen. The fall was very favourable for the crops and for ploughing.

One of the causes of the partial failure of the crops this year is the frost. The thermometer went below freezing point sixteen times in May, six times in June and once in July, and the longest period without frost was only 47 days. To find a similar season, we have to go back to 1918 when there were 59 days without frost.

WEATHER RECORDS, 1923

Month	Temperature, F.						Precipitation				Hours of sunshine	
	Maximum		Minimum		Mean		1923			Total average for 5 years, 1918-22 inclusive	1923	4-year average, 1919-22 inclusive
	1923	Five-year average, 1918-22 inclusive	1923	Five-year average, 1918-22 inclusive	1923	Five-year average, 1918-22 inclusive	Rainfall	Snowfall	Total			
January	29	30·0	−39	−41·0	−6·29	−1·67	.....	10·0	1·0	2·20	95·8	86·7(a)
February	30	39·6	−41	−35·0	−6·61	−1·86	.....	11·0	1·1	1·79	113·2	107·9(b)
March	42	52·8	−31	−25·5	5·76	18·58	0·32	15·5	1·87	2·72	152·1	142·7(b)
April	73	66·4	−21	−1·0	26·6	40·69	0·75	20·0	2·75	2·53	177·7	152 (b)
May	82	84·6	2	18·0	42·8	50·46	1·15	4·0	1·55	2·38	222·7	234·8(b)
June	87	87·0	27	28·0	56·0	55·24	2·86	.....	2·86	2·36	229·3	281·7
July	86	88·6	30	37·5	59·8	63·55	2·02	.....	2·02	4·03	305·8	232·5
August	76	84·6	33	37·8	55·7	59·34	5·28	.....	5·28	4·20	201·3	202·2
September	77	76·4	26	30·2	51·2	50·78	2·78	.....	2·78	3·53	150·8	140·8
October	67	66·2	9	14·0	41·1	38·5	1·49	.....	1·49	2·84	108·5	80·8
November	50	43·0	−2	−11·32	27·3	22·2	0·16	3·75	0·53	2·38	77·9	38·4
December	45	37·6	−20	−34·2	20·5	6·3	0·5	24·0	2·9	3·15	29·0	46·5(b)
Total, 1923	.....	.....	.....	.....	.....	.....	17·31	88·25	26·135	.....	1,864·1	
Five-year average	.....	.....	.....	.....	.....	.....	.....	.....	34·19	.....	1,758.8 (a)	

NOTE: (a) 2-year average only. (b) 3-year average only.

ANIMAL HUSBANDRY

DAIRY CATTLE

The experimental work conducted during the two years ending December 31, 1922, and December 31, 1923, respectively, has been incorporated in this report.

On December 31, 1922, the herd was composed of nine milking cows, seven heifers, ranging in age from one month to a year and a half, and two bulls. Five of these animals are pure-breds and these include two cows, one heifer and the two bulls.

For the year 1923 the herd included thirteen milch cows, six heifers from 1 to 2½ years of age, seven calves under one year and the herd sire, Springbank King Theodore 2nd—49995—. Three of the cows and two of the calves are registered Ayrshires. The other individuals of the herd include grade Ayrshires and Holsteins. Four cows were received from the Central Experimental Farm, Ottawa, on the first of October. The herd sire is from a good milking strain his mother having a record of 15,178 pounds of milk, 646 pounds of fat.

COST OF MILK PRODUCTION

The following ration is given to the cows in winter: 7 to 8 pounds of clover hay, 30 to 40 pounds of oats, peas, and vetches silage, and a pound of the following meal mixture for every four pounds of milk produced; bran, 5 parts; oat chop, 2 parts; barley chop, 2 parts; and linseed meal, 1 part.

In summer the cows are kept on pasture from the beginning of June to the middle of September. As the pasture was not good in the summer of 1923 it was supplemented with ensilage and green fodder and as a result the silo was emptied for the first time in three years. The ensilage was of very good quality.

The records of production and the cost of feed for the cows that have completed their milking periods are given in the following table. No account is taken of the labour employed, of the interest and depreciation, of the value of the calves, or of manure in the table.

RECORDS OF MILCH COWS IN 1922

Name of Cow	Number of Cow	Age at calving	Date of calving	Duration of lactation	Total production of milk during lactation period	Average daily milk production	Value of milk at $3.20 per 100 pounds	Quantity of grain consumed, at current prices	Quantity of roots consumed at $6.75 per ton	Quantity of ensilage consumed at $10 per ton	Quantity of hay consumed at $22 per ton	Pasture at $1 per month	Quantity of green feed consumed at $10 per ton	Total cost	Cost of production of 100 pounds of milk	Profit per 100 pounds of milk	Net profit during period (Labour and manure omitted)
				dys.	lbs.	lbs.	$	lbs.	lbs.	lbs.	lbs.		lbs.	$	$	$	$
(b)Blanche of La Ferme	.....	.....	May 8, 1921	394	6,635	16·8	212·32	1,446·5	493	8,436	1,306	4·0	1,727	101·24	1·52	1·67	111·08
Glista of La Ferme	.....	.....	June 4, 1921	500	12,254	24·5	392·12	2,129·5	648	11,067	1,611	7·0	3,099	140·98	1·15	2·05	251·14
Jumelle of La Ferme	.....	.....	May 16, 1921	414	6,873	16·6	219·93	1,469·5	493	8,706	1,366	5·5	1,723	105·31	1·53	1·67	114·62
Lilian	.....	.....	April 2, 1921	497	11,110	22·3	355·52	2,305·5	618	11,151	2,157	6·0	2,015	156·43	1·40	1·79	199·09
Average	.....	.....	.....	451	9,218	20·4	294·97	1,838·0	563	9,840	1,610	5·6	2,141	125·99	1·366	1·834	168·98

RECORDS OF MILCH COWS IN 1923

Belle de La Ferme	A9	2½	Dec. 8, 1922	388	5,416·0	13·96	173·31	2,105·5	1,690	8,570	3,116	1·5	4,730	147·53	2·72	0·48	25·78
Daisy A-1	A14	3	Sept. 9, 1922	333	6,608·5	19·85	211·47	1,972·0	.....	9,922	1,680	2·0	1,033	115·17	1·74	1·46	96·30
Baisy B-1	A16	3	Sept. 21, 1922	370	6,485·5	17·5	207·54	2,074·0	.....	10,365	2,024	2·0	755	122·19	1·885	1·315	85·35
Doncette	A1	.....	April 2, 1923	325	8,197·0	25·2	262·30	1,681·7	883	11,173	1,231	3·5	2,624	122·56	1,495	1·705	139·74
(a) Jumelle de la Ferme	A6	3½	July 4, 1922	432	5,745·0	13·3	183·84	1,641·0	883	9,230	2,721	4·0	4,013	137·02	2·38	0·82	46·82
Lillian	A3	.....	Oct. 3, 1922	392	8,128·0	20·7	260·10	3,247·3	1,313	10,788	2,698	3·0	6,439	181·67	2·235	0·965	78·43
Nellie	A2	.....	Mar. 15, 1922	351	9,195·0	26·2	294·24	1,819·9	883	10,124	981	3·0	2,696	117·26	1·27	1·93	176·98
Ottawa Folly	A66458	3	Sept. 19, 1922	370	7,903·0	21·4	252·90	1,974·0	.....	10,435	2,024	2·0	754	120·55	1·52	1·68	132·35
Ottawa Mina	A64750	2½	Feb. 19, 1922	372	4,556·0	12·32	145·79	1,117·8	883	8,323	801	3·5	2,521	87·54	1·92	1·28	58·25
Primrose of Ottawa	A72903	2	Mar. 7, 1922	356	4,807·5	13·5	153·84	1,165·3	883	8,468	823	3·5	2,491	93·71	1·95	1·25	60·13
Average	.....	.....	.....	369	6,704·0	18·2	214·53	1,880	742	9,740	1,810	2·8	2,806	124·52	1·86	1·34	90·01

(a) Aborted July 4, 1922. (b) Aborted June 6, 1922.

Four cows completed their lactation periods on December 31, 1922. These gave an average of 9,218 pounds of milk at an average cost of $125.99, or $1.37 per hundred.

On December 31, 1923, ten cows completed their milking periods and averaged 6,704 pounds of milk at an average cost of $124.52, or $1.86 per hundred pounds. In 1920 the cost of producing a hundred pounds of milk was $1.46, while it was $1.59 in 1921.

COST OF REARING HEIFERS AND CALVES

The following table shows the cost of raising heifers and calves from birth to the dates indicated in the table. It will be observed that hay and grain are charged at market prices. During the period covered by this table (June 24, 1920, to December 31, 1922) the price of hay varied from $30 to $40 per ton and grain from $31 to $61 per ton. These figures serve as a guide when estimating costs under local conditions and market prices.

The cost of rearing Belle de la Ferme up to her first calving at the age of about thirty months was $134.27.

COST OF RAISING HEIFERS

	Date of birth.	Age	Feed calculated up to—	Whole milk at $3.20 per 100 pounds	Skim milk at 50 cts. per 100 pounds	Grain at market prices	Hay at market prices	Green feed at $10 per ton	Ensilage at $10 per ton	Roots at $6.75 per ton	Pasture at $1 per month	Total cost of feed
		mos.		lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	mos.	$
Belle of La Ferme.....	June 24, 1920	29½	Oct. 8, 1922	180	937	963	2,067	1,512	9,977	474	8½	134·27
Anna of La Ferme.....	June 4, 1921	19	Dec. 31, 1922	680	2,020	475	1,537	401	4,164	257	3½	86·65
Emma of La Ferme.....	May 16, 1921	19½	" 31, 1922	681	2,021	475	1,537	401	4,164	257	3½	86·68
Desneiges of La Ferme .	May 8, 1921	20	" 31, 1922	680	2,022	475	1,537	401	4,164	257	3½	86·66
Rose of La Ferme.....	Feb. 19, 1922	10½	" 31, 1922	207	2,794	618	915	171	1,057	.....	.....	47·63
Premier of La Ferme....	Mar. 7, 1922	10	" 31, 1922	133	3,619	610	908	23	1,058	.....	.....	47,01

COST OF RAISING CALVES

The calves are taken away from their mothers at birth, but receive the first milk, which has purgative properties and cleanses out the fecal matters accumulated in the intestines. This milk is given for five to seven days until it has again become normal. Whole milk is then given for three or four weeks followed by a ration of skim-milk gradually substituted, until nothing but skim-milk is fed at the age of five weeks. For each pound of skim-milk substituted, one ounce of calf meal is added. This is made up as follows: 6 parts of corn meal, 3 parts of oat meal and 1½ parts of ground flax seed. This mixture is scalded and left standing several hours. As soon as the calves can eat, they are given a little clover hay of good quality in the manger and a small portion of a mixture of dry grain, composed of 4 parts of bran, 3 parts of oats and 1 part of corn meal. Skim-milk is given for twenty-four weeks, when it is available, and during this time, the calves are not allowed to go out on pasture, as they would suffer from flies and heat. This system of feeding has proved satisfactory. The older heifers which are in good condition at the age of one year are fed on hay and ensilage only. A few days before calving, however, they receive 2 to 3 pounds of the same mixture of grain as given to the cows.

Name and Number of calves		Date of birth	Date of first calving	Feed computed up to	Age	Pure milk consumed	Skim-milk consumed	Meal consumed	Hay consumed	Green feed consumed	Ensilage consumed	Roots consumed	Pasture	Total cost
					mos.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	mos.	$ cts.
Anna de La Ferme	10	June 4, 1921	Dec. 18, 1923	Dec. 18, 1923	29½	680·0	2,020·0	754·0	3,189	3,502	7,785	687	6	147 35
Desneiges de La Ferme	11	May 16, 1921	.....	Dec. 31, 1923	31½	681·0	2,021·0	727·0	3,223	3,502	8,064	687	6	149 02
Emma de La Ferme	12	May 8, 1921	.....	Dec. 31, 1923	32	680·0	2,022·0	727·0	3,223	3,502	8,064	687	6	149 00
Rose de La Ferme	13	Feb. 19, 1922	.....	Dec. 31, 1923	22½	207·0	2,794·0	1,036·0	2,426	2,722	4,986	430	2½	108 56
Premier de La Ferme (M)	14	Mar. 7, 1922	.....	Mar. 7, 1923	12	133·0	3,619·0	745·0	1,212	173	1,851	.....	.....	57 59
Fauvette de LaFerme	17	Oct. 3, 1922	.....	Dec. 31, 1923	15	799·0	1,242·0	1,142·0	1,421	2,031	3,349	344	2½	100 72
Rita de LaFerme	18	Dec. 6, 1922	.....	Dec. 31, 1923	13	390·0	1,362·5	979·0	1,313	1,172	2,494	437	1	76 98
Veline de LaFerme	19	Dec. 8, 1922	.....	Dec. 31, 1923	13	670·7	761·0	946·0	1,266	1,672	2,471	437	1	81 27
Second de LaFerme (M)	20	April 9, 1923	.....	Dec. 31, 1923	9	388·0	1,872·0	693·0	707	741	1,072	430	.....	55 77
Eva de LaFerme	21	April 10, 1923	.....	Dec. 31, 1923	9	554·0	1,680·5	651·5	377	1,418	1,018	430	.....	57 90
Mignonne de LaFerme	22	April 28, 1923	.....	Dec. 31, 1923	8	365·0	1,670·5	651·5	376	1,418	1,018	430	.....	51 78

IMPROVEMENT OF A GRADE HERD THROUGH THE USE OF A PURE-BRED BULL

Two grade Ayrshire cows, one grade adult Holstein, one grade Ayrshire heifer and one grade Holstein heifer were purchased for this experiment. The quality of these cows varied from fair to good. This herd is now headed by an Ayrshire bull, the mother of which has a record of 15,178 pounds of milk and 646 pounds of fat. The original bull employed was not, however, of as good a quality as the latter, which accounts perhaps for the negative results shown below. The available results obtained up to date are given in the following table:—

Name of Cow	Breed	Age	Number of days lactation period	Milk	Per cent Fat	Lbs. Butter 85 per cent	Number of lactations
		Years		Pounds			
Doucette No. 1.....	Holstein, good.....	Mature	293	8,315	3·1	303·2	3
Blanche No. 8.....	Daughters of Doucette sired by Ayrshire bull.	2-3	394	6,635	3·3	257·6	2
Belle No. 9.....		2½	388	5,416	3·4	216·6	1

The results will doubtless be more apparent after using the present bull. These will be recorded year by year.

HORSES

On December 31, 1922, there were nine draught and two light horses at this Station. No experimental feeding work is done with horses but horse labour on the different branches of the farm is carefully recorded as well as feeding costs.

The nine draught horses were worked 18,816 hours on the farm; from January 1, 1922, to December 31, 1922.

During this period the following quantities of feed which was valued at market prices were consumed by the horses:—

52,479 pounds of hay at $31.90 per ton	$837	04
47,974 pounds of oats at $0.61 per bushel	860	71
6,868 pounds of bran at $28.25 per ton	97	01
1,100 pounds of straw at $10 per ton	5	50
1,060 pounds of green feed at $6.75 per ton	3	58
Total cost of feed	$1,803	84
Average cost per horse	200	42
Average cost of feed per hour of work	0	096 cents

The inventory showed an increase of three draught horses on December 31, 1923, this making a total of twelve draught horses and also two lighter horses for driving and delivery.

The heavy horses are grades and vary in weight from 1,290 to 1,580 pounds or an average of 1,430 pounds.

When at work the following daily ration is given to the horses: 16 pounds of hay; 15 pounds of oats; 3 pounds of bran.

The total number of hours of labour from January 1, 1923, to December 31, 1923, by an average of 11 horses was 21,279 hours, an average per horse of 1,934·5 hours.

Careful records are maintained of the actual number of hours of horse labour utilized in the different branches of the farm work.

The total amount of feed consumed during this period was as follows for 11 horses:—

38·1 tons of hay at $22 per ton	$ 838 20
1,906·1 bushels of oats at 59 cents per bushel	1,124 60
5·45 tons of bran at $28.77 per ton	156 80
0·125 tons of straw at $8 per ton	1 00
0·17 tons of carrots at $6.75 per ton	1 15
200 pounds of rock salt at $2 per cwt	4 00
Total cost of feed	$2,125 75
Average cost per horse	193 25
Average feed cost per hour of labour	9·9 cents

SWINE

At the end of the year 1922 there were nine Yorkshires at this Station these including six brood sows, two pigs two months old and one breeding boar.

COST OF REARING BREEDING STOCK

The cost of feeding two brood sows from weaning to farrowing was as follows:—

2,048 pounds of bran at $29 per ton	$29 69
2,317 pounds of shorts at $33 per ton	38 23
160 pounds of oat chop at $37 per ton	2 96
Total cost	$70 88

The cost of feeding two sows from farrowing to the time the pigs were weaned at eight weeks of age including the feed consumed by the nursing pigs was as follows:—

132 pounds of bran at $29 per ton	$ 1 91
287 pounds of shorts at $33 per ton	4 73
517 pounds of oats at $37 per ton	8 56
36 pounds of barley at $40 per ton	0 72
141 pounds of oil cake at $56 per ton	3 95
117 pounds of roots at $6.75 per ton	0 39
506 pounds of milk at 35 cents per cwt	1 77
Total	$22 03
Total cost of two litters (16 pigs) at 8 weeks	92 91
Average cost per pig	5 80

In order to determine the cost of feeding from weaning to 7½ months of age, four sow pigs were selected. The cost of feed for these four pigs was as follows:

516 pounds of bran at $29 per ton	$ 7 48
1,282 pounds of shorts at $33 per ton	21 15
371 pounds of oat chop at $37 per ton	6 86
48 pounds of oil cake at $55.83 per ton	1 34
86 pounds of corn meal at $40 per ton	1 72
2,057 pounds of barley meal at $40 per ton	41 14
Total	$79 69
Cost of 4 pigs from weaning to 7½ months	79 69
Average cost per pig	19 92

From these cost of production figures it is found that the cost of rearing pigs to 7½ months of age is as follows:—

Average cost per pig at weaning (including feed consumed by sows)	$ 5 80
Average cost from weaning to 7½ months of age	19 92
Total	$25 72

It would appear from these figures that the cost of raising pigs to 7½ months is $25.72 when only one litter is raised per year. If the accommodation had been suitable to raise two litters the cost would have been about $3.59 per pig at eight weeks of age.

On December 31, 1923, the herd included five sows over a year old, five sows eight months of age, and eighteen feeders, all of these being Yorkshires.

Breeding stock is supplied to the farmers of the neighbourhood at very reasonable prices and it is hoped by this means to develop a breeding centre for pigs of the bacon type.

Further experimental work has been conducted to determine the cost of raising young pigs to weaning and also of raising young sows after they have been weaned. A record has been kept of the cost of feeding two sows, (1) from weaning to farrowing, (2) from farrowing to weaning, and, (3) also the cost of raising four young sows selected from the litters at weaning time.

FEED COST OF 2 SOWS (WEANING TO FARROWING) FOR 10 MONTHS.

2,577 pounds of bran at $27 per ton	$34 79
1,125 pounds of middlings at $32 per ton	18 00
758 pounds of oat chop at $33 per ton	12 50
289 pounds of barley chop at $36 per ton	5 20
648 pounds of skim-milk at 50 cents per 100 pounds	3 24
854 pounds of roots at $6.75 per ton	2 88
	$76 61

FEED COST OF TWO SOWS FROM PARTURITION TO WEANING TIME, INCLUDING THE FOOD OF THE YOUNG PIGS.

878 pounds of shorts at $32 per ton	$14 05
310 pounds of oat chop at $33 per ton	5 09
98 pounds of barley chop at $36 per ton	1 76
147 pounds of linseed oil meal at $60 per ton	4 41
1,262 pounds of skim-milk at 50 cents per 100 pounds	6 31
	$31 62
Total feed cost of two litters (17 pigs) raised to 8 weeks	$108 23
Average cost per pig	6 37

FEED COST OF 4 YOUNGS SOWS FROM 8 WEEKS OLD TO THE TIME OF FARROWING, AT THE AGE OF 13 MONTHS.

1,831 pounds of bran at $27 per ton	$24 72
1,467 pounds of middlings at $32 per ton	23 47
1,714 pounds of oat chop at $33 per ton	28 28
390 pounds of barley chop at $36 per ton	7 02
308 pounds of damaged wheat at $36 per ton	5 54
243 pounds of linseed oil meal at $60 per ton	7 29
1,831 pounds of roots at $6.75 per ton	6 18
1,228 pounds of skim-milk at 50 cents per 100 pounds	6 14
Total cost for 4 sows	$108 64
Cost for one sow	27 16

STATEMENT OF FEED COST OF SOW AT 13 MONTHS OF AGE.

Average feed cost of pigs at 2 months of age including feed of sow and young pigs	$ 6 36
Average cost of feeding sow from weaning to 13 months of age	27 16
Total cost	$33 52

These four young sows were in perfect condition and farrowed thirty-four pigs, thirty-two of which lived. It is estimated that where conditions were suitable the cost of raising pigs to eight weeks could be reduced to about $4 per pig by raising two litters per year.

SHEEP

The flock of sheep on this station included forty ewes, fourteen ewe lambs, twenty-two lambs for feeding (cross-breds), and two pure-bred Cheviot rams on December 31, 1922.

The 1922 crop of lambs was satisfactory. Forty-four lambs were raised from 28 ewes. Six of these lambs were dead at birth or died a few days later.

Of these twenty-eight ewes six were bred in 1921 to lamb at the end of the year, in order to determine the advisability of breeding lambs. The percentage of deaths was higher among the ewes.

During the winter the ewes were fed 2 pounds of hay, 3 pounds of oats, peas and vetches ensilage, and three-quarters of a pound of equal parts of bran and oats.

IMPROVEMENT OF THE FLOCK THROUGH THE USE OF A PURE-BRED RAM

A flock of nineteen grade ewes coming from various flocks in the eastern part of the province was brought in 1919. A Cheviot ram was purchased from Macdonald College. Another ram was received in 1921 from the Fredericton Experimental Station, N.B. The latter ram, however, did not prove to be as good a breeder. The wool from the Macdonald ram was graded " Ordinary Combing " and that from the Fredericton ram " Coarse Combing ". Judging by results given below, the latter has, if anything, lowered the quality of our flock in the second generation.

The average weight of ewes in different generations was:—

—	6 months	1 year	2 years	3 years
Old ewes	.....	.....	.....	170
1st generation	112	138	157	.....
2nd generation	111	141	147	.....

The average weight of wool in different generations was:—

—	1st clip	2nd clip	3rd clip	4th clip
Old ewes	.....	.....	7·2	7·7
1st generation	7·9	7·7	7·9	.....
2nd generation	5·9	6·1	.....	.....

The grade of wool in each generation was:—

—	Medium combing	Ordinary combing	Coarse combing
	%	%	%
Old ewes	23	46	31
1st generation	.....	35	15
2nd generation	.....	71	29

The flock of sheep on December 31, 1923 included sixteen Cheviot ewes, six Cheviot ewe lambs and three Cheviot rams, 54 cross-bred ewes, thirteen cross-bred ewe lambs and thirty-eight cross-bred lambs and ewe lambs for fattening. The sixteen ewes, the six ewe lambs and the imported ram are all pure-bred and were received from the Experimental Station of Fredericton, N.B. on December 10. With this flock, it should be possible to supply the farmers of the district with some good ram lambs and a few pure-bred ewe lambs every year. This breed is prolific and very hardy, and it is hoped, will become as popular as it deserves to be.

Part of the grade flock will be sold and only a few ewes of each generation will be kept, in order to go on with the grading up experiment with the pure-bred ram.

The lamb crop of 1923 was quite satisfactory; out of a total of forty-eight ewes, including eight ewe lambs born in 1922, forty-six lambed, giving sixty lambs, or 1.3 per head. Of these nine died, or 15 per cent, leaving a crop of 1.1 lambs per head. The experiment with ewe lambs has lowered the average of the lamb crop. Out of eight ewe lambs served, seven have delivered 6 lambs and one ewe lamb, 43 per cent of which are dead.

IMPROVEMENT OF A FLOCK THROUGH THE USE OF A PURE-BRED RAM

One of the rams employed having given negative results, this experiment will be continued with a ram imported from Scotland and received from the Experimental Station of Fredericton. It will be interesting to compare the results given by this ram with those given by the former. This again demonstrates the importance of carefully choosing breeding animals.

BREEDING OF EWE LAMBS

The object of this experiment was to determine if it might be advisable to breed ewe lambs at the age of seven to eight months, so that they might lamb when they are one year old. Six of the best ewe lambs, born in 1921, and eight ewe lambs born in 1922 were used in this experiment. Twelve ewe lambs born in 1921 were kept as checks; these ewe lambs were to be mated at the age of nineteen to twenty months, so as to lamb when two years old. The ewe lambs were weighed at breeding time and at each of the following seasons. The number of lambs born of each lot and the number of lambs that died were recorded.

In order to know how far the progeny might be affected by the breeding of ewe lambs, two ewe lambs out of the first ones mated were bred at the age of seven months. The results are given in the following tables:—

EWE LAMBS BRED AT THE AGE OF EIGHT TO EIGHT AND A HALF MONTHS

—	Date of birth	Weight of mothers			Lambs born the first year					Lambs born the second year				
		Six months old	One and a half years old	Two a half years old	Date of dropping lamb	Number of lambs	Number dead	Per cent of mortality	Weight at birth	Date of dropping lamb	Number of lambs	Number dead	Per cent of mortality	Weight at birth
									lbs.					lbs.
Claire de LaFerme.....No. 34	1921	110	118	138	27-4-22	1-F	.....	.....	7	30-3-23	2-F-M	1	.....	8
Catherine de LaFerme.....No. 36	1921	111	120	128	26-4-22	1-F	.....	.....	6	21-3-23	1-F	.....	.....	9½
Cunégonde de LaFerme.....No. 44	1921	109	115	136	21-4-22	1-M	.....	.....	7	31-3-23	1-F	.....	.....	9
Caroline de LaFerme.....No. 45	1921	110	120	128	23-4-22	1-M	.....	.....	9	13-4-23	1-M	.....	.....	13
Charlotte de LaFerme.....No. 48	1921	107	138	154	21-4-22	2-M	2	.....	.....	23-3-23	2-F-M	1	.....	8
Colombine de LaFerme.....No. 30	1921	107	114	126	21-4-22	1-M	.....	.....	8	16-4-23	1-F	.....	.....	6¼
Average.....	.....	109	120·8	135	.....	1·16	0·3	28·6	7·4	.....	1·33	0·25	25	8·9
(a) Dorothée de LaFerme...No. 92	1922	55	91	.....	.....	.....	.....	.....	.....					
(b) Dora de LaFerme.....No. 89	1922	75	116	.....	24-4-23	1-M	1	.....	.....					
Desneiges de LaFerme.....No. 65	1922	100	161	.....	7-4-23	1-M	1	.....	.....					
Daphnée de LaFerme.....No. 54	1922	101	141	.....	13-4-23	1-M	.....	.....	10					
Delphine de LaFerme.....No. 62	1922	95	114	.....	15-4-23	1-M	.....	.....	6					
Dionée de LaFerme.....No. 58	1922	92	136	.....	15-4-23	1-M	.....	.....	5½					
Denise de LaFerme.....No. 57	1922	98	126	.....	16-4-23	1-M	.....	.....	9½					
Dardanelle de LaFerme.....No. 85	1922	95	111	.....	3-6-23	1-F	.....	.....	4½					
Average.....	.....	88·9	124·5	.....	.....	1·0	0·28	28·6	7·1					

(a) Daughter of Claire de LaFerme, No. 34.
(b) Daughter of Catherine de LaFerme, No. 36.

EWE LAMBS BRED AT THE AGE OF NINETEEN TO TWENTY MONTHS

Ewes born in 1921

Name of ewe	Weight of mothers			Lambs born of 2-year-old ewes			
	Six months old	One and one-half years old	Two and one-half years old	Date of dropping lamb	Number of lambs	Number dead	Weight at birth
	Lbs.	Lbs.	Lbs.				Lbs.
Cécile de LaFerme.....No. 41	109	145	151	27-3-23	1-M	.....	9½
Cérès de LaFerme.....No. 42	89	117	124	26-3-23	1-F	.....	8
Césarine de LaFerme.....No. 32	85	114	126	23-3-23	2-M-M	.....	6-5
Chloris de LaFerme.....No. 46	91	126	141	30-3-23	1-M	.....	9
Christine de LaFerme.....No. 38	103	128	121	11-4-23	1-M	.....	7½
Cibèle de LaFerme.....No. 35	93	122	116	14-4-23	1-F	.....	8½
Clara de LaFerme.....No. 40	82	119	114	31-3-23	1-F	.....	8½
Claudine de LaFerme.....No. 31	95	128	136	11-4-23	2-F-F	.....	7-7½
Clémentine de LaFerme.....No. 49	109	148	144	28-3-23	2-F-M	.....	8-7
Chloée de LaFerme.....No. 47	113	158	161	21-3-23	1-M	.....	10
Cordélia de LaFerme.....No. 37	80	106	106	26-3-23	1-M	.....	9½
Corinne de LaFerme.....No. 33	104	143	176	5-4-23	1-M	.....	5½
Average.....	96	129+5	134+6	.....	15	.....	7·77

Summary.—The following summary gives the results obtained from the six ewe lambs bred at the age of eight to eight and a half months (group No. 1) which gave two crops of lambs, and those served at the age of nineteen to twenty months (group No. 2) which gave only one crop of lambs:—

SUMMARY—LAMBING AT ONE YEAR OF AGE VS. TWO YEARS OF AGE

—	1	2
	Ewe lambs served at the age of 8 to 8½ months	Ewe lambs served at the age of 19 to 20 months
Number of ewe lambs	6	12
Average weight at 6 months	109 lbs.	96 lbs.
Average weight at 1½ years	120·8 lbs.	129·5 lbs.
Average weight at 2½ years	135 lbs.	134·6 lbs.
Number of lambs produced	15	15
Production per 100	250	125
Number of lambs that died 8 days after birth	4	0
Production per 100 of living lambs	183+3	125
Percentage of mortality	26·6	0

The ewe lambs of group 1 (bred at the age of eight to eight and a half months) gave, the first year, 83.3 per cent of living lambs and 100 per cent the second year, as compared with 125 per cent for a single crop for group No. 2. The production per 100 of group No. 1 was exactly double that of group No. 2, but there was no mortality in the latter, while there was a mortality of 26·6 per cent in group No. 1. At the time of mating, the ewe lambs of group No. 1 were more developed than those of group No. 2 at the same time, and the results might have been quite different if ewe lambs of average size had been used. For this reason, ewe lambs of average size were selected in 1922 and this experiment will be continued in order to come to a final conclusion.

The two ewe lambs, progeny, in turn of the lambs bred at the age of eight months, were bred at the age of seven months and these gave only one lamb

that died a few days after birth. As there were only two ewes in this experiment, no conclusion could safely be drawn from it. This experiment will also be continued.

The weight of the lambs at the age of six months will be taken, in order to see if the mating of ewe lambs at the age of eight months has any influence on the size of lambs.

It might be deduced, from the results given above, that the mating of ewe lambs at eight months has little influence on their size, if they are well fed. Late lambing delays the weaning and the ewes are usually thinner the next season. This should be compensated by a more substantial ration.

BEST TIME FOR SELLING LAMBS

Twenty-two castrated lambs were divided in two lots of eleven each in the fall of 1922; the first lot was to be fattened for the Christmas market and the other lot was to receive a maintenance ration until the first days of March when they were to be fed for the Easter market. Those selected for lot No. 1 only required a small quantity of grain to finish them completely, while those of lot No. 2 required very much more grain to acquire the necessary finish. This explains the difference in the quantities of grain consumed by both lots. The results are given in the following table:—

LAMB FEEDING EXPERIMENT

Number of Lot		1	2
Number of lambs in the lot	No.	11	11
Total weight at beginning of fattening period	lbs.	963	943
Total weight upon completion of fattening period	"	1,002	1,113
Total gain during period	"	39	170
Average wt. at beginning of fattening period	"	87·5	85·7
Average wt. upon completion of fattening period	"	91·1	101·1
Average gain per lamb	"	3·6	15·4
Cost of feed	$	12·06	55·71
Cost of feed per 100 lbs. of gain	$	30·92	32·77
Value at 8½c. per lb. live weight	$	85.17	.....
Value at 9c. per lb. live weight	$	.....	100.17
Profit of lot No. 1 over lot No. 2	$	28.65	.....

QUANTITY OF FOOD CONSUMED

	lbs.	lbs.
Hay at $22 per ton	539	3,017
Ensilage at $6.75 per ton	308	3,916
Grain ration: (2 parts of bran, 2 parts of ground oats, 1 part of barley meal, 1 part of oil-cake meal) at $37.00 per ton	275	503

Conclusion.—The above results confirm in all particulars those obtained in 1921-22. The deduction to be drawn is that locally, at least, it is better to prepare lambs for the Christmas trade; the fall prices have generally reached their height at that time and the difference of ½ to 1 cent per pound between the fall and the spring prices does not pay the cost of feed for this period.

The price of lamb and mutton is usually comparatively low in this district, and only a very small quantity can be absorbed by the market at any time. By slaughtering the lambs in the fall, they may be kept in cold storage and placed on the market as they are needed.

FIELD HUSBANDRY

(YEAR 1922)

The spring of 1922 was fairly favourable for seeding. The first grain was sown on May 15. Seeding was general on May 25. There was no frost from May 9 to June 13 and the temperatures were exceptionally favourable, promising an excellent crop. But on June 12 snow fell for three hours, and the next day there were five degrees of frost, which greatly damaged clover, oats, barley and turnips, as well as vegetables. The rainfall in June was satisfactory but July was extremely wet. The fodder corn was damaged by a slight frost on August 5 and again on September 6. The temperature in September and up to October 11 was exceptionally favourable to the crops.

OATS

Thirty-nine acres were sown to oats but the crop did not ripen on 20·5 acres because seeding was done too late on land cleared in the spring. The crop was cut, however, in good condition to be put into the silo. The remaining 18½ acres gave an average yield of 31.4 bushels per acre. Part of the oats had been sown on land ploughed in the spring because some experiments had been planned too late to enable ploughing to be done in the fall. It is impossible to prepare clay properly by spring ploughing. The cost of production per acre was as follows:—

	$ cts.
Rent of land	3 00
Use of machinery	1 00
Seed, 2½ bush. at $1.20	3 00
Twine, 6½ lbs. at 15½c. per pound	0 97
Ploughing, teamster, 9 hours at 30c	2 70
" 2 horses, 9 hours at 18c	1 62
Discing, teamster, 3·75 hours at 30c	1 12
" 2 horses, 3·5 hours at 18c	0 63
Hoeing: teamster, 0·75 hours at 30c	0 23
" 2 horses, 0·75 hour at 18c	0 13
Seeding: teamster, 0·75 hour at 30c	0 23
" 2 horses, 0·75 hour at 18c	0 45
Cutting: teamster, 1½ hours at 30c	0 45
" 2 horses, 1½ hours at 18c	0 27
" Labour, 2 hours at 30c	0 60
Loading, hauling and unloading:	
teamster, 2 hours at 30c	0 60
2 horses, 2 hours at 18c	0 36
Labour, 2 hours at 30c	0 60
Threshing, labour, 8 hours at 30c	2 40
Motor, at $1 per hour	2 00
Cost per acre	$ 22 04
Yield per acre	31·4 bushels
Cost per bushel	$ 0·702

The very high cost per bushel is due to the poor yield. The month of July being very wet, oats made a second growth and the straw was overly long, and the kernels did not fill well.

SUNFLOWERS

Six acres were planted in sunflowers, which gave an average yield of 5 tons 500 pounds per acre. Five acres and a half were sown on black loam recently cleared and surface-drained by means of ditches. This land is very retentive of moisture and growth was checked by the very heavy rainfall in June (2.66 inches), July (6·24 inches) and August (3·85 inches). The frost on June 12 only caused slight damages.

COST OF GROWING AN ACRE OF SUNFLOWERS

	$ cts.
Rent of land	3 00
Use of machinery	1 00
Manure, ¼ of 16 tons at $2	8 00
Seed, 18 pounds at 9c	1 62
Ploughing: teamster, 10·5 hours at 30c	3 15
" 2 horses, 9 hours at 18c	1 62
" 3 horses, 1½ hours at 27c	0 40
Discing: teamster, 2·5 hours at 30c	0 75
" 2 horses, 2½ hours at 18c	0 45
Harrowing: teamster, 1 hour at 30c	0 30
" 2 horses, 1 hour at 18c	0 18
Seeding: teamster, 1 hour at 30c	0 30
" 2 horses, 1 hour at 18c	0 18
Hoeing: teamster, 4 hours at 30c	1 20
" 1 horse, 4 hours at .09c	0 36
Labour, 24 hours at 30c	7 20
Cutting, labour, 14 hours at 30c	4 20
Loading, hauling and unloading:	
Labour, 3 hours at 30c	0 90
Teamster, 5 hours at 30c	1 50
2 horses, 5 hours at 18c	0 90
Filling of silo, labour, 8 hours at 30c	2 40
Motor, 4 hours at $1	4 00
Cost per acre	$ 43 61
Yield per acre	5 tons, 500 lbs.
Cost per ton	$ 8 30

PEAS, OATS AND VETCHES

Record was taken of the cost of growing a mixture of peas, oats and vetches for silage. Eight acres were sown at the following rate: oats, 2 bushels; peas, ¾ bushel; and vetches, ¼ bushel per acre. This mixture gave a yield of 1 ton 950 pounds per acre. Part of this fodder was sown on black loam and the yield was very low owing to the heavy rainfall in July and August. The following is the cost of growing one acre of O.P.V. ensilage:—

	$ cts.
Rent of land	3 00
Use of machinery	1 00
Seed	5 78
Ploughing: teamster, 10·3 hours at 30c	3 09
" 2 horses, 10·3 hours at 18c	1 85
Discing: Teamster, 2½ hours at 30c	0 75
" 2 horses, 2½ hours at 18c	0 45
Harrowing: teamster, 1 hour at 30c	0 30
" 2 horses, 1 hour at 18c	0 18
Seeding: teamster, 0·75 hour at 30c	0 23
" 2 horses, 0·75 hour at 18c	0 13
Cutting, teamster, 2 hours at 30c	0 60
" 2 horses, 2 hours at 18c	0 36
Loading, hauling and unloading:—	
teamster, 3 hours at 30c	0 90
2 horses, 3 hours at 18c	0 54
Labour, 2 hours at 30c	0 60
Filling silo: Labour, 2 hours at 30c	0 60
Motor, 1 hour at $1	1 00
Cost per acre	$ 21 36
Yield per acre	1 ton 950 pounds
Cost per ton	$ 14 48

HAY

The year was very favourable for the production of hay. The area in hay was 64 acres, giving an average yield of 1 ton 878 pounds per acre. The 7 degrees of frost on June 13 greatly damaged clover, but owing to the heavy rainfall in June and the beginning of July, the crop made a satisfactory growth after the frost. The following is the cost of growing one acre of hay:—

	$ cts.
Rent of land	3 00
Use of machinery	1 00
Seed, ½ of 22 pounds at 27c. per pound	1 98
Mowing, teamster, 0·75 hour at 30c	0 23
" 2 horses, 0·75 hour at 18c	0 13
Raking, teamster, ½ hour at 30c	0 15
" 1 horse, ½ hour at 9c	0 05
Handling in the field, 2½ hours at 30c	0 75
Loading, hauling and unloading:	
Labour, 4½ hours at 30c	1 35
Horses, 2½ hours at 18c	0 45
Cost per acre	$ 9 09
Yield per acre	1 ton 870 pounds
Cost per ton	$ 6 33

ENSILAGE AND ROOT EXPERIMENT

An eight-acre field was chosen for this experiment which includes the following crops: ½ acre mixture oats, peas and vetches; ½ acre sunflowers; ½ acre corn; ½ acre fodder roots (¼ acre mangels, ¼ acre swedes).

The object of this experiment is to find out what crop makes the most economical silage, in comparison with roots. It is conducted under a four years' rotation, the above crops being followed by oats and two years of hay. The land on which the experiment was conducted is a black loam with heavy clay sub-soil. As the layer of vegetable earth was thinner on the first year soil, a great deal of work was necessary to till the very heavy clay. As it was too late when this experiment was planned to plough in the fall, the intertilled crop was grown under poor conditions. It was more a work of a preparatory nature than anything else. Sixteen tons of manure per acre were applied on this four-year rotation the first year. Production costs, value of crop, profit or loss and cost per ton are included in the following table:—

ENSILAGE AND ROOT EXPERIMENT

——	Yield per acre	Cost per acre	Value of crop	Profit or loss (−) per acre	Cost per ton
	tons	$ cts.	$ cts.	$ cts.	$ cts.
Mixture O.P.V.	3·30	37 62	33 00	−4 62	11 40
Sunflowers	5·25	41 54	52 50	10 96	7 91
Corn	·65	40 24	6 50	−33 74	61 91
Fodder Roots: Mangel	·57	70 88	7 64	−63 24	124 35
" " Swede	5·82	66 08	39 28	−26 80	11 35

Corn was greatly damaged by frost in June and again in August. The yield of mangles was reduced owing to the heavy rainfall in July and August. This experiment will be continued.

MAINTAINING SOIL FERTILITY

The following experiments were started in 1922:—

Green manure—Sweet clover ploughed down and summer-fallow.

Green manure—Sweet clover ploughed down and buckwheat planted to be ploughed down or cut for grain if possible.

No manure—Check experiment.

Farm manure—Sixteen tons per acre applied at the first year.

Lime—Two tons of ground limestone applied at the second year.

Commercial fertilizers—Two hundred pounds of nitrate of soda and 300 pounds of superphosphate per acre.

All the experiments are conducted under a four-year rotation as follows: first, oats; second, barley; third, clover hay; fourth, timothy hay. The object of these experiments is to find out the most economical method of maintaining the soil in good fertility and the cost of production of each crop.

As these experiments were planned too late to enable ploughing to be done in the fall before the snow, this work had to be done in the spring. It was impossible to work clay properly under such conditions and very light crops were obtained. This year all the ploughing was done in the fall and better results are looked for next year if the season is satisfactory.

CLEARING LAND

Thirty-one acres of land were cleared in 1922, at a total cost of $1,083.30. Each acre cost $34.92. This area had been burnt over two or three times and the clearing was comparatively easy. Twenty and one-half acres were disked and sown at the end of June to oats which did not ripen. The oats were cut green and put into the silo. The brush which was 8 to 10 feet high was cut down and burnt on 12 acres, at a total cost of $285.90, being $23.82 per acre.

DRAINAGE

Two carloads of drain tiles were purchased this fall in order to drain a 20-acre field for the test of cereals. Work was begun this fall but on account of the unfavourable weather, only the main drain was dug, 1,545 feet long, and the outlet 1,050 feet long. Work will be resumed in the spring.

An outlet was straightened and lengthened so as to drain a low field covering 35 acres, always covered with water and where only shrubs grow. No horse work could be done there even in mid-summer. The water was entirely removed by this outlet and this field now will be easily cleared. The outlet is 3,215 feet long, 3 feet deep, 4 feet at the base and 5 feet at the surface. All the work was done by means of dynamite at the following cost:—

2,382 sticks of dynamite at 10c	$	238 20
926 electric caps at 8c		74 08
274 hours of hand-labour at 30c		82 20
Total cost	$	394 48
Number of cubic yards		1,603
Cost per cubic yard of ditching	$	24 60

(YEAR 1923)

The season of 1923 was the least favourable for the growing of crops that we have had since this Station was established. As stated under " The Season ", the late spring, the drought in May and June, the frequent rains during August and the first part of September, and the coolness of the summer are the factors responsible for failure of the crops. The grain grew high but did not ripen; the new meadows suffered to a great extent from the spring frosts, and hay, as a rule, suffered from the early drought. The roots and sunflowers also suffered from the cold temperatures. The sunflowers were greatly damaged by the frost of July 26 when the thermometer went down to 30 degrees, and as the thermometer is situated on a height, we are inclined to think that in other locations the temperature was even lower than 30 degrees.

All ploughing had been done the preceding fall, and seeding was started as soon as the land could be worked with machinery. The first grain was sown on May 25, about 15 to 20 days later than usual.

COST OF PRODUCTION

In all experiments with fertilizers, and rotations and in the cost of production of crops, the following values were used for 1923:—

Values

	$ cts.
Labour, per hour	0 30
Horsepower, one horse	0 12
Rent of land, per acre	3 85
Use of Machinery, per acre	3 00
Farm manure (cost of handling only) per acre	1 00
Nitrate of soda, per ton	75 00
Acid phosphate, per ton	28 00
Seed, oats, per bushel	1 60
" wheat, per bushel	3 10
" barley, per bushel	2 00
" buckwheat, per bushel	2 00
" turnips, per pound	0 70
" beets, per pound	0 40
" corn, per pound	0 06
" sunflowers, per pound	0 15
" red clover,	0 35
" alsike, } Total cost to be divided among the number of years in hay and pasture.	0 24
" timothy,	0 13
" sweet clover, per pound	0 15
" potatoes, per bushel	1 39
Twine, per pound	0 14
Threshing, per bushel	0 07
Ensilage, per ton	0 68

Receipts

Barley, per bushel	1 00
Oats, wheat cut for hay, per ton	20 20
Hay, per ton	20 20
Ensilage, per ton	6 75
Roots and small potatoes, per ton	3 40
Potatoes, per bushel	0 80
Straw, per ton	8 00

OATS

Thirty-two acres were sown in Banner oats for grain from May 25 to June 2, but the oats did not ripen. The crop had a normal appearance in height, at least, until the beginning of August, although the colour was yellowish, showing the lack of nitrification in the soil. Nitrification takes place when there is sufficient humus upon which the micro-organisms feed, sufficient phosphoric acid, which is also one of the most important elements for the plants, sufficient moisture and an average temperature. This failure may be attributed to the temperature and to the acidity of certain lands. With the continuous rains in August and September, oats reached a height of 5 feet, but the crop was still green at the end of September and it had to be cut for hay before bad weather started.

The cost of production of oat hay is as follows:—

Area	32 acres	
Rent of land	$ 3 85	per acre
Use of machinery	3 00	"
Grain, 2½ bushels at $1·60	4 00	"
Ploughing, one man and two horses, 9 hours at 54c	4 86	"
Harrowing, " " " " 2·75 hours at 54c	1 48	"
Seeding, " " " " 0·75 hours at 54c	0 40	"
Mowing, " " " " 0·8 hours at 54c	0 43	"
Work in the field, one man and two horses, 2·6 hours at 54c	0 78	"
Loading, hauling and unloading, one man and two horses, 1 hour at 54c	0 54	"
Manual labour, 1 hour at 30c	0 30	"
Cost per acre	$ 19 64	"

Yield per acre (dry fodder)	1·16 ton
Cost per ton	$ 16 98
Value per acre, 1·16 ton at $20.20	23 43
Profit per acre	3 79

Oat hay was valued at the current prices of clover and grass hay in the district. According to Henry and Morrison, in their table of digestible nutrients contained in feeds, oat hay has about the same value as clover and timothy hay.

BARLEY

Ten acres were sown in barley on May 28 and May 29. The land where this barley was sown contained almost no humus, it was almost pure clay; the humus having been burnt by bush fires. This, added to the unsuitable temperatures reduced the yield to almost nothing. For the last two years, we have observed that when the plant reaches a height of 6 to 12 inches, a part of the stem becomes yellow and dries up. We do not know to what this should be attributed, except to the reasons given above. However, observations will be continued in order to find the causes, so as to be able to remedy the same if possible.

WHEAT

Three acres of fall wheat and eight acres of spring wheat were sown on a meadow on which 12 tons of manure had been applied. The fall wheat was completely destroyed by spring frosts. The plants were heaved and the roots broken. In a case of this kind, under some conditions the ground is rolled. It was not done in this case because the clay land was very wet and rolling might have been disastrous.

The Marquis wheat sown in the spring had a fine appearance, but it did not ripen. It was cut and made into hay.

OATS, PEAS AND VETCHES

Forty-nine acres were sown in oats, peas and vetches for the production of ensilage, at the rate of two bushels of oats, ¾ bushels of peas and ¼ bushel of vetches per acre. The total production was 142.47 tons, or 2.9 tons per acre. The cost of production of ensilage of the above mixture is as follows:—

Area	49	acres
Rent of land	$ 3 85	per acre
Use of machinery	3 00	"
Seed, 3 bushels at $2.32	6 96	"
Ploughing, one man and 2 horses, 9 hours at 54c	4 86	
Harrowing, one man and 2 horses, 2.75 hours at 54c	1 48	
Seeding, one man and 2 horses, 0.75 hour at 54c	0 40	
Mowing, one man and 2 horses, 1.00 hour at 54c	0 54	
Loading and hauling, one man and 2 horses, 1.5 hr. at 54c	0 81	
Manual labour, 1.5 hour at 54c	0 45	
Putting in silo, 2·9 tons at 68c. per ton	1 97	
Cost per acre	$24 31	
Yield per acre	2·9	tons
Cost per ton	$ 8 38	
Value per acre, 2·9 tons at $6.75 per ton	19 58	
Loss per acre	4 74	

SUNFLOWERS

Three and one-half acres were sown in sunflowers and a total yield of 9.5 tons, or 2.71 tons per acre, was obtained. The growth was slow throughout the season, on account of the cold weather. The crop was much damaged by the frost on July 25. The growth was checked and a quantity of lateral branches developed around the top. The cost of production is as follows:—

Area	3·5	acres
Rent of land	$ 3 85	per acre
Use of machinery	3 00	"
Manure, 6·29 tons at $1	6 29	"
Seed, 8 pounds at 15c. per pound	1 20	"
Ploughing, one man and 2 horses, 9 hours at 54c	4 86	
Harrowing, one man and 2 horses, 3·1 hours at 54c	1 67	
Seeding, one man and 2 horses, 0·8 hour at 54c	0 43	
Hoeing, one man and 1 horse, 7·1 hours at 42c	2 98	
Hoeing, manual labour, 39 hours at 30c	11 70	
Cutting, manual labour, 4 hours at 30c	1 20	
Loading and hauling:—		
One man and 2 horses, 2½ hours at 54c	1 35	
Manual labour, 2½ hours at 30c	0 75	
Putting in silo, 2·71 tons at 68c. per ton	1 84	
Cost per acre	$41 12	
Yield per acre	2·71	tons
Cost per ton	$15 17	
Value per acre, 2·71 tons at $6.75	18 29	
Loss per acre	22 83	

HAY

The hay crop was only fair in 1923. The new meadows were greatly damaged by the spring frosts and the yield was below the average on such meadows; however, the old meadows did not suffer so much, and their yield was greater. On a total area of 75 acres, 74 tons of hay were cut, or about one ton per acre.

The cost of production is as follows:—

Area	75	acres
Rent of land	$ 3 85	per acre
Use of machinery	3 00	"
Seed, ¼ of 22 pounds at 22c. per pound	1 61	"
Cutting, one man and 2 horses, 0·75 hour at 54c	0 41	"
Raking, one man and 2 horses, 0·5 hour at 54c	0 27	"
Tedding and coiling: one man, 1·5 hour at 30c	0 45	"
Loading, hauling and unloading:—		
One man and 2 horses, 2 hours at 54c	1 08	"
Manual labour, 1 hour at 30c	0 30	"
Total cost	$10 97	"
Yield per acre	0·99	tons
Cost per ton	$11 08	
Value per acre, 0·99 ton at $20.20	20 00	
Profit per acre	9 03	

The mixture of clover and grasses used per acre is as follows: 12 pounds of timothy, 8 pounds of red clover, 2 pounds of alsike clover. This has given entire satisfaction.

On account of the bad season, the crop of hay will again be insufficient to meet the local needs this year, but there has been such an increase in land clearing this year, that if the yield of hay is at all reasonable, it will now be necessary to raise more live stock, in order to consume the surplus. Prices will certainly go down, and exporting is out of the question, owing to the prohibitive costs of freight.

EXPERIMENTS WITH ENSILAGE AND ROOT CROPS

The object of this experiment was to compare fodder corn, sunflower and a mixture of oats, peas and vetches for ensilage with mangels and turnips.

The details of this experiment are given in the following table. The comparison of yields is to be found in the second column from the left. The loss or gain in the entire four-year rotation (ensilage or root crop, oat hay, clover and timothy) is to be found in the column to the extreme right.

ENSILAGE AND ROOT CROPS—COST, YIELD AND VALUE OF CROPS PER ACRE

Crops	Yield		Items of Expense in Raising Crop											Loss or gain on the rotation		
						Manual labour and horse labour										
	Hay crops in rotation	Hoed crop	Rent	Manure	Seed	Manual labour	Teamster	Cost of the manual labour	One horse	Two horses	Value of horse labour	Ensilage	Use of machinery	Total cost	Value of crops	Loss (−) or gain
	T	T	$ cts.	$ cts.	$ cts.	hrs	hrs	$ cts.	hrs	hrs	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
Roots	3·45	2·06	15 40	16 00	11 09	98·33	45·25	43 07	6·0	39·24	10 14	.....	12 00	107 66	76 68	− 30 98
Sunflowers	3·45	4·35	15 40	16 00	10 04	75·08	41·49	34 98	2·5	38·99	9 66	2 96	12 00	100 99	99 05	− 1 94
Fodder corn	3·45	.....	15 40	16 00	10 28	58·08	38·49	28 98	3·0	35·49	8 87	.....	12 00	91 53	69 69	− 21 84
Mixture of O.P.V.	3·45	10·76	15 40	16 00	15 80	23·08	41·07	19 25	.....	41·07	9 86	7 32	12 00	95 63	142 32	46 69

Half of the first rotation (roots) was sown in mangels and the other half in swede turnips. Half of each was thinned to 6 inches in the row and the other half to 12 inches. The swede turnips yielded considerably more than the mangels. The roots thinned at 6 inches apart yielded only 7 per cent more than those thinned at 12 inches. The relation between those thinned at 6 and 12 inches is about the same for mangels as for swede turnips. There is no doubt, however, that if the season had been favourable, those thinned at 12 inches would have given a better yield.

The fodder corn was first damaged by the frosts in June and completely destroyed by the frost of July 26. The sunflowers were also damaged by the frost of July 26 and suffered from the excessive dampness in August and September.

The mixture of oats, peas and vetches gave a good yield. The mixture sown per acre is as follows: 2 bushels of oats, ¾ bushel of peas and ¼ bushel of vetches.

EXPERIMENT WITH GREEN MANURE, BARNYARD MANURE, COMMERCIAL FERTILIZERS AND LIME

The object of this experiment is to find the best methods to maintain the fertility of the soil. The results are computed in the following tables:—

TABLE I—CHECK ROTATION, NO MANURE, FERTILIZERS OR LIME—COST, YIELD AND VALUE OF CROPS PER ACRE

Rotation year	Crops	Yield			Items of Expense in raising crop													Loss or gain on the rotation			Cost	
									Manual labour and horse power													
		Grain	Straw	Hay	Rent	Manure	Chemical fertilizers	Seed	Manual labour	Teamster	Cost of manual labour	Two horses	Three horses	Value of horse power	Threshing	Use of machinery	Twine	Total cost	Total value of the crop	Loss (—) or gain	Per ton	Per bushel
		tons	tons	tons	$ c.			$ c.	hrs.	hrs.	$ c.	hrs.	hrs.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
1	Oats	.....	.....	1·04	3 85	.....	.....	4 00	1·80	15·0	5 04	12·4	2·6	3 91	.....	3 00	.....	19 80	21 01	1 21	19 04	
2	Barley	5·4	0·44	.....	3 85	.....	.....	4 00	1·4	14·5	4 77	12·5	2·0	3 72	0 38	3 00	0 25	19 97	8 92	−11 05	17 91	2 24
3	Clover hay	.....	.....	0·56	3 85	.....	.....	2 42	2·75	3·0	1 73	3·0	.....	0 72	.....	3 00	.....	11 72	11 31	− 0 41	20 93	
4	Grass (hay)	.....	.....	0·46	3 85	.....	.....	2 42	2·75	3·0	1 73	3·0	.....	0 72	.....	3 00	.....	11 72	9 29	− 2 43	25 48	
	Total	5·4	0·44	2·06	15 40	.....	.....	12 84	8·7	35·5	13 27	30·9	4·6	9 07	0 38	12 00	0 25	63 21	50 53	−12 68		
	Average per acre	.....	.....	.....	3 85	.....	.....	3 21	2·2	8·87	3 32	7·7	1·15	2 27	·095	3 00	0 06	15 81	12 63	−3 18		

TABLE II—GREEN MANURE, CLOVER PLOUGHED UNDER FOLLOWED BY FALLOW—COST, YIELD AND VALUE OF CROPS PER ACRE

Rotation year	Crops	Yield			Items of Expense in raising crop													Loss or gain on the rotation			Cost	
									Manual labour and horse power													
		Grain	Straw	Hay	Rent	Manure	Chemical fertilizers	Seed	Manual labour	Teamster	Cost of manual labour	Two horses	Three horses	Value of horse power	Threshing	Use of machinery	Twine	Total cost	Total value of the crop	Loss (−) or gain	Per ton	Per bushel
		tons	tons	tons	$ c.			$ c.	hrs.	hrs.	$ c.	hrs.	hrs.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
1	Oats	.....	.....	1·73	3 85	.....	.....	4 97	1·4	14·2	4 68	11·9	2·3	3 68	.....	3 00	.....	20 18	34 95	14 78	11 66	
2	Clover seeded down and fallow	.....	.....	.....	3 85	.....	.....	3·97	.....	21·0	6 30	21·0	.....	5 04	.....	3 00	.....	22 16	.....	−22 16	.....	.....
3	Barley	7·3	0·63	.....	3 85	.....	.....	4 97	1·7	14·0	4 71	11·75	2·25	3 63	0·55	3 00	0 35	21 06	12 34	−8 72	13 65	1 70
4	Barley (a)	6·3	0·58	.....	3 85	.....	.....	4 97	1·7	14·0	4 71	11·75	2·25	3 63	0 43	3 00	0 35	20 94	10 94	−10 00	15 47	1 91
5	Grass (hay)	.....	.....	0·82	3 85	.....	.....	5 81	2·90	2·35	1 58	2·35	.....	0 56	.....	3 00	.....	14 80	16 56	1 76	18 05	.....
	Total	13·6	1·21	2·55	19 25	.....	.....	24 69	7·7	65·55	21 98	58·75	6·8	16 54	0·98	15 00	0 70	99 14	74 79	−24 35		
	Average per acre	.....	.....	.....	3 85	.....	.....	4 94	1·54	13·11	4 39	11·75	1·36	3 31	0 20	3 00	0 14	19 83	14 96	−4 87		

(a) Barley was sown as new meadow was killed out.

TABLE III—GREEN MANURE, CLOVER PLOUGHED UNDER FOLLOWED BY BUCKWHEAT, HALF OF WHICH IS PLOUGHED UNDER AND THE OTHER HALF CUT FOR GRAIN—COST, YIELD AND VALUE OF CROPS PER ACRE

Rotation year	Crops	Yield			Items of Expense in raising crop													Loss or gain on the rotation			Cost	
									Manual labour and horse power													
		Grain	Straw	Hay	Rent	Manure	Chemical fertilizers	Seed	Manual labour	Teamster	Cost of manual labour	Two horses	Three horses	Value of horse power	Threshing	Use of machinery	Twine	Total cost	Total value of the crop	Loss (—) or gain	Per ton	Per bushel
		tons	tons	tons	$ c.			$ c.	hrs.	hrs.	$ c.	hrs.	hrs.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
1	Oats	.....	.....	1·70	3 85	.....	.....	4 97	1·4	14·2	4 68	11·9	2·3	3 68	.....	3 00	.....	20 18	34 34	14 16	11 87	
2	Sweet clover and buckwheat ploughed under	.....	.....	.....	3 85	.....	.....	6 97	.....	20·33	6 10	20·33	.....	4 88	.....	3 00	.....	24 80	.....	−24 80		
3	Barley	7·8	0·62	.....	3 85	.....	.....	4 97	1·7	14·0	4 71	11·75	2·25	3 63	0 55	3 00	0 35	21 06	12 76	−8 30	13 22	1 65
4	Barley (a)	6·1	0·59	.....	3 85	.....	.....	4 97	1·7	14·0	4 71	11·75	2·25	3 63	0 43	3 00	0 35	20 94	10 82	−10 12	15 48	1 94
5	Grass (hay)	.....	.....	0·82	3 85	.....	.....	5 81	2·9	2·35	1 58	2·35	.....	0 56	.....	3 00	.....	14 80	16 56	1 76	18 05	
	Total	13·9	1·21	2·52	19 25	.....	.....	27 69	7·7	64·88	21 78	58·08	6·8	13 68	0 98	15 00	0 70	101 78	74 48	−27 30		
	Average per acre	.....	.....	.....	3 85	.....	.....	5 54	1·54	12·98	4 35	11·61	1·4	3 28	0 19	3 00	0 14	20 35	14 89	−5 46		

(a) Barley was sown as new meadow was killed out.

TABLE IV—BARNYARD MANURE (16 TONS PER ACRE)—COST, YIELD AND VALUE OF CROPS PER ACRE

Rotation year	Crops	Yield			Items of Expense in raising crop													Loss or gain on the rotation			Cost	
									Manual labour and horse power													
		Grain	Straw	Hay	Rent	Manure	Chemical fertilizers	Seed	Manual labour	Teamster	Cost of manual labour	Two horses	Three horses	Value of horse power	Threshing	Use of machinery	Twine	Total cost	Total value of the crop	Loss (−) or gain	Per ton	Per bushel
		tons	tons	tons	$ c.	$ c.		$ c.	hrs.	hrs.	$ c.	hrs.	hrs.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
1	Oats	.....	.....	1·74	3 85	6 40	.....	4 00	1·4	14·2	4 68	11·9	2·3	3 68	.....	3 00	.....	25 61	35 15	9 54	14 72	
2	Barley	4·5	0·43	.....	3 85	4 80	.....	4 00	1·7	14·0	4 71	11·75	2·25	3 63	0 32	3 00	0 25	24 56	7 94	−16 62	24 74	3 09
3	Clover hay	.....	.....	0·72	3 85	3 20	.....	2 42	3·0	3·0	1 80	3·0	.....	0 72	.....	3 00	.....	14 99	14 54	−0 45	20 82	
4	Grass (hay)	.....	.....	0·53	3 85	1 60	.....	2 42	2·41	2·84	1 58	2·84	.....	0 68	.....	3 00	.....	13 13	10 71	−2 42	24 77	
	Total	4·5	0·43	2·99	15 40	16 00	.....	12 84	8·51	34·04	12 77	29·49	4·55	8 71	0 32	12 00	0 25	78 29	68 34	9 95		
	Average per acre	.....	.....	.....	3 85	4 00	.....	3 21	2·12	8·51	3 19	7·35	1·14	2 18	0 08	3 00	0 06	19 57	17 08	2 49		

TABLE V—COMMERCIAL FERTILIZERS—COST, YIELD AND VALUE OF CROPS PER ACRE

Rotation year	Crops	Yield			Items of Expense in raising crop													Loss or gain on the rotation			Cost	
									Manual labour and horse power													
		Grain	Straw	Hay	Rent	Manure	Chemical fertilizers	Seed	Manual labour	Teamster	Cost of manual labour	Two horses	Three horses	Cost of horse power	Threshing	Use of machinery	Twine	Total cost	Total value of the crop	Loss (—) or gain	Per ton	Per bushel
		tons	tons	tons	$ c.		$ c.	$ c.	hrs.	hrs.	$ c.	hrs.	hrs.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
1	Oats	.....	.....	1·03	3 85	.....	2 61	4 00	1·49	14·23	4 72	13·57	0·66	3 49	.....	3 00	.....	21 67	20 81	−0 86	21 04	
2	Barley	3·4	0·73	.....	3 85	.....	3 97	4 00	1·83	14·0	4 75	12·17	1·83	3 58	0 24	3 00	0 21	23 60	9 24	−14 36	20 43	2 55
3	Clover hay	.....	.....	0·49	3 85	.....	0 73	2 42	2·15	2·98	1 54	2·98	.....	0 72	.....	3 00	.....	12 26	9 90	−2 36	25 02	
4	Grass (hay)	.....	.....	0·66	3 85	.....	4 39	2 42	2·85	3·18	1 81	3·18	.....	0 76	.....	3 00	.....	16 23	13 33	−2 90	24 59	
	Total	3·4	0·73	2·18	15 40	.....	11 70	12 84	8·32	34·39	12 82	31·90	2·49	8 55	0 24	12 00	0 21	73 76	53 28	−20 48		
	Average per acre	.....	.....	.....	3 85	.....	2 93	3 21	2·08	8·6	3 20	7·97	0·62	2 14	0 06	3 00	0 05	18 44	13 32	−5 12		

NOTE.—100 lb. Nitrate of Soda applied to barley, 100 lb. Nitrate of Soda and 300 lbs. Superphosphate to timothy hay.

TABLE VI—LIME—COST, YIELD AND VALUE OF CROPS PER ACRE

Rotation year	Crops	Yield			Items of Expense in raising crop													Loss or gain on the rotation			Cost	
									Manual labour and horse power													
		Grain	Straw	Hay	Rent	Manure	(a) Chemical fertilizers	Seed	Manual labour	Teamster	Cost of manual labour	Two horses	Three horses	Value of horse power	Threshing	Use of machinery	Twine	Total cost	Total value of the crop	Loss (−) or gain	Per ton	Per bushel
		tons	tons	tons	$ c.	$ c.		$ c.	hrs.	hrs.	$ c.	hrs.	hrs.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
1	Oats	.....	.....	1·00	3 85	6 40	.....	4 00	2·10	14·65	5 03	13·25	1·40	3 69	.....	3 00	.....	25 97	20 20	−5 77	25 97	
2	Barley	3·7	0·41	.....	3 85	4 80	.....	4 00	1·83	14·4	4 87	13·0	1·40	3 62	0 26	3 00	0 21	24 61	6 98	−17 63	28 20	3 53
3	Clover hay	.....	.....	0·46	3 85	3 20	.....	2 42	1·75	2·58	1 30	2·58	.....	0 62	.....	3 00	.....	14 39	9 29	−5 10	31 28	
4	Grass hay	.....	.....	0·26	3 85	1 60	.....	2 42	1·66	2·41	1 22	2·41	.....	0 58	.....	3 00	.....	12 67	5 25	−7 42	48 73	
	Total	3·7	0·41	1·72	15 40	16 00	.....	12 84	7·34	34·04	12 42	31·24	2·8	8 51	0 26	12 00	0 21	77 64	41 72	−35 92		
	Average per acre	.....	.....	.....	3 85	4 00	.....	3 21	1·84	8·51	3 10	7·81	0·7	2 13	0 07	3 00	0 05	19 41	10 43	−8 98		

NOTE.—(a) Lime applied at the rate of 2 tons per acre. No value is given to the lime until the increase in yield from this application is ascertained.

TABLE VII.—SUMMARY—COST, YIELD AND VALUE OF CROPS PER ACRE

	Yield			Items of Expense in raising Crop													Loss or Gain on the rotation		
								Manual labour and horse-power											
	Grain	Straw	Hay	Rent	Manure	Chemical fertilizers	Seed	Manual labour	Teamster	Cost of manual labour	Two horses	Three horses	Value of horse-power	Threshing	Use of machinery	Twine	Total cost	Total value of Crop	Loss (−) or Gain
	tons	tons	tons	$ c.	$ c.	$ c.	$ c.	hrs.	hrs.	$ c.	hrs.	hrs.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
No fertilizers	5·4	0·44	2·06	15 40	.....	.....	12 84	8·7	35·5	13 27	30·9	4·6	9 07	0 38	12 00	0 25	63 21	50 53	−12 68
Clover ploughed down and fallow	13·6	1·21	2·55	19 25	.....	.....	24 69	7·7	65·55	21 98	58·75	6·8	16 54	0 98	15 00	0 70	99 14	74 79	−24 35
Clover and buckwheat ploughed down	13·9	1·21	2·52	19 25	.....	.....	27 69	7·7	64·88	21 78	58·08	6·8	16 38	0 98	15 00	0 70	101 78	74 48	−27 30
Barnyard manure	4·5	0·43	2·99	15 40	16 00	.....	12 84	8·5	34·04	12 77	29·49	4·6	8 71	0 32	12 00	0 25	78 29	68 34	9 95
Chemical fertilizers	3·4	0·73	2·18	15 40	.....	11 70	12 84	8·3	34·39	12 82	31·90	2·5	9 55	0 24	12 00	0 21	73 76	53 28	−20 48
Lime	3·7	0·41	1·72	15 40	16 00	.....	12 84	7·3	34·04	12 42	31·24	2·8	8 51	0 26	12 00	0 21	77 64	41 72	−35 92

It will be impossible to draw any conclusion from these experiments before four or five years, but it is interesting to note that the rotation in which barnyard manure is used is the one which left the smallest deficit. The season was so unfavourable that it is not surprising to see the poor results obtained.

These experiments were made on a very heavy clay land, containing little humus.

ROTATIONS

The object of these rotations is to find out the following:—

1. The value, if any, of a short rotation in restoring the fertility of the soil.
2. The effect of a one, two, or three-year old sod on the crops following.
3. The yield of hay for one, two or three years.
4. The yield of sunflowers after grass or grain, or after clover or grass sod.
5. The yield of grain after: (*a*) sunflowers, (*b*) hay, (*c*) grain.
6. The advantage of different rotations including various crops in different proportion.
7. The value of potatoes as a cash crop.

The advantages that may result from the use of these rotations may be classified as follows:—

1. The land may be prepared for the growing of a crop one or more years before this plant is actually grown.
2. The rotation may be arranged so as to meet the special requirements of the system of farming that is followed.
3. The use of special rotations makes it easier to control or even to destroy completely some weeds.
4. Many plant diseases may be controlled or extirpated by the use of certain rotations.
5. The fertility of the soil may be maintained as well as gradually increased through the supply of humus by adopting well-planned rotations and by good use of clover and manure.
6. A more systematic programme of farm work may be prepared, thus eliminating unnecessary work.
7. It is generally possible to keep the land in better condition, thus increasing the yield.

The following rotations were started in 1923. They should meet the requirements of the district.

THREE-YEAR ROTATION

This rotation should meet the needs of those who have much rough pasture. It is splendidly adapted for the extirpation of weeds.

First year.—Hoed crop. The land is ploughed the previous fall and 12 tons of manure are applied per acre.

Second year.—Grain seeded down with 6 pounds of timothy, 10 pounds of red clover and 2 pounds of alsike clover. No advantage was derived from the application of manure this year, as this is the first year that this experiment is started.

Third year.—Clover hay cut early, before the weeds have ripened. The land is ploughed soon after and cultivated the rest of the season. As this is the first year that this rotation has been under way, this field has not received its share of the first year's application of manure. It should also be noted that it is a three-year's sod and therefore composed of timothy hay.

FOUR-YEAR ROTATION

This rotation may be suitable for the raising of live stock as it produces more hay than the first one.

First year.—Hoed crop. Sixteen tons of manure per acre are spread on the land ploughed the preceding fall.

Second year.—Grain, seeded down with 12 pounds of timothy, 8 pounds of red clover and 2 pounds of alsike clover. No advantage was derived this year from the manure applied the first year, as this is the first year that the rotation has been in operation.

Third year.—Clover hay. For the same reason as in the second year, this field did not benefit from the manure applied the first year. This was a three-year old sod.

Fourth year.—Timothy hay. As soon as the hay is cut, the land is ploughed and cultivated the rest of the season. For the same reason as already mentioned this land has not got its share of manure; it is also a three-year-old sod.

FIVE-YEAR ROTATION

This rotation gives as much hay as the preceding one, and more grain.

First year.—Grain, sown at the rate of 2½ bushels per acre and ploughed in the fall.

Second year.—Hoed crop, manured on the stubble the preceding fall at the rate of 12 tons of manure per acre.

Third year.—Grain seeded down with 12 pounds of timothy, 8 pounds of red clover and 2 pounds of alsike clover.

Fourth year.—Clover hay. For the same reasons given above, this crop was on a three-year-old sod this year.

Fifth year.—Timothy hay with an application of 8 tons of manure per acre as a covering. This was a three-year-old sod.

The crops of the first, third and fourth year did not benefit from the application of manure of the second and fifth year.

SIX-YEAR ROTATION

This rotation gives a great deal of grain, besides giving three crops of hay. It would be very suitable for dairying.

First year.—Hoed crop manured the preceding fall on the fall-ploughed land, at the rate of 16 tons of manure per acre.

Second year.—Grain.

Third year.—Grain seeded down with 12 pounds of timothy, 8 pounds of red clover and 2 pounds of alsike clover.

Fourth year.—Clover hay manured at the rate of 8 tons of manure per acre. This crop was also a three-year-old sod for the same reasons as given above.

Fifth year.—Timothy hay. This crop was also a three-year-old sod for the same reasons.

Sixth year.—Timothy hay. This crop was also a three-year-old sod for the same reasons.

The crops of the second, third, fifth and sixth years did not benefit from the application of manure of the first and fourth years. So long as the crops have not covered a complete cycle, the yields will not be up to their maximum and these notes are given only as a matter of record. No conclusions can be drawn before many years.

THREE-YEAR ROTATION—COST, YIELD AND VALUE OF CROPS PER ACRE

Rotation Year	Crop	Yield				Items of Expense in raising Crop													Loss or Gain on the rotation			Cost	
									Manual labour and horse labour														
		Grain	Straw	Hay	Hoed crop	Rent	Manure	Seed	Manual labour	Teamster	Cost of manual labour	One horse	Two horses	Three horses	Value of horse-power	Ensilage	Use of machinery	Twine	Total cost	Total value of crop	Loss—or gain	Per ton	Per bushel
		tons	tons	tons	tons	$ c.	$ c.	$ c.	hrs.	hrs.	$ c.	hrs.	hrs.	hrs.	$ c.	$ c.	$ c.		$ c.	$ c.	$ c.	$ c.	
1	Sunflower	....	....	....	2·48	3 85	6 00	1 20	53·0	25·75	23 63	7·5	18·25	.....	5 28	1 69	3 00	.....	44 65	16 74	−27 91	18 00	
2	Oats[a]	....	....	1·0	.....	3 85	3 60	4 00	1·5	15·75	5 18	.....	15·0	0·75	3 87	.....	3 00	.....	23 50	20 20	− 3 30	23 50	
3	Grass (hay)	....	....	0·38	.....	3 85	2 40	4 76	1·0	3·0	1 20	.....	3·0	.....	0 72	.....	3 00	.....	15 93	7 68	− 8 25	41 90	
	Total	....	....	1·38	2·48	11 55	12 00	9 96	55·5	44·5	30 01	7·5	36·25	0·75	9 87	1 69	9 00	.....	84 08	44 62	−39 46		
	Average per acre	....	....	....	.....	3 85	4 00	3 32	18·5	13·8	10 00	2·5	12·08	0·25	3 29	0 56	3 00	.....	28 02	14 87	−13 15		

NOTE.—[a] Oats cut green for hay.

FOUR-YEAR ROTATION—COST, YIELD AND VALUE OF CROPS PER ACRE

Rotation Year	Crop	Yield				Items of Expense in raising Crop												Loss or Gain on the rotation			Cost	
									Manual labour and horse labour													
		Grain	Straw	Hay	Hoed crop	Rent	Manure	Seed	Manual labour	Teamster	Cost of manual labour	One horse	Two horses	Three horses	Value of horse-power	Ensilage	Use of machinery	Twine	Total cost	Total value of crop	Loss—or gain	Per ton	Per bushel
		tons	tons	tons	tons	$ c.	$ c.	$ c.	hrs.	hrs.	$ c.	hrs.	hrs.	hrs.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	
1	Sunflower	....	....	....	2·68	3 85	6 40	1 20	46·0	24·0	21 00	7·25	16·75	.....	4 89	1 82	3 00	.....	42 16	18 09	−24 07	15 74	
2	Oats[a]	....	....	0·97	.....	3 85	4 80	4 00	1·8	16·3	5 43	.....	15·3	1·0	4 03	.....	3 00	.....	25 11	19 60	− 5 51	25 89	
3	Grass (hay)	....	....	0·45	.....	3 85	3 20	2 42	2·05	3·25	1 59	.....	3·25	.....	0 78	.....	3 00	.....	14·84	9 09	− 5 75	32 98	
4	Grass (hay)	....	....	0·39	.....	3 85	1 60	2 42	2·0	3·0	1 50	.....	3·0	.....	0 72	.....	3 00	.....	13 09	7 88	− 5 21	33 56	
	Total	....	....	1·81	2·68	15 40	16 00	10 04	51·85	46·55	29 52	7·25	38·3	1·0	10 42	1 82	12 00	.....	95 20	54 66	−40 54	.....	
	Average per acre	....	....	....	.....	3 85	4 00	2 51	12·96	11·64	7 38	1·81	9·6	0·25	2 61	0 45	3 00	.....	23 80	13 66	−10 14		

NOTE.—[a] Oats cut green for hay.

FIVE-YEAR ROTATION—COST, YIELD AND VALUE OF CROPS PER ACRE

Rotation Year	Crop	Yield				Items of Expense in raising Crop												Loss or Gain on the rotation			Cost	
									Manual labour and horse labour													
		Grain	Straw	Hay	Hoed crop	Rent	Manure	Seed	Manual labour	Teamster	Cost of manual labour	One horse	Two horses	Three horses	Value of horse-power	Ensilage	Use of machinery	Twine	Total cost	Total value of crop	Loss—or gain	Per ton	Per bushel
		tons	tons	tons	tons	$ c.	$ c.	$ c.	hrs.	hrs.	$ c.	hrs.	hrs.	hrs.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
1	Oats[a]	....	....	1·03	.....	3 85	2 60	4 00	1·8	15·5	5 19	.....	14·5	1·0	3 84	.....	3 00	.....	22 48	20 81	− 1 67	21 83	
2	Sunflower	....	....	....	2·16	3 85	6 40	1 20	45·5	24·6	21 03	6·5	17·0	1·1	5 26	1 47	3 00	.....	42 21	14 58	−27·63	19 54	
3	Barley	4·8	0·41	....	.....	3 85	3 80	4 00	0·8	15·4	4 86	.....	15·4	.....	3 70	0 34	3 00	0 25	23 80	8 08	−15 72	23 56	2 95
4	Clover (hay)	....	....	0·55	.....	3 85	2 80	2 42	2·0	3·6	1 68	.....	3·6	.....	0 86	.....	3 00	.....	14 61	11 11	− 3 50	26 56	
5	Grass (hay)	....	....	0·63	.....	3 85	4 40	2 42	2·0	3·6	1 68	.....	3·6	.....	0 86	.....	3 00	.....	16 21	12 73	− 3 48	25 73	
	Total	4·8	0·41	2·21	2·16	19 25	20 00	14 04	52·1	62·7	34 44	6·5	54·1	2·1	14 52	1 81	15 00	0 25	119 31	67 31	−52 00		
	Average per acre	....	....	....	.....	3 85	4 00	2 81	10·4	12·5	6 89	1·3	10·8	0·42	2 90	0 36	3 00	0 05	23 86	13 46	−10 40		

NOTE.—[a] Oats cut green for hay.

SIX-YEAR ROTATION—COST, YIELD AND VALUE OF CROPS PER ACRE

Rotation Year	Crop	Yield				Items of Expense in raising Crop												Loss or Gain on the rotation			Cost	
									Manual labour and horse labour													
		Grain	Straw	Hay	Hoed crop	Rent	Manure	Seed	Manual labour	Teamster	Cost of manual labour	One horse	Two horses	Three horses	Value of horse-power	Ensilage	Use of machinery	Twine	Total cost	Total value of crop	Loss—or gain	Per ton	Per bushel
		tons	tons	tons	tons	$ c.	$ c.	$ c.	hrs.	hrs.	$ c.	hrs.	hrs.	hrs.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
1	Potatoes.....	Saleable		e...	11·8[a]																	
		Unsaleable		able	0·82	3 85	7 20	19 46	119·00	32·25	45 38	6	26·25	.....	7 02	.....	3 00	.....	85 91	12 25	−73 66	23 77[b]	5 63
2	Wheat.....	.....	.....	1·01	.....	3 85	4 40	4 65	1·85	15·25	5 13	.....	14·25	1·0	3 78	....	3 00	.....	24 81	20 40	− 4 41	24 56	
3	Barley.....	5·1	0·38	.....	.....	3 85	3 20	4 00	1·25	14·8	4 82	.....	13·8	1·0	3 67	0 36	3 00	0 25	23 15	8 14	−15 01	22 75	2 84
4	Clover hay.....	.....	.....	0·86	.....	3 85	4 80	1 61	2·4	3·4	1 74	.....	3·4	.....	0 82	.....	3 00	.....	15 82	17 37	1 55	18 40	
5	Grass hay.....	.....	.....	0·48	.....	3 85	2 80	1 61	2·0	3·25	1 58	.....	3·25	.....	0 78	.....	3 00	.....	13 62	9 70	− 3 92	28 38	
6	Grass hay.....	.....	.....	0·51	.....	3 85	1 60	1 61	2·0	3·25	1 58	.....	3·25	.....	0 78	.....	3 00	.....	12 42	10 30	− 2 12	24 35	
	Total.....	5·1	0·38	2·86	11·8[a] 0·82	23 10	24 00	32 94	128·14	72·20	60 23	6	64·20	2·0	16 85	0 36	18 00	0 25	175 73	78 16	−97 57		
	Average per acre..	.....	.....	.....	.....	3 85	4 00	5 69	21·37	12·03	10 04	1	10·70	0·3	2 81	0 06	3 00	0 4	29 29	13 03	−16 26	.....	.....

NOTES.—(a) Bushels. (b) Cost per ton of unmerchantable potatoes.

CLEARING LAND

Thirty-eight acres were cleared in 1923. The stumps were pulled out, piled up in hills and burnt, after which a first ploughing was given. After this first ploughing, there is still a great many roots to pick up. This work could not be done this fall, on account of the quantity of water in the soil.

Part of this field was comparatively easy to clear, but the other part was very difficult, being covered thickly with moss. The following is a statement of the cost of clearing:—

Manual labour, 5,399 hours at 30c	$ 1,619 70
One horse, 913 hours at 12c	109 56
Total cost	$ 1,729 26
Cost per acre	45 51

UNDER DRAINAGE

During the season of 1923, 27.9 acres were drained so as to prepare the land for an experiment with fodder plants and cereals. Of this area, 7 acres were drained by manual labour but as the land was very hard and labour expensive, a draining machine belonging to the Kapuskasing Experimental Station was secured. The cost of draining by both methods was as follows:—

COST WITH MANUAL LABOUR

Excavating: 7,623 feet at 6c. a running foot	$ 457 38
Lining of tiles, 155 hours at 30c	46 50
Tiles, 7,623 feet at $43.50 per thousand	331 60
Filling up of trenches with a road machine	15 47
Total cost	$ 850 95
Cost per acre	121 56

COST WITH THE DRAINING MACHINE

Overhead expenses:—		
Transportation of machine from Kapuskasing to La Ferme and return	$ 238 68	
Travelling expenses of mechanic from Windsor to Kapuskasing and return, including time employed for repairs to the machine and time lost during transportation of machine, unloading, etc.	231 47	
Total of overhead expenses		$ 470 15
Cost per acre of overhead expenses		22 49
Operating costs:—		
Mechanic, 11½ days at $5	$ 57 50	
Two assistants, 9 days at $3 each	54 00	
Gasoline, 106 gallons at 40c	42 40	
Tiles, 22,758 feet at $43.50 per thousand	989 97	
Filling up of trenches with a road machine	50 40	
Total cost of operating (less overhead expenses)		$1,194 27
Area drained	20·9 acres	
Total length of ditches dug	22,758 feet	
Average per day (9 days' work)	2,529 "	
Operating cost per acre (less overhead expenses)	$57 14	
Cost per acre, overhead expenses included	79 63	
Cost of ditching per rod (1,379 rods)	14·9c.	

Summary.—The land where this drainage was done was very heavy clay and on the land where the drainage was done by hand labour, a pick had to be used often. The average length of ditches dug by hand labour was 60 feet, and it was hard work. The machine could not be worked to its full capacity for the same reason.

The greatest length dug in 10 hours was 3,375 feet. The bottom of the ditches dug by hand is not very uniform and great care is necessary in laying tile when the grade is small. The bottom of the ditches is very uniform when the digging is done with the draining machine, and the tiles may be safely laid on a very slight slope.

The accompanying tables are self-explanatory and in spite of the very high overhead expenses, the use of the machine resulted in a saving of $41.93 per acre.

Under the existing conditions in Abitibi, under-drainage cannot be recommended. The cost is too high and the land is too cheap. This drainage was done in order to prepare the land for experiments that require soil uniformity to a high degree.

HORTICULTURE

Neither the season of 1922 nor that of 1923 was very favourable. In fact that of 1923 was the poorest since 1918. The season of 1922 was comparatively cool. There were frosts on June 13 and June 26, which damaged tomatoes, corn and beans. The summer of 1923 was even more unfavourable, beans, corn, melons, squash, tomatoes, flowers and small fruits being seriously damaged by frost on June 12 and completely destroyed by that of July 26. The seeding was late and the growth was very slow, and not at all satisfactory in 1923 on account of the cold summer and continuous rains in August.

APPLES

The apple trees came through the winter of 1921-22 well, and some of the trees made growth of from eighteen to twenty-four inches. Some varieties originated at the Central Experimental Farm, Ottawa, bloomed, but no fruit set. The winter of 1922-23 was harder on the trees, however, and few were uninjured. Out of a total of 502 trees in good condition in the autumn of 1922, only 18 escaped injury. Varieties which did not suffer damage are Prince, Eve, and Osman. Pinching off the tips was tried both in the autumn of 1921 and 1922 in the hope of getting trees to ripen their wood better, but this made no appreciable difference.

The following table shows the percentage of injury of each variety:—

CONDITION OF APPLE ORCHARD ON MAY 1, 1923

Varieties	Dead	Percentage of Injury									No injury	Total trees
		90%	80%	70%	60%	50%	40%	30%	20%	10%		
		1	2	3	4	5	6	7	8	9	10	
Patten Greening	10	7	6									23
Blushed Calville	6	10	2	1	1	4						24
Orange Crab	6	11	10	1		2		1		1	1	33
Josie	1											1
Orion Crab	2	3	2	1					1			9
Martha Crab	1	1				1					1	4
Quaker Beauty Crab	1							1	1			3
Golden	1	1										2
Anis	11	13								1		25
August	1	4	2	1								8
Antonovka	7	19	3	1							1	31
Moscow Pear Apple	2	1										3
Anisim	16	4	2	1					1			24

CONDITION OF APPLE ORCHARD ON MAY 1, 1923—*Concluded*

Varities	Dead	Percentage of Injury									No injury	Total trees
		90%	80%	70%	60%	50%	40%	30%	20%	10%		
		1	2	3	4	5	6	7	8	9	10	
Mecca	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	2	3
Ostrakoff Glass	2	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	3
Hibernal	3	4	3	.....	.....	.....	.....	.....	.....	.....	.....	10
Dudley	4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4
Wapella	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	2
Lowland Raspberry	2	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	3
Patten Duchess	8	6	7	1	.....	2	.....	.....	.....	.....	.....	24
Trail	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	2
Rondo	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Grand St. Jean	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	2
Rupert	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2
Ponoka	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Eve	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1
Ostrakoff	15	13	4	1	.....	.....	.....	.....	.....	.....	.....	33
Duchess	9	10	6	3	.....	.....	.....	.....	.....	.....	.....	28
Moscow	1	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	2
Moscow Pear	2	7	6	1	.....	3	1	.....	1	.....	2	23
Burgess Crab	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Crimson Beauty	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2
Simbirsk	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	2
Vargulek	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2
Hoadley	7	6	1	.....	.....	.....	.....	1	.....	.....	.....	15
Charlamoff	10	10	6	2	.....	.....	.....	.....	.....	.....	1	29
Piotosh	1	1	1	.....	.....	.....	.....	.....	.....	.....	1	4
Margery	.....	1	.....	1	.....	.....	.....	.....	.....	.....	.....	2
Jewel	2	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	3
Norman	.....	1	1	1	.....	.....	.....	.....	.....	.....	.....	3
Prince	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	2
Ruby	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Osman	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	3
Crusoe	7	6	7	.....	.....	1	.....	.....	.....	.....	1	22
Excelsior	3	3	.....	1	.....	.....	.....	.....	.....	.....	.....	7
Tetofsky	5	6	4	5	.....	.....	.....	.....	.....	.....	.....	20
Pioneer Spy	6	7	5	2	.....	.....	.....	.....	.....	.....	1	21
Magnus	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Elsa	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	2
Pyrus prunifolsa	5	3	5	2	.....	.....	.....	.....	.....	.....	.....	15
McMahon	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Red Anis	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Vargul	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2
Wealthy	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2
Excelsior Crab	2	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	5
Total	176	172	85	26	1	13	1	3	4	3	18	502

SMALL FRUITS

The currant, gooseberry, and raspberry bushes bloomed in 1922, but gave practically no fruit as the frosts of May and June caused injury. There were a few fruits of black currants. The same thing occurred in 1923, the black currants alone bearing a little fruit. New plantations of bush fruits were made in the autumn of 1923. Fourteen varieties of strawberries were planted in 1923, and made satisfactory growth.

About 200 plants of the native blueberries, with especially good fruit, were marked and planted out in the nursery in the autumn of 1923. Plants of two different species were saved, one bearing dark blueberries, and the other light-coloured ones.

VEGETABLES

BEANS.—The beans were destroyed by June frosts in 1922 and 1923, with the exception of the Broad, Horse, or Windsor beans, which stand considerable frost and promise to be valuable in northern Quebec.

The following table shows the results obtained from these beans in 1922 and 1923. Nineteen varieties were planted in rows thirty feet long and thirty inches apart. The pods were picked green and weighed. The amount of fodder was also ascertained. The date of planting in 1923 was May 30 and May 31, and of harvesting October 2.

BROAD BEANS—VARIETY TEST

Variety	Number of days from seeding until ready for use 1922	Number of days from seeding until ready for use 1923	Average number of days from seeding until ready for use 1922-23	Yield per acre green pods 1922	Yield per acre green pods 1923	Average yield per acre green pods 1922-23	Yield per acre green fodder 1922
	Days	Days	Days	Lbs.	Lbs.	Lbs.	Lbs.
Long Pod Monarch	120	124	122	22,942	2,323	12,632½	42,107
Long Pod Masterpiece Green.	123	124	123½	19,747	2,904	11,325½	38,914
Windsor Green	123	124	123½	20,909	581	10,745	41,818
Long Pod Bunyard Exhibition	123	124	123½	18,005	1,742	9,873½	39,214
Long Pod Early	120	124	122	16,843	2,904	9,873½	34,287
Long Pod Hangdown	123	124	123½	16,263	3,194	9,728½	34,287
Long Pod Green	120	124	122	18,005	1,162	9,583½	39,495
Long Pod Conqueror	120	124	122	16,843	2,323	9,583	34,848
Windsor Broad Taylor	123	124	123½	16,843	1,162	9,002½	36,010
Windsor Giant four-seeded	120	124	122	16,263	1,162	8,712½	34,267
Long Pod Johnson Wonder	123	124	123½	14,520	2,323	8,421½	38,914
Windsor Harlington	122	124	123	15,101	581	7,841	30,202
Dwarf Fan, Bog or Cluster	123	124	123½	11,616	3,485	7,550½	24,975
Early Mazagan	123	124	123½	12,197	1,162	6,679½	29,040
Windsor Common	122	124	123	11,616	1,742	6,679	24,975
Long Pod Aquadulce	123	124	123½	5,808	5,227	5,517½	13,939
Long Pod Seville	120	124	122	8,131	2,323	5,227	18,105
Beck Green Gem	123	124	123½	6,389	3,194	4,791½	19,747
Windsor Harlington Green	123	.....	.....	16,263	.....	.....	35,429
Mammoth Broad Windsor	.....	124	.....	.....	2,323	.....	.....

It is interesting to note the quantity of fodder that can be secured from these beans. The Monarch Long Pod came first with 21 tons 107 pounds per acre, which is very much above the yield of sunflower in the same year.

BEETS—TEST OF VARIETIES.—Five varieties of beets were sown on May 16, 1922, in drills thirty feet long and thirty inches apart. Plants were thinned to three inches apart in the row.

The results obtained are as follows:—

BEETS—VARIETY TEST

Varieties	Source of seed	Days from seeding until ready for use	Yield per acre
		Days	Lbs.
Early Eclipse	Steele Briggs	122	10,454
Crosby Egyptian	McDonald	122	9,874
Crimson Globe	Steele Briggs	122	8,422
Columbia	Burpee	122	8,131
Black Red Ball	"	122	6,839

In 1923, a somewhat similar test was made, but, owing to late seeding followed by drought and cold, none reached marketable size.

BEETS—THINNING TEST.—The variety Detroit Dark Red was sown on May 16, 1922, on a hundred foot row, being one of several rows thirty inches apart. One third of the row was thinned to two inches, one third to three inches, and another third to four inches.

The results obtained are as follows:—

Beets thinned to two inches gave 4,224 pounds; thinned to three inches, 3,300; and thinned to four inches, 1,056.

The land on which this experiment was carried was very wet, and this is why the yield was so low. The average yield for two years of beets thinned to two inches was 14,340 pounds; for beets thinned to three inches, 12,788 pounds; and to four inches, 6,864 pounds.

In 1923, the beets in this test did not reach marketable size.

BRUSSELS SPROUTS—VARIETY TEST.—Brussels Sprouts have been tested in 1921, 1922, and 1923, but have not developed sprouts in any of these years.

CABBAGE—VARIETY TEST.—Eleven varieties of cabbage were grown in 1922 and seventeen varieties, or similar varieties from various seed firms, were sown in hot beds on April 16, 1923, and planted in the open from the 14th to the 17th of June. They were planted in rows 30 feet long and 30 inches apart in both years. The seed of some of those varieties did not germinate, and this is why they are not all given in the following table.

The results obtained are as follows:—

CABBAGE—TEST OF VARIETIES

Varieties	Source of seed	Number of days until ready for use 1922	Number of days until ready for use 1923	Average number of days from seeding until ready for use 1922-23	Yield per acre 1922	Yield per acre 1923	Average yield per acre 1922-23
					Lbs.	Lbs.	Lbs.
Enkhuizen Glory	Ewing	115	137	126	31,363	45,302	38,332½
Ex-Amager Danish Ballhead	0-934-2-3	128	133	103½	31,363	30,202	30,782½
Copenhagen Market	Steele Briggs	112	133	122½	29.621	31.363	30,492
Fottler's Improved Brunswick	"	186	137 (Ewing)	161½	36.009	14.520	25,264½
Perfection Drumhead Savoy	Ewing	145	148 (D. & F.)	146½	25,555	21,199	23,377
Succession	"	124	137	130½	10,454	34,848	22,651
Kildonan	Steele Briggs	124	137	130½	24,394	19,747	22,070½
Flat Swedish	Ewing	155	137 (D. & F.)	146	22,070	12,197	17,133½
Pe-Tsay	Ewing	.....	107	.....	.....	58,080	.....
Danish Ballhead	Lethbridge	.....	137	.....	.....	41,818	.....
Flat Parisian	Simon Frères	.....	137	.....	.....	39,494	.....
Marblehead Mammoth	Ewing	115	.....	.....	34,267	.....	.....
Jersey Wakefield	Steele Briggs	132	.....	.....	25,555	.....	.....
Etampes Very Early	Simon Frères	.....	137	.....	.....	22,070	.....
Ex-Amager Danish Ballhead	Harris	.....	137	.....	.....	22,070	.....
Delicatesse Rouge	Ewing	151	.....	.....	9,293	.....	.....

CABBAGE—DATES OF SOWING.—One row, 30 feet long, of each of the varieties, Copenhagen Market, and Danish Ballhead, was sown in the open on June 1, 1923, and also every ten days until five or six sowings had been done. The cabbages of the first sowing were the largest, but were not firm enough to be sold. There is no doubt, however, that by sowing two or three weeks earlier,

which would have been done if the weather had been better, it would be possible to get good-sized cabbages.

CABBAGE—STARTING.—The cabbages that were started in hotbeds on April 21, 1923, and planted in the open on June 14 were harvested on October 2, and gave a yield of 48¾ pounds on a 30-foot row. No yield was recorded of those that had been sown in the open.

CABBAGE AND ROOT MAGGOT.—The varieties, Early Jersey Wakefield and Danish Ballhead, were used for this experiment. They were sown in 100-foot rows, half of which were protected with tar paper discs, and the others were left unprotected.

The results for three years are given in the following table:—

Year	Varieties	Yield per acre protected	Yield per acre unprotected
		Lbs.	Lbs.
1921	Copenhagen Market	25,612	27,878
1921	Early Jersey Wakefield	25,960	22,302
1922	Copenhagen Market	26,486	22,304
1922	Early Jersey Wakefield	23,698	14,288
1923	Early Jersey Wakefield	16,843	28,459
1923	Danish Ballhead	17,424	22,651
	Average	22,671	22,980

As no cabbages were attacked by root maggots in 1923, it would seem as if the tar discs did some injury, but further experiments are needed as they have proved so satisfactory elsewhere.

CAULIFLOWERS AND ROOT MAGGOT.—Two varieties, Early Snowball and Early Dwarf Erfurt, were used in this experiment. They were sown in rows 100 feet long, and on one-half of each row the plants were protected with tar paper discs, while on the other half they were left unprotected.

The results for three years are given in the following table:—

Year	Varieties	Yield per acre protected	Yield per acre unprotected
		Lbs.	Lbs.
1921	Early Snowball	17,598	16,726
1921	Early Dwarf Erfurt	10,366	17,598
1922	Early Snowball	13,392	10,455
1922	Early Dwarf Erfurt	5,925	5,218
1923	Early Snowball	6,762	13,794
1923	Early Dwarf Erfurt	6,982	9,460
	Average	10,171	12,208

The results given by this experiment confirm those on cabbages, showing that it would be harmful to put tar paper discs when there are few or no root maggots. There may be causes that were not checked, and this experiment will be continued a few years for this reason.

CAULIFLOWERS—VARIETY TEST.—Two varieties were sown in hot beds on the 16th of April, 1923, and planted in the open on the 16th of June. They were planted in rows 30 feet long and 30 inches apart, and 18 inches apart in the row.

CAULIFLOWERS—VARIETY TEST

Variety	Source of Seed	Number of days until ready for use	Yield per acre
			Lbs.
Early Snowball	Graham	112	12,777
Early Dwarf Erfurt	McDonald	112	12,197

CARROTS—VARIETY TEST.—Four varieties were sown on May 16, 1922, and seven varieties in 1923 on May 30, in 30-foot rows 30 inches apart. They were thinned to 1½ inches in the row, and harvested on September 28, 1923.

The results are given in the accompanying table:—

CARROTS—VARIETY TEST

Varieties	Source of Seed	Number of days from seeding until ready for use 1922	Number of days from seeding until ready for use 1923	Average number of days from seeding until ready for use 1922-23	Yield per acre 1922	Yield per acre 1923
					Lbs.	Lbs.
Danvers Half Long	McDonald	122	.....	.....	18,005	.....
Early Scarlet Horn	"	122	.....	.....	16,262	.....
Chantenay	0-206-9	122	.....	.....	16,262	.....
Oxheart	McDonald	122	.....	.....	14,521	.....
Early Nantes	Simon Frères	.....	63	.....	.....	9,583
Nantes Half Long	Steele Briggs	.....	94	.....	.....	8,712
Chantenay	McDonald	.....	94	.....	.....	7,695
Chantenay	0-2011	.....	94	.....	.....	6,824
Chantenay or Model	Simon Frères	.....	63	.....	.....	5,953
Danvers	Rennie	.....	94	.....	.....	5,518
Maux Long Red Smooth	Simon Frères	.....	63	.....	.....	5,372

CARROTS—DATE OF SOWING.—The Chantenay variety was used in this experiment. The first seeding was made on the 30th of May, 1923, the others at 10 days' intervals. The yields of a 30-foot row are given in tabular form.

DATES OF SOWING CARROTS

Date of sowing	Yield of a 30 ft. row marketable	Yield of a 30 ft. row unmarketable
	Lbs.	Lbs.
May 30	10	3¼
June 9	11¼	3¼
June 19	7¼	2¼
June 29	3¼	2¼
July 9	.....	1¼

Carrots, like all other vegetables, grew very slowly on account of the cold temperature, and this is why the yield is so small.

CARROTS—DISTANCES OF THINNING.—Carrots thinned at 1½ inches gave a yield in 1923 of 1,843 pounds; those thinned at 2 inches, 2,107 pounds; and those thinned at 3 inches, 1,185 pounds per acre. The yields are very poor,

but they enable us to make a comparison between thinning distances. On an average of two years, carrots thinned to two inches apart head the list with 7,389 pounds per acre; those thinned to three inches apart, 5,872 pounds, and those thinned to 1½ inches, 5,173 pounds.

CELERY—BLANCHING.—The following methods were tried with the variety, Golden Self-blanching, in 1923: 1, blanched with earth; 2, blanched with paper; 3, in trench with earth; 4, with board; 5, with straw. The plants were planted in a 15-foot row 4 feet apart and at 6-inch intervals in the row. The yields with notes on quality, earliness, etc., are given in the following table:—

CELERY—METHODS OF BLANCHING

Method of blanching	Distance apart in the row	Distance between rows	Date sown	Date planted	Date ready for use	Yield given by twelve average plants	General remarks
	"	'					
Experiment I— Blanched with earth.	6	4	6-4	21-6	28-8	6¼	Three-quarter blanched. Medium in earliness. Very good flavour. Not as tender as the celery blanched with straw.
Experiment II— One double row, plants alternated, 6 inches apart. Blanched with roof paper.	6	4	6-4	21-6	28-8	6¾	Practically all blanched. Earlier than the celery blanched with earth. Good flavour. Not as tender as the straw-blanched celery.
Experiment III— 30 plants, trench 6 inches deep by 1½ ft. wide. Blanched with earth.	6	4	6-4	21-6	28-8	8	A little more of it blanched than the first one. Plant little bigger. Medium earliness. Flavour as good as the celery of the first experiment.
Experiment IV— Blanched with boards.	6	4	6-4	21-6	28-8	5	Very long, well blanched, but too tender for handling, breaking easily. Several hollow stems. Average flavour. Taste watery.
Experiment V— Blanched with straw.	6	4	6-4	21-6	28-8	7	Short, but very well blanched, bigger than the celery of the second and fourth methods. Ideal flavour, very early.

The celery blanched with straw was of very much better quality than the rest, and it was possible with this method to blanch even the leaves by covering the field a week or two before cutting. The plants may be set closer in order to save straw.

CELERY—VARIETY TEST.—Eight varieties were sown in hot beds on April 6, 1922, and set out on June 19, and fifteen varieties were sown in hot beds on the 6th of April, 1923, and were ready to plant on the 21st of June. Thirty plants of each variety were planted 6 inches apart in rows 15 feet long and 4 feet apart, and blanched with earth. Two varieties did not grow in 1923.

The results are given in the accompanying table, the yield being taken from ten average plants.

CELERY—VARIETY TEST

Varieties	Source of seed	Number of days from seeding until ready for use 1922	Number of days from seeding until ready for use 1923	Average number of days from seeding until ready for use 1922-23	Yield per acre 1922	Yield per acre 1923	Average yield per acre 1922-23
		Days	Days	Days	Lbs.	Lbs.	Lbs.
Paris Golden Yellow	Graham	180	148	164	41,382	9,256	25,319
Golden Self-blanching	0-299-30	186	148 (McDonald)	167	34,848	14,520	24,684
Winter Queen	Graham	186	148	167	34,848	10,708	22,778
Evans Triumph	McDonald	174	148 (D.&F.)	161	30,492	12,205	21,348½
Giant Pascal	Graham	169	148	158½	28,314	9,438	18,876
Rose Ribbed Paris	"	186	148 (Vaughan)	167	23,958	7,783	15,870½
London Prize Red	Steele Briggs	180	148	164	19,602	8,167	13,884½
White Plume	Graham	180	.....	.....	17,424	.....	.....
Fordhook Sel. Emperor	Vaughan	.....	148	.....	.....	11,616	.....
New Emperor	"	.....	148	.....	.....	8,349	.....
Celeriac Large Rooted	Carter	.....	148	.....	.....	8,167	.....
Solid White (Ivory)	"	.....	148	.....	.....	6,897	.....
Windsor King	Stokes	.....	148	.....	.....	6,534	.....
Rose Ribbed Golden Self-blanching	Vaughan	.....	148	.....	.....	5,626	.....

SWEET CORN—VARIETY TEST.—Nine varieties were planted on May 17, 1922, but failed to yield, being damaged by frosts on June 13 and 26, and entirely destroyed on September 7. Ten varieties were planted in 1923, but they were entirely destroyed by frost on July 26. During the last five years, a few ears were harvested in 1921.

CITRONS—TEST OF VARIETIES.—Two varieties were sown on May 16, 1922, under glass, so as to be protected against frosts and cool nights. They were set out in hills 9 feet apart each way. The Red Seeded variety is by far the earliest, and most productive.

CITRONS

Varieties	Source of seed	Number of days from seeding until ready for use	Yield per acre
		Days	Lbs.
Red Seeded	McDonald	100	4,358
Colorado	"	114	645

CUCUMBERS—VARIETIES.—Four varieties were planted in the open, under glass, in 1922. This prevented the cucumbers from being destroyed by the frosts of June. They were set out on May 18 in hills six feet apart each way.

CUCUMBERS

Varieties	Source of seed	Number of days from seeding until ready for use	Yield per acre
		Days	Lbs.
Giant Pera	McDonald	114	1,815
Improved Long Green	"	114	1,210
Davis Perfect	"	114	666

Although the Giant Pera is ahead this year, Improved Long Green came first with an average for two years of 3,025 pounds, while Giant Pera comes second with 2,541 pounds.

In 1923, five varieties were sown in the open in frames under glass. Growth was slow because of cool nights, and on July 26 the plants were entirely destroyed by frost, and there were no cucumbers that year.

EGG PLANTS—VARIETY TEST.—Two varieties were sown in 1923, but were destroyed by frosts. It is possible to get a crop of this fruit when the temperature is mild, but not in a season like last year. A few were harvested in 1921.

KOHL RABI—VARIETY TEST.—Two varieties were sown in 30-foot rows in 1923. The percentage of marketable roots was very small.

The results are given in the following table:—

KOHL RABI—VARIETY TEST

Varieties	Source of seed	Number of days from time of seeding until ready for use	Yield per acre
		Days	Lbs.
White Vienna	McDonald	116	3,485
Purple Vienna	Graham	116	1,742

LETTUCE—VARIETY TEST.—Eight varieties were sown in 1922 in rows 15 feet long and thinned at 6 inches in the row, and seven varieties were planted on May 16, 1923, in rows 30 feet long and 15 inches apart.

The results are given in the accompanying table.

The Cos variety led in production in 1923, but its quality is not as good as that of the Iceberg, Salamander, and New York varieties, which yielded higher on the average.

LETTUCE—VARIETY TEST

Variety	Source of seed	Number of days from seeding until ready for use 1922	Number of days from seeding until ready for use 1923	Average number of days from seeding until ready for use 1922–23	Yield per acre 1922	Yield per acre 1923	Average yield per acre 1922–23
					lbs.	lbs.	lbs.
Salamander	McDonald	69	67	68	66,221	24,974	45,597½
New York	Bruce	115	67	91	65,050	22,070	43,560
Iceberg	McDonald	85	67 (Ewing)	76	67,373	17,424	42,398½
Improved Hanson	McDonald	123	67 (Ewing)	95	46,461	22,070	34,265½
Grand Rapids	Summerland	66	67 (0–232) 67 (Dreer)	66⅔	58,080	19,940 19,940	32,653⅓
Black Seeded Simpson	McDonald	66	67 (Burpee)	66½	44,141	20,521	32,331
Extra Early Paris Market	0–845	123	.....	.....	41,818	.....	.....
Cos	Graham	.....	67	.....	.....	30,202	.....

MUSKMELONS AND WATERMELONS—VARIETY TEST.—In 1922, of two varieties of watermelons tested, namely, Cole Early and Fordhook, the former is the only one which yielded, and the fruit was not ripe when picked before frost on September 7. Three varieties of muskmelons were sown, but none fruited in 1922.

In 1923, all the plants in these tests were destroyed by the frost of July 26. The season is too cool here for melons.

ONIONS—VARIETIES.—Thirteen varieties were sown on May 16, 1922, in 30-foot rows, 15 inches apart. Plants were thinned to 3 inches in the row. Only one variety, the White Barletta, ripened a few onions. All other varieties were destroyed by white grubs. Different means of protection were tried, but none were satisfactory.

ONIONS—PROTECTION AGAINST ROOT MAGGOTS.—The following methods were tried in order to kill root maggots:—

Poisoned baits with sodium arsenite.
Solution of carbolic acid.
Lime mixed with earth before sowing.
Lime water applied in solution as soon as the onions are up so as to form a crust on the surface of the soil.
Solution of bichloride of mercury (corrosive sublimate).
Ashes mixed with the soil.
Solution of white hellebore.
Hen manure in solution sprinkled once a week.

The treatment with lime water, which injures plants by preventing them from growing, was abandoned. All these methods appear to give equally good results. No marketable onions were harvested; a few reached a reasonable size, but they were worm-eaten. At the suggestion of the Dominion Horticulturist, the plantation will be covered with a layer of straw in order to keep the flies from attacking the onions.

COMPARISON OF SEEDING AND TRANSPLANTING ONION SETS

A comparison was made in 1922, as shown in the following table, between seeding in the open, seeding in beds, transplanting, and onion sets. No exact comparison could be made owing to the fact that a large percentage of the onions sown in the open were destroyed by grubs. Onion sets were not attacked by grubs nor were the onions that were transplanted. In 1923, the damage by root maggots again prevented getting accurate results.

PARSLEY—VARIETY TEST.—Two varieties, Champion Moss Curled and Fine Triple Curled were sown on May 16, 1922, in 30-foot rows thirty inches apart. The same two varieties were sown on May 29 and were ready for use on September 2, 1923. Both varieties are considered equal as regards quality. Champion Moss Curled gave an average yield for the two years of 5,082 pounds, and Fine Triple Curled 4,065.5 pounds.

PARSNIPS—DATES OF SEEDING.—The first sowing was done on May 30, 1923, and other sowings at ten-day intervals until five sowings had been made. The crop was harvested on September 28. Except from the two first sowings, no marketable crop was obtained as the roots were too small. The two first sowings only gave a small percentage of marketable products.

The results are given in the following table:—

PARSNIPS—DATE OF SEEDING

Dates of sowing	Yield of a 30-foot row marketable	Yield of a 30-foot row unmarketable
	lbs.	lbs.
May 30	1¾	2¾
June 9	2¼	2¼
June 19	–	2¼
June 29	–	1¾
July 9	–	–

PARSNIPS—VARIETY TEST.—Two selections made by the Horticultural Division of Ottawa of the varieties, Hollow Crown and Guernsey Half Long, were sown on May 29, 1923, and harvested on September 28.

The results are given in the following table:—

PARSNIPS—VARIETY TEST

Variety	Source of seed	Number of days from time of seeding until ready for use	Yield per acre
			lbs.
Hollow Crown	0–1919	122	3,049
Guernsey Half Long	Rennie	122	2,759
Hollow Crown	0–1921	122	2,468

PARSNIPS—THINNING TEST.—The Hollow Crown variety was sown in a 100-foot row in 1922. One-third of the row was thinned to 2 inches apart, another third to 3 inches apart, and the remainder to 4 inches. In 1923, the roots did not come to sufficient diameter to make the test worth while, over 75 per cent of the parsnips being under one inch in diameter. They usually gave fair yields.

The yields for 1922 are given in the following table:—

PARSNIPS—THINNING

Varieties	Date of Sowing	Date of Sprouting	Thinned 2 in.	Thinned 3 in.	Thinned 4 in.
			lbs. per acre	lbs. per acre	lbs. per acre
Hollow Crown	May 16	June 23	2,376	2,112	2,112

For an average of two years, parsnips thinned to 2 inches gave a yield of 7,725 pounds; those thinned to 3 inches, 6,286 pounds, and to 4 inches, 3,933 pounds.

PEAS—TEST OF VARIETIES.—Nine varieties of peas were sown on May 17, 1922, and twenty on May 30, 1923, in 30-foot rows, 30 inches apart. Peas were sown one inch apart in the row.

The results obtained are given in tabular form.

PEAS—VARIETY TEST

Variety	Source of seed	Number of days from seeding until ready for use, 1922	Number of days from seeding until ready for use, 1923	Average number of days from seeding until ready for use, 1922-23	Yield per acre, 1922	Yield per acre, 1923	Average yield per acre, 1922-23
English Wonder	Ottawa 1644	74	64	69	9,438	21,296	15,367
Lincoln	Invermere	77	76	.....	12,584	12,100	.....
			88 (Sharpe)	80½	.....	10,648	11,777½
Telephone	Steele Briggs	76	88 (D. & F.)	82	14,520	8,954	11,737
Sutton Excelsior	McDonald	76	64 (Harris)	70	10,164	10,164	10,164
American Wonder	"	68	64 (0-2332)	65½	7,986	13,009	.....
			64 (Carter)	.....	.....	6,191	9,062
Laxtonian	"	61	69 (Graham)	65	9,196	2,420	5,808
Reliance	Steele Briggs	76	.....	.....	14,762	.....	.....
Gregory Surprise x English Wonder	Ottawa 2343	.....	64	.....	.....	14,520	.....
Harrison Glory	Invermere	75	.....	.....	13,310	.....	.....
English Wonder x Gradus	Ottawa 2338	.....	64	.....	.....	12,342	.....
Senator	D. & F.	.....	88	.....	.....	11,253	.....
McLean Advancer	Ottawa 8927	.....	88	.....	.....	13,552	
			85 (Harris)	.....	.....	10,164	
			65 (Livingston)	.....	.....	4,598	
Gradus	Ottawa 2348	.....	75	.....	.....	11,374	
			78 (Carter)	.....	.....	6,292	
June	Belgiano	.....	103	.....	.....	8,591	
McLean Advancer x Gregory Surprise	Ottawa 2336	.....	69	.....	.....	8,349	
Stratagem	Rennie	.....	103	.....	.....	4,961	
Thos. Laxton	D. & F.	.....	62	.....	.....	4,719	

The Laxtonian and Thomas Laxton varieties are two of the earliest. English Wonder is very productive, as is also Reliance. All are of good quality.

PEAS—DISTANCES OF PLANTING.—The three varieties used in this experiment were sown on May 3. One row, 30 feet long, of each variety was sown at 1 inch, one row at 2 inches, and another row at 3 inches.

INTERVALS FOR PLANTING PEAS

Variety	Sown	Ready for use on	Yield of a 30-foot row		
			1 inch	2 inches	3 inches
			pints	pints	pints
Thomas Laxton	May 30	Aug. 2	38⅝	36½	41
English Wonder	" 30	" 3	57½	49½	51
Stratagem	" 30	" 27	51½	40	32½
Average	.....	.....	49 5/12	42	41⅓

The peas sown at one-inch interval gave 7 pints more than those sown at 2 inches. The peas sown at 3 inches come next. As this is the first year that this experiment has been carried on, it will be necessary to wait at least five years before coming to a conclusion as to the best distance for sowing.

PEAS—LENGTHENING THE SEASON.—The object of this experiment is to compare the planting of an early variety at different dates with plantings of early, medium and late varieties at the one date (an early sowing). A 100-foot row of each variety was planted for each date of sowing.

The results are given in tabular form.

LENGTHENING THE SEASON FOR GREEN PEAS

Variety	Season of varieties	Date of sowing	Date ready for use	Yield per acre
				lbs.
McLean Advancer	Medium	6–6	3–8	5,324
Gradus	Late	6–6	16–8	7,139
Stratagem	Extra late	6–6	10–9	6,050
Thomas Laxton	Early	6–6	27–8	7,865
" "	"	13–6	27–8	7,018
" "	"	20–6	10–9	4,719
" "	"	27–6	24–9	6,292

	lbs.
Total for four varieties, early, medium, and late	26,378
Total for four seedings of the early variety	25,894
Average for three years for the four varieties	35,396
Average for three years for four seedings of the early variety	25,542

According to the three-year average, it would be very much better, as regards yield, to sow the four varieties. However, the season of production of the peas sown at various intervals was much longer than that of four varieties sown at the same date. These tests will be continued a few years. In 1922, half of the row was picked green, and the other half allowed to ripen with the following results. Owing to the short season, many of the peas did not ripen in the part of the row to be picked ripe.

LENGTHENING THE SEASON FOR GREEN PEAS, 1922

Varieties	Date of Sowing	Yield per acre	
		Picked green unshelled	Picked ripe shelled
		lbs.	lbs.
Stratagem	May 26	17,102	329
McLean Advancer	" 26	21,048	877
Gradus	" 26	12,169	439
Thomas Laxton	" 25	13,813	548
" "	June 2	8,770	.....
" "	" 9	7,893	658
" "	" 16	5,701	.....

PEPPER—VARIETY TEST.—Four varieties were sown on April 12, 1922, but only one germinated. Plants were set out in the open on June 14, but peppers did not ripen by September 6, when frost killed the plants.

PUMPKINS—TEST OF VARIETIES.—Three varieties were tested in 1922. They were planted on May 19 in hills nine feet apart each way.

The results obtained are tabulated.

PUMPKINS—VARIETY TEST

Varieties	Source of seed	Days from seeding until ready for use	Yield per acre
			lbs.
King of the Mammoth	Steele-Briggs	111	15,495
Connecticut Field	"	111	14,042
Small Sugar	"	111	6,617

The variety, King of the Mammoth, is the most productive, but the Small Sugar is of the best quality.

SQUASH—VARIETY TEST.—Four varieties were sown on May 19, 1922, in hills nine feet apart each way. The results follow in tabular form.

SQUASH—VARIETY TEST

Varieties	Source of seed	Days from seeding until ready for use	Yield per acre
			lbs.
English Vegetable Marrow	Steele-Briggs	111	21,627
Hubbard	McDonald	111	16,786
Golden Hubbard	"	111	10,329
Delicious	"	111	1,009

The variety English Vegetable Marrow not only gave by far the highest yield, but was of very good quality.

RADISHES—TEST OF VARIETIES.—Three varieties were sown on May 16, 1922, in 30-foot rows 15 inches apart. The White Icicle is the earliest and most productive, but Early Scarlet Turnip White Tipped is the best.

TOMATOES.—TEST OF VARIETIES.—Nine varieties of tomatoes were sown in a hot bed on April 6, 1922, and set out in the open on June 14, after the hard frost. Slight damage was caused by the light frost of June 26, but two varieties, Red Head and Langdon Earliest, were not affected. These two varieties came from Langdon. All the fruit did not ripen.

TOMATOES

Varieties	Source of seed	Days from seeding until ready for use	Yield per acre
			lbs.
Red Head	Langdon	139	5,445
Langdon Earliest	"	139	5,445
Bonny Best	Ottawa 719	142	4,719
Alacrity	Ottawa 1815-29	141	3,267
John Baer	Steele-Briggs	141	2,178
Chalk Jewel	Ottawa 710	154	2,178
Burbank	Bruce	154	1,815
Danish Expert	Ottawa 186-73	138	1,452
Crimson Canner	Ottawa 707	154	1,089

The Red Head and Langdon Earliest gave the largest yield, but the Danish Export is the earliest.

FORAGE PLANTS

(YEAR 1922)

A test of different varieties of mangels, sugar beets, field carrots, swedes, fall turnips, red clover, alsike, white clover, and annual hay crops was started in 1922. Experiments were also started with various mixtures of grasses, with clover and alone; early and late clover with early and late grasses; with alfalfa sown broadcast and in drills 12 inches apart; and for the production of red clover seed sown broadcast and in drills 12 and 24 inches part. These experiments covered an area of 19 acres. Part of this land was cleared in 1921 and the balance in the spring of 1922. It is a sandy loam containing a high proportion of vegetable earth, and which had not been cropped as yet. It is

also very wet and very acid. The germination of clover and alfalfa seed was fairly good, but a great many plants perished on account of the soil acidity and of the excess of humidity. It was decided to plough the whole of this land in the fall, to put in a tile drainage system and to apply 2 tons of lime per acre in the fall so as to correct the acidity. These experiments will be resumed in 1924.

TESTS OF MANGELS

Forty varieties of mangels of various types were tested on $\frac{1}{100}$-acre plots in duplicate. These were sown on June 27 and harvested on October 6 and October 7. Plants were thinned to 10 inches apart in the row. Seed was sown at the rate of 8 pounds per acre. The results obtained are given in the accompanying table:—

VARIETY TEST OF BEETS

Varieties	Source of seed	Yield per acre			
		ton	lbs.	bush	lbs.
New Ideal	Steele-Briggs	13	1,878	557	28
Golden Tankard	Rennie	13	1,553	551	3
Giant Yellow Globe	Steele-Briggs	11	925	458	5
Giant Yellow Intermediate	Dupuy and Ferguson	11	70	441	20
Giant Intermediate Sugar Beet	Ewing	10	1,211	444	11
Red Globe	D. & F.	10	328	406	28
Giant Half Sugar Beet	D. & F.	9	1,473	389	18
Giant Yellow Globe	Rennie	7	1,908	318	8
Giant Yellow Intermediate	Steele-Briggs	7	1,724	314	24
Giant Yellow Globe	Ewing	7	1,246	304	46
Giant Yellow Half Long	Rennie	7	889	296	39
Long Red Mammoth	D. & F.	6	1,689	273	39
Golden Tankard	Ewing	6	1,089	261	39
Prize Mammoth Long Red	Steele-Briggs	6	978	259	28
Yellow Globe	D. & F.	6	672	253	22
Giant Yellow Intermediate	Ewing	6	445	248	45
Yellow Tankard	D. & F.	6	445	248	45
Mammoth Long Red	Steele-Briggs	6	299	245	49
Ideal	Rennie	5	1,979	239	29
Perfection Mammoth Long Red	Rennie	5	1,615	232	15
Yellow Intermediate	Ottawa	5	1,325	226	25
Jumbo	Rennie	5	890	219	40
Long White Sugar Beet	D. & F.	5	296	205	46
Red Globe	Ewing	4	1,956	199	6
Giant Rose Sugar	Rennie	4	1,583	191	43
Half Sugar White	D. & F.	4	1,380	187	30
Long Red Mammoth	Ewing	4	712	174	12
Giant White Sugar	Rennie	4	712	174	12
Giant White Feeding Sugar Beet	Steele-Briggs	4	712	174	12
Red Skinned Leviathan	Rennie	4	363	187	13
Giant White Half Sugar	Ewing	3	969	139	19
Giant White Feeding	Rennie	2	1,808	116	8
Royal Giant White	Steele-Briggs	2	1,575	111	25
Red Top Sugar Beet	Ewing	2	878	97	28
Danish Sugar Beet	D. & F.	2	356	87	6
Green Top White	Ewing				
Danish Sludstrup	D. & F.				
Sugar Beet	Denmark				
"	Chatham				
"	British Columbia				
"	Sidney				

The average yield of the different types is as follows:—

	Tons	Lbs.
Yellow Intermediate	8	939
Globes	8	172
Long Red	5	185
Half Sugar Rose	5	1,453
Half Sugar White	4	292
Sugar Beet	Nil	Nil
Danish Sludstrup	"	"

The germination of the seed of these two latter kinds was very poor.

SWEDE TURNIPS

Forty-three varieties of swede turnips and thirteen varieties of fall turnips were sown in rows 30 inches apart on one-hundred acre plots, in duplicate; these were thinned to 12 inches apart in the row. Sixteen tons of manure per acre were applied to this land. Seeding took place on May 29 and the crop was pulled on October 9 and 10.

VARIETY TEST OF TURNIPS

Varieties	Source of seed	Yield per acre			
		Ton	Lbs.	Bush.	Lbs.
Swedes—					
Elephant or Monarch	Steele Briggs	14	190	563	40
Perfection	Dupuy & Ferguson	13	1,250	455	..
Champion	Steele-Briggs	13	1,250	545	..
Champion Purple Top	Ewing	12	950	499	..
Kangaroo	Steele-Briggs	12	900	498	..
Monarch	Ottawa	12	900	498	..
Hall's Westbury	Rennie	11	1,740	474	40
Kangaroo	Rennie	11	1,700	474	..
Westbury	Steele-Briggs	11	900	458	..
Westbury	D. & F.	10	1,650	433	..
Good Luck	Steele - Briggs	9	1,950	399	..
Derby Bronze Green Top	Rennie	9	1,950	399	..
Canadian Gem	Rennie	9	1,700	394	..
Canadian Gem	Steele-Briggs	9	1,350	387	..
Champion Purple Top	D. & F.	9	1,350	387	..
Hall's Westbury	Ewing	9	950	379	..
Champion Purple Top	Rennie	9	900	378	..
Invicta Bronze Top	Rennie	9	700	374	..
Best of all	Rennie	9	550	371	..
Invicta	Ewing	9	200	364	..
Good Luck	Ste. Anne	9	100	362	..
Kangaroo	D. & F.	8	1,100	342	..
Bangholm	Charlottetown	8	1,050	341	..
Bangholm	Steele-Briggs	8	900	338	..
Elephant	D. & F.	8	750	335	..
Bangholm	Rennie	7	1,850	317	..
Kangaroo	Ewing	7	1,550	311	..
Magnum Bonum	Rennie	7	1,050	301	..
Prize Purple Top	Rennie	7	900	298	..
Best of all	Ewing	7	850	297	..
Magnum Bonum	Steele-Briggs	6	1,600	272	..
Jumbo	Steele-Briggs	6	1,400	268	..
Hartley's Bronze Top	Steele-Briggs	6	850	257	..
Ne Plus Ultra	D. & F.	6	200	244	..
Bangholm	Ewing	6	150	243	..
Elephant or Monarch	Ewing	5	1,950	239	..
Selected Purple Top	Steele-Briggs	5	800	216	..
Perfect Model	D. & F.	5	750	215	..
Imp. Jumbo or Elephant	Rennie	4	1,650	193	..
Magnum Bonum	Ewing	4	1,650	193	..
Garton's Superlative	D. & F.	4	900	178	..
New Universal Purple Top	D. & F.	4	350	167	..
Universal Purple Top	Ewing	3	100	122	..
Fall turnips—					
Purple Top Greystone	Steele-Briggs	15	1,780	635	30
Purple Top Mammoth	Sutton	15	1,780	635	30
Devonshire Greystone	Steele-Briggs	13	1,130	542	30
Red Paragon	Sutton	12	1,850	519	..
Green Top Yellow Aberdeen	Ewing	12	900	498	..
Bortfolder	Sweden	12	900	498	..
Favorite Purple Top Aberdeen	Sutton	12	850	497	..
Hardy Green round	Sutton	12	40	480	40
Early Six weeks	Sutton	11	630	452	30
Yellow Tankard	Sweden	9	1,700	394	..
Red Top Strap Leaf	Steele-Briggs	7	470	289	20
Flat Norfolk	Ewing	7	90	281	40
White Globe	Ewing	6	1,780	275	30

Swede turnips averaged 8 tons 1,176 pounds per acre and fall turnips 11 tons 1,066 pounds. The germination of certain varieties was less than 50 per cent.

FIELD CARROTS

Fifteen varieties of carrots were sown on May 27 on 1/100-acre plots, in duplicate, in rows 30 inches apart, and plants were thinned to 6 inches apart in the row. The results obtained are given in the accompanying table.

VARIETY TEST OF FIELD CARROTS

Varieties	Source of seed	Yield per acre			
		Ton	Lbs.	Bush.	Lbs.
White Belgian	Dupuy & Ferguson	7	1,900	318	..
Mammoth White Intermediate	Rennie	7	1,900	318	..
Mammoth Short White	Rennie	7	1,650	313	..
Large White Belgian	Steele-Briggs	7	170	283	20
White Vosges	D. & F.	6	1,650	273	
White Intermediate	D. & F.	6	1,400	268	..
Imp. White Intermediate	Ewing	6	1,400	268	..
Large White Belgian	Rennie	6	850	257	
Imp. Short White	Steele-Briggs	5	1,950	239	..
Giant White Belgian	Ewing	5	800	218	..
Long Orange Belgian	Rennie	4	950	199	..
Yellow Belgian	Ewing	4	350	187	..
New Yellow Int.	Ewing	3	1,775	155	20
Long Red Surrey	Steele-Briggs	3	1,650	153	..
Imp. Danvers Half long	D. & F.	3	280	125	30

ANNUAL HAY CROP

Different varieties of oats, grasses, sweet clover, and various mixtures were sown for hay on June 7 and 9. The yield per acre for green and cured fodder was taken. Results obtained are given in the accompanying table.

TEST OF ANNUAL HAY CROP

Variety	Date of sowing	Date of cutting	Yield per acre green	Yield per acre dry
			Lbs.	Lbs.
Oats, Alaska	June 7	Aug. 21	10,440	4,860
" Daubeney	" 7	" 21	8,916	4,650
" Gold Rain	" 7	" 30	9,516	4,380
" Victory	" 7	Sept. 6	8,880	3,966
" Seger	" 7	" 1	8,298	3,816
" Banner, peas and vetch	" 9	" 5	7,920	3,814
" O.A.C. No. 72	" 7	" 1	7,896	3,636
" Banner	" 7	Aug. 31	7,692	3,600
" Liberty	" 7	" 28	7,356	3,414
" Abundance	" 7	Sept. 7	6,900	3,174
" Ligowo	" 7	" 6	6,875	3,154
" Banner and peas	" 9	" 5	6,105	2,924
" Leader	" 7	Aug. 31	6,126	2,815
" and sweet clover	" 9	Sept. 3	5,324	2,266
Peas, Canadian Beauty	" 9	" 3	4,296	2,090
" Arthur	" 9	" 3	4,116	1,953
" Prussian Blue	" 9	" 2	2,886	1,744
" Golden Vine	" 9	Aug. 31	3,534	1,416

Sweet clover, yellow blossom (soil treated with nitro-culture)	June 9.	Did not grow enough to be harvested.
Sweet clover, white blossom	" 9.	" " " "
Sweet clover, Hubam	" 9.	" " " "
Common Vetch	" 9.	Not worth cutting
Sudan grass	" 9.	" "
Common Millet	" 9.	" "
Siberian Millet	" 9.	" "
Hungarian Millet	" 9.	" "
Gold Millet	" 9.	" "

The soil was very acid and the very heavy rainfall in July prevented the growth of the roots and of the various kinds of millets. Oats were not so much affected by the acidity, and this explains their better growth.

(YEAR 1923)

Trials with the different varieties of mangels, carrots, swede turnips, fall turnips, sunflowers and fodder corn were conducted in 1923. We were forced to discontinue the other trials begun in 1922, in order to drain and lime the land, as moisture and acidity compromised the results. All preparatory work was performed this fall, and we shall commence the trials of clover, grass mixtures, alfalfa, etc., next spring.

TRIAL OF MANGEL VARIETIES

Twenty-four varieties were tried this year on duplicate plots measuring one-twentieth of an acre. Seeding was performed on June 7 and harvesting, on October 3. The seed was sown at the rate of 8 pounds per acre and plants were thinned to 8 inches in the row; the rows were 30 inches apart. The stands suffered from the June drought and the low summer temperature. The lateness of the seeding was due to the May temperature.

TRIAL OF MANGEL VARIETIES

Varieties	Source of seed	% of stand	Yield per acre		Remarks
		%	tons	lbs.	
1. Runkelbrock fro Barres Stryno V. 3084.	Trifolium.. Denmark..	83·5	1	1,735	Mixed orange and green, globe form.
2. Long White	D. & F.	75·7	1	1,224½	Mixed white and pink, long green top.
3. Half Sugar Beet, 1141	Trifolium.. Denmark..	76·9	1	1,161	Pink, long, short roots, uniform.
4. Best of All	D. & F.	74·1	1	905½	Green, globe and intermediate types.
5. Long Yellow	Ewing	76·2	1	866	Uniform, long, easy to harvest.
6. Giant, Yellow Globe	"	77·1	1	691	Uniform, true type.
7. Danish Sludstrup	D. & F.	91·4	1	245	Orange and yellow, fairly long.
8. Long Red Mammoth	Ewing	81·7	1	145	Uniform, true type, deep roots.
9. Barres Stryno B.C. 748	D.L.F.. Denmark..	73·0	1	28	Uniform, intermediate.
10. Fadersukkeroe (Sugar Mangel B.C. 760.	"	65·8		1,775	Uniform, pink, long, small.
11. Barres Tystophe B.C. 749	"	78·5		1,755	Uniform, orange, long.
12. Select Giant Rose Sugar	Ewing	88·7		1,677	Oblong, mixed white and pink.
13. Red Globe	D. & F.	62·0		1,599	Uniform, red, small, good type, easy to harvest.
14. Red Globe	Ewing	75·6		1,566	True type, small, easy to harvest
15. Danish Sludstrup	D.L.F.. Denmark..	83·8		1,521	True type, small, easy to harvest
16. Barres Sludstrup	"	81·0		1,443	Uniform, intermediate.
17. Mammoth Long Red	D. & F.	79·0		1,404	Uniform, small, deep roots.
18. Green Top White Sugar	Ewing	86·2		1,404	Uniform, small, true type.
19. Yellow Globe	D. & F.	72·2		1,326	Uniform, long, pink, short roots.
20. Yellow Intermediate	C.E.F.	69·6		1,306½	Uniform, small, true type.
21. Golden Tankard	D. & F.	87·7		1,200	Uniform, small, true type.
22. Golden Tankard	Ewing	75·7		1,031	Intermediate, orange, small.
23. Runkelbrock fro Barres Stryno V. 2034.	Trifolium.. Denmark..	45·0		936	Orange, Sludstrup type.
24. Danish Imp. Sugar Beet	D. & F.	71·2		624	White, small, uniform.

Yields of the different types are as follows:—

	tons	lbs.
Globe	1	899
Pink, half sugar	1	453
Long	1	227
Sludstrup	0	1,736
Intermediate	0	1,663
White, half sugar	0	1,014

For a two-year average, the varieties of Globe type are first with an average yield of 5 tons 419 pounds.

TRIAL OF FIELD CARROT VARIETIES

Thirteen varieties were sown, but none gave sufficient growth to be worth harvesting. We simply pulled them out and fed them to the stock with the foliage. This failure may be attributed to the bad season, as germination of seed was good.

TRIAL OF FALL TURNIP VARIETIES

Twelve varieties were sown on June 7 at the rate of 3½ pounds pere acre, on duplicate plots measuring one-fiftieth of an acre. They were harvested on October 4. The plants were thinned to 12 inches in the row, and a space of 30 inches was left between the rows.

Yields are given in the accompanying table.

For an average of two years, the Purple Top Mammoth variety is a good first with an average yield of 15 tons 510 pounds. It is followed by the Red Paragon variety, with an average yield of 12 tons 1,815 pounds.

TRIAL OF FALL TURNIP VARIETIES

Varieties	Source of seed	% of stand	Yield per acre green		Remarks
		%	tons	lbs.	
1. Purple Top Mammoth	Sutton	96·7	14	1,640	Purple top, round, uniform, white tender flesh, best yield.
2. Red Paragon	"	96·6	10	162	Purple top, uniform, white.
3. Purple Top Mammoth or Imp. Greystone.	Steele	94·5	9	1,851	Purple top, round, uniform, average size.
4. Greystone	"	91·0	8	1,589	Uniform, bronze top, green stripes, good size.
5. Early Six weeks	Sutton	94·9	8	1,511	Uniform, white, flat form.
6. White Globe	Ewing	96·8	8	1,062	Mixed green and white, flat form
7. Pomeranian White Globe	Steele	98·8	8	575	Mixed green and pink, long and round, good size.
8. Green Top Aberdeen	Sutton	96·9	7	527	Green top, yellow and white, uniform in size.
9. Green Top Yellow Aberdeen.	Ewing	97·2	6	1,396	Firm, yellow flesh, uniform.
10. Hardy Green Round	Sutton	97·3	6	402	Green top, round.
11. Aberdeen Purple Top	Steele	96·8	6	031	Purple top, uniform, yellow.
12. Purple Top Aberdeen	Sutton	97·6	5	1,349	Round, uniform, firm, good keeper.

TRIAL OF SWEDE TURNIP VARIETIES

Thirty varieties were sown on June 8 at the rate of 3½ pounds per acre on duplicate plots measuring one-fiftieth of an acre, the rows being 30 inches apart and the plants thinned to 10 inches in the row. The yields per acre are given in the accompanying table.

The four first varieties listed were imported from Denmark. As it is the first year that these varieties have been tried, we shall wait a couple of years in order to compare them with the Canadian varieties.

TRIAL OF SWEDE TURNIP VARIETIES

Varieties	Source of seed	% of stand	Yield per acre green weight		Remarks
		%	tons	lbs.	
1. Yellow Tankard, B.C. 351	D.L.F.	94·3	9	564	Mixed white and yellow, the largest.
2. Fynsk Bortfilder Parti 2660	Denmark	95·3	8	906½	Long, good size, firm, uniform.
3. Dalis, B.L. 773	"	95·5	6	1,845	Round, mixed, green and purple top, tender.
4. Bangholm Lyngby, B.L. 318	"	89·9	6	694½	Oblong, purple top, uniform, good size.
5. Mammoth Clyde Purple Top 7021	Ewing / Trifolium	94·6	6	140	Purple top, uniform, oblong,
6. Bangholm	Denmark	92·3	5	1,217½	" " good size.
7. Kangaroo	Ewing / Trifolium	93·4	5	805½	" " average size.
8. Bangholm Pajberg V. 7022	Denmark	88·9	5	613	" " oblong.
9. Early Model	D. & F.	88·0	5	237	" " average size.
10. Kangaroo	" / D.L.F.	94·8	5	101	" " oblong.
11. Bangholm Studsgard B.L. 768	Denmark	89·9	4	1,945	" "
12. Bangholm	D. & F.	95·1	4	1,613½	" "
13. Ne Plus Ultra	" / Trifolium	91·2	4	1,438	" " bronze.
14. Swede Shepherd No. 2056	Denmark	95·1	4	1,711	Grey top, uniform, average size.
15. D. & F. Favourite	D. & F.	94·7	4	1,076	Purple top, uniform, average size.
16. Garto's Superlative	Ewing	90·0	4	697	Purple top, firm, good size.
17. Best of All	"	95·4	4	697	Purple top, uniform, average size.
18. Invicta Bronze Top	"	89·5	4	482½	Bronze top, uniform, firm.
19. Bangholm	"	92·9	4	34	Purple top, uniform, average size.
20. Halewood Green Top	"	90·6	4	34	Mixed purple and green tops, without uniformity.
21. Elephant or Monarch	D. & F.	91·0	3	1,839	Purple top, oblong and round.
22. Ditmars Sweet Turnip	H. H. McNutt.	97·0	3	1,819½	Green top, uniform, average size.
23. Mammoth Clyde Purple Top	D. & F.	94·3	3	1,818	Oblong, very uniform, firm, good quality.
24. Drummond Purple Top	"	93·0	3	1,516	Purple top, uniform.
25. Kaalroe "Wilhemsburger B. L. 770."	Roskilde	92·8	3	1,410	Green top, round, firm, uniform.
26. Elephant or Monarch Imp	Ewing	91·5	3	1,371	Purple top, oblong, uniform.
27. Hall's Westbury	"	96·0	3	156	Purple top, average size, uniform.
28. Selected Bangholm	E. F. Charl'town.	85·4	3	903	Purple top, average size, uniform.
29. Monarch	E. F. Nappan.	90·3	3	903	Purple top, average size, oblong.
30. Laing's Imp	D. & F.	83·7	2	153½	Purple top, average size, uniform.

TRIAL OF SUNFLOWER VARIETIES

Nine varieties were sown on June 9, in rows 3½ feet apart, the plants being 10 inches apart in the row. They were harvested on September 22. They had suffered much injury from the July 26 frost; the other June and early September frosts did not affect them. The July frost seemed to check the growth and a quantity of lateral stems appeared and became larger even than the main stem. None bore flowers.

The results are given in the following table:—

TRIAL OF SUNFLOWER VARIETIES

Varieties	Source of seed	Yield per acre	Height
		lbs.	ft.
Giant Russian	Disco	2,209	4
Giant Russian	C.P.R.	1,887	3½
Ottawa 76	Cereal Div	1,788	3½
Mammoth Russian	McDonald	1,525	3½
Manchurian 87-352	MacKenzie & Co	1,341	3
Mixed	C.P.R.	1,210	3
Monteca	"	1,184	2½
Mennonite	E. F. Rosthern	1,160	2½
Black	C.P.R.	1,052	2½

TRIAL OF FODDER CORN VARIETIES

Fifteen varieties were sown on June 9 in rows 3½ feet apart, and the plants 6 inches apart in the row. Germination was good in each case, but the plants, injured by frost in June, were completely destroyed by the frost of July 26, when about 18 inches high.

POULTRY

(YEAR 1922)

Plymouth Rocks are kept on this Station and there are 69 hens and 161 pullets. Thirty-three hens one year old and 70 pullets were received in October, 1922, from the Lennoxville Experimental Station. Ninety-one pullets were bred on this Station. Trap-nests are used for the whole flock. The egg production varied from 57 to 213 eggs, with an average of 112 eggs. The hens coming from the Lennoxville Experiment Station laid 103 to 183 eggs; the average was 159 eggs. The best layers of these two flocks will be used for breeding next spring and they should make a good foundation stock.

GREEN FEED FOR PULLETS

A feeding experiment with pullets was started on November 20, the object of which was to compare roots and clover as green feed for winter laying. Fifty pullets were divided into two lots; both pens received the same feed, except that pen No. 7 had roots in the mash and also hanging before them all the time. Pen No. 8 was fed chopped clover in the mash and in a hopper kept before them at all times. The 25 pullets from each pen weighed exactly the same and were from the same breeding so that no pen had any advantage over the other. On December 31 none of these pullets had as yet laid any eggs.

POULTRY BUILDINGS

A log poultry house, 16 by 32 feet, for 100 hens was built according to the plan given in bulletin No. 87, in order to demonstrate to the farmers of this locality that poultry-houses can be built with the material available in this part of the country. The foundations are stone, the logs being barked and dove-tailed at the corners. Joints are caulked and filled with mortar. The front and the interior are exactly the same as for the ordinary poultry house and every pen has trap-nests. The loft floor is built of poles covered with straw and the roof is covered with regular shingles. This poultry house is very satisfactory and keeps very dry.

A poultry house accommodating 100 hens and partitioned into four pens was built this spring. This house takes the place of four separate colony houses and is not so expensive to build as are the latter. It has a stone foundation.

WATER FOWL

In the fall of 1921, four Pekin ducks, three Muskovy and three Toulouse geese were received from the Poultry Division, Central Experimental Farm, Ottawa. The Pekin ducks came through the winter in a very good condition but the Muskovy do not seem to be so hardy. During the extreme cold their feet were frozen and they had to be destroyed. Three other ducks were received this fall but in December they suffered the same fate. The geese came through the winter well and are very strong.

(YEAR 1923)

On December 31, 1923, the flock consisted of 123 hens, 181 pullets, 125 cockerels and capons (then being fattened) and 11 cocks, all Barred Plymouth Rocks. The plant now comprises three 100-hen poultry houses, one of which is built of logs; four colony houses, and a brooder house which will accommodate nearly 2,000 chicks. The whole faces the south and is protected against northern winds by a hillock and a grove, an ideal location being thus provided.

Our poultry investigations cover breeding, incubation, rearing, housing and feeding. We also sell breeding stock and eggs of the best strains at reasonable prices. We do not issue reports on breeding because we have not practised line breeding long enough to enable us to give details. Cocks out of dams with a 217 to 264 egg production were used for breeding. With careful feeding and by using hens with a good record, there are 99 chances out of 100 that the pullets resulting from such matings will be superior to their dams.

BEST KIND OR MAKE OF INCUBATORS

Three different makes and two different kinds of incubators were compared. Incubator No. 1 was heated by hot air and the two others by hot water. Results obtained are given in tabular form.

INCUBATION RESULTS WITH DIFFERENT KINDS OF INCUBATORS

Number of incubator	Kind of incubator	Total number of eggs set for incubation	Number of fertile eggs	Per cent fertile	Number of chicks	Per cent total eggs hatched	Per cent fertile eggs hatched	Number of chicks alive at the age of 3 weeks	Per cent hatched chicks alive at the age of 3 weeks	Total eggs required for one chick hatched	Total fertile eggs required for one chick hatched	Total eggs required for a three week old chick
1	Hot air	432	371	85·9	195	45·1	52·6	142	72·8	2·2	1·9	3·0
2	Hot water	703	629	89·4	266	37·8	42·3	148	55·6	2·6	2·4	4·8
3	Hot water	813	669	82·3	82	10·0	12·3	33	40·2	9·9	8·1	24·6

BEST INCUBATION DATES

Date set for incubation	Total eggs set for incubation	Number fertile	Per cent fertile	Number of chicks	Per cent total eggs hatched	Per cent fertile eggs hatched	Number of chicks alive at the age of 3 weeks	Per cent hatched chicks alive at age of 3 weeks	Total eggs required for one chick hatched	Total fertile eggs required for one chick hatched	Total eggs required for one three week old chick
March	680	625	91·9	316	46·4	50·6	153	48·4	2·1	1·9	4·4
April	455	375	82·4	145	31·9	38·7	115	79·3	3·1	2·6	3·9

This experiment will be continued for some years yet, as we found when the incubation season was over that incubator No. 3 was slightly leaky and that the resulting loss of water could have affected the results. Moreover, the incubation in No. 3 took place a little later than in the first ones, when the birds were laying much more heavily but did not have more exercise. This may have affected the germs. The percentage of pullet eggs was also higher in incubator No. 3.

BEST DATE FOR INCUBATION

Six hundred and eighty eggs were set for incubation in March, and four hundred and fifty-five in April. Less eggs were required to produce one chick with eggs set for incubation in March. Fertility was also better in the first lot, but mortality of chicks was heavier. It will be necessary to continue the test for several years before drawing definite conclusions. Results for 1923 are shown in tabular form.

BEST KIND OF POULTRY HOUSE

The log poultry house which we built in 1922 was found just as good as ordinary houses. Variation of temperature was greater, however, than in stud and board houses, but this did not appear to affect the egg production. We sincerely believe that it is very practical for a person who cannot obtain sawn lumber to build such a poultry house with the available wood. It cost us a little more than houses built with studding, but the settler can very well erect such a house in his spare time and practically avoid a money outlay.

COMPARISON OF ROOTS AND CLOVER FOR WINTER EGG PRODUCTION

The object was to find under what form it was preferable to supply green feed in winter, as it is generally recognzed that such feed is an essential part of the layers ration. For this experiment, we chose, in each lot, 25 pullets of identical stock and of exactly the same weight, in order to equalize all chances. Lot No. 1 received cut clover soaked 24 hours in the mash, and dry clover constantly available in a hopper. Lot No. 2 was fed cut mangels in the mash, and mangels hung constantly in front of them. We give in tabular form the results obtained in 1922 and 1923, a period extending from November 20 to April 30.

These results must not be considered as conclusive, as it is the first year that this experiment is conducted. We shall continue these investigations. It is reasonable to believe that the clover leaves picked off the barn threshing floor have much value for winter feeding, and where it is possible to supply succulent feed, they should be given with the latter.

PULLETS VERSUS HENS FOR FERTILITY, HATCHABILITY AND VIABILITY OF CHICKS

Four hundred and forty-two hen and two hundred and five pullet eggs were incubated for this comparison. The results are given in tabular form.

COMPARISON BETWEEN ROOTS AND CLOVER FOR EGG PRODUCTION

Lot No.	Number of pen	Number of birds in experiment	Number of days in experiment	Total weight on Nov. 20, 1922	Total weight on April 30, 1923	Increase in weight during experiment, at 30 cents per pound	Number of eggs laid at 60 cents per dozen.	Value of eggs	Total value of products	Pounds of grain at $2 per 100 pounds	Pounds of meal at $2.65 per 100 pounds	Pounds of beef scrap at $1	Pounds of mangels at 34 cents per 100 pounds	Pounds of clover at $1.10 per 100 pounds	Pounds oyster shell at $3.50 per 100 pounds	Value of feed	Grain per pen	Grain per bird	Cost of 1 dozen eggs
No. 1— Clover...	7	25	161	88	108½	20½	579	28·95	35·03	532	270	83	....	33	18	19·62	9·33	0·37	0·406
No. 2— Roots....	8	25	161	88	107½	19½	460	23·00	28·93	508	271	83	179	....	18	19·41	5·39	0·14	0·506

INCUBATION RESULTS WITH HEN AND PULLET EGGS

—	Total eggs	Number fertile	Per cent fertile	Number of chicks	Per cent eggs hatched	Per cent fertile eggs hatched	Number of chicks alive at age of 3 weeks	Per cent chicks alive at age of 3 weeks	Total eggs required for one chick hatched	Total fertile eggs required for one chick hatched	Total eggs required for a three week old chick
Hen eggs.....	442	391	88·5	169	38·2	43·2	102	60·4	2·6	2·3	4·3
Pullet eggs.....	205	188	91·7	43	21	22·9	26	60·4	4·7	4·6	7·9

It is remarkable, in the above table, that compared with hen eggs, nearly twice as many pullet eggs were required to produce a chick alive at the end of three weeks. The percentage of fertility was higher in pullet eggs, but the percentage of hatches was only half as great. The percentage of viability at the age of three weeks (age when they are considered saved) was the same for chicks from pullet as from hen eggs.

It will be necessary to continue this experiment for a few years, in order to draw definitive conclusions, as some causes may not have been controlled, and the average of several years will afford much more reliable data.

BEST SITE FOR INCUBATOR AND CORN VS BARLEY FOR LAYERS

These two experiments are at present being conducted, but details regarding them will be given in the report for the coming year.

BEES

A small apiary was started at this Station on May 15, 1922, with two colonies received from the Central Experimental Farm, Ottawa. Apparently both colonies were in good condition upon arrival, but a few weeks later as one colony was found weak and queenless it was united to the other. During July the remaining colony was requeened with a young queen and, later, when the colony became strong, two frames of brood with adhering bees were taken from it and placed in a new hive, this nucleus was given a young queen.

Owing to a wet and comparatively cool season no surplus honey was stored, in fact, the bees did not gather enough for their own use during the winter and therefore, had to be fed sugar syrup. The syrup was made by dissolving two parts of white granulated sugar in one part water. The feeding was done during September. After the last good cleansing flight in November, the two colonies were placed in the cellar beneath the Superintendent's house. This cellar is dry and the temperature ranged from 40 to 45 degrees F. during the winter.

Both colonies wintered well with small loss in bees, and the following spring, May 3, 1923, were taken from the cellar and placed in the apiary. One colony was placed on scales so that a daily record of gains or losses might be made throughout the season. Daily records of temperatures were also taken in conjunction with the weighing to ascertain the influence of temperatures on the honey flow. Two other colonies were received from Ottawa early in the spring.

The season of 1923 was not favourable for high production, due to considerable wet, cloudy weather, especially during August. The first nectar was gathered from willows on May 12. Dandelion and wild fruit began to yield on June 5 and 7 respectively. White Dutch and Alsike clovers were seen in bloom on June 25 and July 5 but the colony on scales did not show a gain from this source until July 10. Fireweed started to yield early in August and the bees

were quite active on it whenever weather conditions permitted. During the month of June the colony on scales showed an increase of 4 pounds, for July 32 pounds and for August 26 pounds. The highest daily gain was on August 1, when a gain of 9 pounds was made.

Of the four colonies only three yielded a surplus, the nucleus formed in 1922 failed to build up in time for the flow. The total crop for the three colonies was 91 pounds. In addition to the crop of honey these three colonies gave an increase of four new colonies. Two of the colonies stored enough honey in the brood chamber while the other six were fed sugar syrup to supply them with sufficient food for the winter.

All colonies were in good condition for the winter, and on November 8 were again placed in the cellar beneath the Superintendent's house.

FIBRE PLANTS

The object of the experiments with fibre plants, commenced in 1923, is to find out if flax and hemp can be grown profitably in this district and what the best varieties are of each and the best time for seeding.

The season was very unfavourable to the production of flax and hemp. Seedlings were late and crops grew slowly. These tests were made on land which had been in sunflower the previous year and on which 16 tons of manure per acre had been spread. The germination of the seed was very good.

TESTS OF VARIETIES OF FLAX

Five varieties were sown on June 7 and pulled on September 24 and 25. These tests were made on one-fortieth-acre plots, in duplicate, and seed was broadcasted at the rate of 1½ bushels per acre. Results obtained are given in the following table.

TESTS OF VARIETIES OF FLAX FOR FIBRE

Varieties	Height	Yield of straw per acre	Remarks
	inches	tons	
Longstem	26	5,200	Too green at pulling; 5 per cent still in blossom.
Riga Blue	24	4,936	Most early, pulled when seed was brown.
Pure Line No. 3	22	4,500	Too green at pulling.
Pure Line No. 5	22	4,300	" "
Saginaw	21	3,280	Rather green at pulling.

TESTS OF VARIETIES OF HEMP

Only one variety of hemp was sown to find out if it could be grown successfully. It was sown on June 7 on a plot of one-fortieth of an acre, in duplicate, and harvested on September 27. The frosts of July 25 and of the beginning of September did much damage. The yield of straw was 4,680 pounds per acre.

VARIOUS DATES OF SEEDING FOR FLAX

The first seeding was done on June 7 and there were three other seedings at a week's interval, on plots one-fortieth of an acre in size, duplicated. The flax was pulled on September 25. The variety Riga Blue was used in this test. The results obtained, with observations on each seeding, are given in the following table.

DATES FOR SEEDING FLAX

Date of seeding	Date of pulling	Height	Yield per acre	Remarks
		inches		
June 7	Sept. 25	24	3,900	Pulled when the seed was brown.
June 14	" 25	22	3,690	Pulled immediately after flowers had fallen.
June 21	" 25	18	3,080	Pulled during blossom time.
June 28	" 25	10	.....	Flax on these plots was not pulled. It had not flowered on September 25.

As the first seeding was done very late in the spring, on account of the poor weather conditions, it will be necessary to continue these experiments several more years. In an ordinary spring, the seeding may be done about fifteen days earlier than this.

The flax and hemp harvested from all plots was packed and shipped to Ottawa, after drying, for a test of the textile quality of each.

EXPERIMENTAL PROJECTS UNDER WAY AT THE EXPERIMENTAL STATION, LA FERME, QUE.

ANIMAL HUSBANDRY

DAIRY CATTLE

Project No.	Title.
A. 56.	Cost of milk production.
A. 59.	Cost of rearing dairy bred calves and heifers.

SHEEP

A. 309.	Age to breed ewe lambs.
A. 310.	Grading up the flock with pure-bred rams.
A. 338.	Cost of rearing market lambs.
A. 343.	Christmas vs. spring marketing of sheep.

SWINE

A. 135.	Corn vs. barley meal for hogs.
A. 157.	Cost of rearing sows to breeding age.
A. 163.	Cost of pork production.

HORSES

A. 331.	Feed cost of maintaining work horses.

FIELD HUSBANDRY

ROTATION EXPERIMENTS

F. 2.	Three-year rotation—Sunflowers; oats; clover.
F. 11.	Four-year rotation—Sunflowers; oats; clover; timothy.
F. 27.	Five-year rotation—Sunflowers; barley; clover; timothy; oats.
F. 37.	Five-year rotation—Summer-fallow; fall wheat and fall rye; clover; timothy; oats.
F. 39.	Six-year rotation—Potatoes; wheat; barley; clover; timothy; timothy.

CULTURAL EXPERIMENTS

F. 71.	Methods of surface drainage.

MANURE AND COMMERCIAL FERTILIZER EXPERIMENTS

F. 78.	Green manure crops.
F. 79.	Manure vs. commercial fertilizer.
F. 85.	Use of lime.

FARM MANAGEMENT EXPERIMENTS

F. 88.	Yield and profit from root and silage crops.
F. 91.	Cost of producing farm crops.

HORTICULTURE

POMOLOGY

H. 4.	Currant, variety experiment.
H. 5.	Gooseberry, variety experiment.
H. 11.	Raspberry, variety experiment.
H. 21.	Strawberry, variety experiment.
H. 33.	Apple.

VEGETABLE GARDENING

H. 57.	Bean, of different seasons, vs. one variety planted at different dates.
H. 61.	Bean, variety experiment.
H. 60.	Bean, broad, variety experiment.
H. 67.	Beet, thinning experiment.

Project No.	Title.
H. 68.	Beet, variety experiment.
H. 69.	Borecole, variety experiment.
H. 70.	Brussels sprouts, variety experiment.
H. 75.	Cabbage, protection from root maggot.
H. 77.	Cabbage, variety experiment.
H. 82.	Carrot, thinning experiment.
H. 83.	Carrot, variety experiment.
H. 86.	Cauliflower, protection from root maggot.
H. 88.	Cauliflower, variety experiment.
H. 94.	Celery, variety experiment.
H. 309.	Citron, variety experiment.
H. 102.	Corn, variety experiment.
H. 106.	Cucumber, variety experiment.
H. 107.	Egg plant, variety experiment.
H. 110.	Kohl Rabi, variety experiment.
H. 116.	Lettuce, variety experiment.
H. 122.	Melon, musk, variety experiment.
H. 125.	Melon, water, variety experiment.
H. 134.	Onion, seed vs. sets.
H. 136.	Onion, thinning experiment.
H. 137.	Onion, transplanting vs. sown in the open.
H. 138.	Onion, variety experiment.
H. 140.	Parsley, variety experiment.
H. 144.	Parsnip, thinning experiment.
H. 145.	Parsnip, variety experiment.
H. 150.	Pea, different seasons vs. one variety planted at different dates.
H. 153.	Pea, variety experiment.
H. 157.	Pepper, variety experiment.
H. 188.	Pumpkin, variety experiment.
H. 192.	Radish, variety experiment.
H. 197.	Salsify, variety experiment.
H. 199.	Spinach, variety experiment.
H. 201.	Squash, variety experiment.
H. 211.	Tomato, variety experiment.
H. 214.	Turnip, variety experiment.

FORAGE PLANTS

Ag. 1.	Indian corn, variety tests for ensilage purposes.
Ag. 16.	Mangels, variety tests for yield and purity.
Ag. 36.	Carrots, variety tests for yield and purity.
Ag. 46.	Turnips, variety tests for yield and purity.
Ag. 47.	Turnips, early vs. late seeding.
Ag. 51.	Swedes, variety tests for yield and purity.
Ag. 76.	Sunflowers, variety tests for yield and purity.

POULTRY

P. 17.	Natural vs. artificial incubation.
P. 18.	Best type of brooder.
P. 23.	Artificial vs. natural brooding.
P. 31.	Rearing costs.
P. 48.	Best date for marketing surplus stock.
P. 58.	Best hatching date for egg production.
P. 66.	Best type of laying house.
P. 93.	Roots vs. clover.

APIARY

Ap. 20.	Returns from apiaries.

FLAX

E. 3.	Testing varieties of flax.
E. 4.	Testing varieties of hemp.
E. 7.	Seeding tests, sowing flax at different dates.

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