DOMINION OF CANADA

DEPARTMENT OF AGRICULTURE

DOMINION EXPERIMENTAL FARMS

EXPERIMENTAL STATION

STE. ANNE DE LA POCATIÈRE, QUEBEC

REPORT OF THE SUPERINTENDENT

J. A. STE. MARIE, B.S.A.

FOR THE YEAR 1929

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DOMINION EXPERIMENTAL STATION
STE. ANNE DE LA POCATIÈRE

REPORT OF THE SUPERINTENDENT, J. A. STE. MARIE

THE SEASON

The winter of 1928-29 began early and finished late. Seeding was delayed until May 10 and could only be done on well-drained land on that date. The crops of timothy and clover hay were the heaviest ever recorded in the history of the station, owing to the heavy blanket of snow, which disappeared late in the spring, and to the abundance of rain in June and July. Frequent rains during the summer months reduced the yield of grain on heavy land or on poorly drained land, but greatly benefited crops sown on sandy or gravely loams.

During the latter part of the summer the weather was favourable for potatoes, root and pasture crops, but it was too wet and cold for corn.

The fruit crop was only medium and of poor quality.

METEOROLOGICAL RECORDS, 1929

Months	Temperature (F.)							Precipitation				Sunshine	
	Mean	Maximum 1929			Minimum 1929			Rain	Snow	Total Precipitation			
	1929	Highest	Date	Mean maximum	Lowest	Date	Mean minimum	1929	1929	1929	Average 17 years	1929	Average 11 years
	°	°		°	°		°	in.	in.	in.	in.	hrs.	hrs.
January	8·6	39·0	7	17·1	−22	14	0·1	0·42	45	4·92	2·64	76	89·14
February	15·6	40·0	20	25·7	−12	13	6·2		1·5	0·15	2·48	133·30	115·43
March	24·3	45·0	15	32·9	−15	9	15·7	0·73	14	2·13	2·29	165·45	135·92
April	34·3	62·0	28	40·3	17	10	27·2	1·12	20	3·12	2·69	134·15	152·48
May	48·3	88·0	29	57·1	26	4	39·5	3·29	.....	3·29	3·38	159·15	198·40
June	55·1	88·0	23	66·4	38	5	45·3	3·19	.....	3·19	2·94	157·45	206·48
July	63·6	85·0	12	75·5	40	19	51·7	5·08	.....	5·08	3·02	242·10	245·57
August	60·8	82·0	10	71·8	40	18	49·8	3·11	.....	3·11	2·28	198·10	221·93
September	52·9	80·0	6	65·6	30	20	40·3	2·45	.....	2·45	3·06	165·25	160·95
October	41·7	63·0	7	50·4	10	7	33·0	3·61	.....	3·61	3·26	73·45	107·56
November	29·2	64·0	1	38·4	1	24	20·0	1·33	4·0	1·37	2·40	36·20	69·67
December	11·7	35·0	15	19·9	−12	11	3·3	.....	3·88	0·38	1·91	44·45	67·07
	37·2	88·0	.....	46·8	−22	.....	27·6	24·33	88·3	27·3	26·91	1,587·05	1,766·60

ANIMAL HUSBANDRY

DAIRY CATTLE

On December 31, 1929, the Ayrshire herd of this Station numbered fifty-three head, including three herd sires, twenty-three cows, four 2-year-old heifers, twelve yearling heifers, and eleven calves. These animals are used mainly for experimental and demonstration purposes. However, the sale of breeding animals throughout the district is also an important part of our work, as shown by the fact that sixty-one bulls, five of which are registered in the Advanced Registry class AA and fourteen in class A, have been sold by the Station in this part of the province during the last five years. All these animals were of good type, of good size, and came from splendid milk-producing strains.

13704—1½

No. of project

LIST OF EXPERIMENTS UNDER WAY

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AYRSHIRE BREEDING

Two sires of high quality head the Ayrshire herd; they are "Ste. Anne Lord Kyle 12" —97949— (class AA), out of the champion cow "Briery Lass" —85707—, and "Ottawa Supreme 10th" —91809— (class AA), out of "Auchinbay Mina 5th" —70080— (62785), champion cow at the Royal Exhibition of Toronto in 1923. Their pedigrees are given further on.

Of twenty-three cows making up the herd, thirteen are registered in the R.O.P. and eight have not yet completed their first lactation period. Seven of the registered cows yielded one-third more than the minimum required.

The average production of all the cows which made official records during the year was 9,752 pounds of milk, containing 413 pounds of butter and averaging 4·24 per cent butterfat.

A list of the cows making official records during the year is given in the following table:—

OFFICIAL RECORDS:—CANADIAN RECORD OF PERFORMANCE, 1929

Name and number of cows	Age at commencement of test	Number of days milking	Pounds of milk produced	Pounds of fat produced	Average per cent of fat
	years	days	lb.	lb.	%
Honour Roll—					
Floss of Elmbrook—72578	8	305	11,835	499	4·23
Lawndale Daisy—83184	6	275	9·820	401	4·08
Queenie of Lawndale—82120	6	301	9,690	407	4·20
Ste. Anne Frivole 2—86194	4	305	8,646	362	4·19
Ste. Anne Fadette 2—87702	4	305	8,195	341	4·16
Ste. Anne Daisy 2—92070	3	305	7,392	339	4·59
Ste. Anne Finette—83980	5	301	9,040	327	3·62
Total	36	2,097	64,618	2,646	
Average	5	300	9,231	382	4·14
365 Day Class					
Floss of Elmbrook—72578	8	330	11,938	503	4·21
Springburn Lovely Actress—63540	9	365	11,330	478	4·22
Springburn Primerose—94321	3	365	10,025	424	4·23
Ste. Anne Lady Jane—105302	2	365	9,888	449	4·54
Ste. Anne Doreen 4—105303	2	365	9,229	431	4·67
Total	24	1,790	52,410	2,285	
Average	5	358	10,482	457	4·36
Total for 12 cows	60	3,887	117,028	4,961	
Average for 12 cows	5	324	9,752	413	4·24

DETAILED PEDIGREE

of

AYRSHIRE BULL

STE. ANNE LORD KYLE 12TH

—97949—

Born on

March 21, 1925

A.R. 55 Class AA.

Sire of 3 sons, Class AA.
Sire of 1 son, Class A.

OTTAWA LORD KYLE—77049—

Class "A"

Sire of 6 R.O.P. Daughters.
Sire of one son, Class A.A.
Sire of 8 sons, Class A.

BRIERY LASS—85707—

Mother of a son, Class A.A.
Mother of 3 sons, Class A.
Records:
At 7 years 16,047 pounds milk, 3·7% fat.
At 8 years, 22,035 pounds milk, 4·44% fat.
At 10 years, 16,009 pounds milk, 3·83% fat.
At 11 years, 10,443 pounds milk, 3·78% fat.

OVERTON LORD KYLE (Imp.)—70090—

Has two sons and one daughter in R.O.P.
Sire of three sons, Class A.

HARDCROFT DEWDROP 3rd (Imp.)—70084

Mother of:
1 son, R.O.P.
1 son, Class AA.
3 sons, Class A.
Record:
At 7 years 11,358 pounds milk, 4·5% fat.
At 9 years, 10,229 pounds milk, 4·42% fat.
At 11 years, 10,113 pounds milk, 3·66% fat.
At 12 years, 10,700 pounds milk, 4·15% fat.

IMPERIAL BEAUTY OF SPRINGBANK —41071—

Qualified, R.O.P. with 4 tested daughters.

MAPLEHURST LASS—23261—

This great cow, bred by W. McIntyre, was never tested. She lived up to the age of 24 years.

NETHERTON SIR PATRICK—(16325)

OVERTON SNOWFLAKE 2nd—(14369)

LOW MILTON PRINCE CHARLIE (10918)

HARDCROFT DEWDROP (43626)

NETHERTON KING THEODORE (Imp.) 35757.

Qualified in R.O.P., with 21 daughters and 9 sons Class "A" and 2 sons Class AA".

BRIERY 2nd of SPRINGBANK—32137—

Record, as a 2 year old, 14,131 pounds milk and 520 pounds fat.

SIR GEORGE OF MAPLE GROVE—16391—

By Rossland of Ste. Anne.

DAISY OF NEWINGTON—13978—

DETAILED PEDIGREE

of

AYRSHIRE BULL

OTTAWA SUPREME 10TH

—91809—

Born on

November 13, 1924

Class A

SHEWALTON MAINS SUPREME (Imp.) 83930.

Champion, National Exposition.

Advanced Registration, A.A.
R.O.P. with 4 daughters.
Sire of five sons, Class A.A.
Sire of 14 sons, Class A.

AUCHINBAY MINA 5TH—(Imp.)-70080—

Records:
At 3 years, 9,522 pounds milk, 4·07% fat.
At 4 years, 16,243 pounds milk, 4·17% fat.
At 6 years, 13,117 pounds milk, 3·65% fat.
At 7 years, 11,174 pounds milk, 4·13% fat.
At 8 years, 10,499 pounds milk, 3·94% fat.

Has two daughters qualified in R.O.P., and two sons in Class A.A. Grand Champion at Royal Fair, 1926.

SHEWALTON MAINS PERFECTION (18664)

SHEWALTON MAINS VIOLET 3RD (58380)

Champion Ayrshire Herd Book Society's Ness Show 1923.
Records:
1920 (2 years) 10,300 pounds milk, 3·94% fat.
1921 (3 years) 12,830 pounds milk, 3·77% fat.
1922 (4 years) 10,850 pounds milk, 4·17% fat.
1923 (5 years) 12,780 pounds milk, 4·00% fat.

AUCHINBAY NORTHERN STAR (15163)

AUCHINBAY MINA 2nd (41312)

Records:
1917—11,090 pounds milk, 4·38% fat.
1918—11,150 pounds milk, 4·38% fat.

HOBSLAND LUCKY BOY—16483—

Sire of nine daughters with official records, the average of which at first calf is: 12,989 pounds milk and 4·05% fat.
Sire of Hobsland Mendel
Hobsland Duplicate
Hobsland Ayr Pilot.

GLOSSAC NELLIE (Vol. 31 p. 837)

Winner of 1st prize, two years in succession in 12,000 pounds class, at the Fenwick Fair, Scotland.

LESSNESSOCK GURKKA (12478)

Out of Lessnessock Gem, dam of Lessnessock Golden Love and Lessnessock Gem's Good Gift, the first having 30 daughters and 4 sons and the second 8 daughters and 2 sons qualified in R.O.P.

SHEWALTON MAINS DEWDROP 2nd (48717)
Records:
At 2 years, 9,090 pounds milk, 4·21% fat.
At 3 years, 8,080 pounds milk, 3·74% fat.
At 4 years, 9,280 pounds milk, 3·86% fat.
At 5 years, 9,530 pounds milk, 3·93% fat.

BRAIE RISING STAR (8187)

A.R. No. 314.
Champion in Scotland, 1911-12. Sire of 10 daughters with official records and 3 sons officially qualified: Netherton Stateman A.R. 211.
Howies Searchlight, A.R. 233.
Howies Wait 8 See A.R. 286.

HOWIES JUICEGIVER (33499)

AUCHINBAY SCOTT AGAIN (8345)

AUCHINBAY MINA (Vol. 31, P. 695)

The following table shows the yields and cost of production of milk for all cows having completed a lactation period during 1929.

All feeds, with the exception of beet pulp and meal, were charged at the average cost of production for a period of five years on the station; the value of butter is an average of the market prices for 1929.

The meals are charged according to the market price; the following mixture was used:—

Bran	300 pounds at $1.70 per cwt
Corn meal	100 pounds at $2.45 "
Barley meal	200 pounds at $2.40 "
Gluten meal	200 pounds at $1.70 "
Linseed cake	50 pounds at $2.75 "
Average cost of mixture	$40 per ton

This mixture contains 14·4 per cent digestible protein.

DAIRY HERD RECORDS AND COST OF MILK PRODUCTION

Name and number of cows	Date of calving	Age at beginning of lactation period	Number of days in lactation period	Total pounds of milk for period	Average per cent fat in milk	Pounds of butter produced in period	Value of butter at 39 cts. per pound	Value of skim-milk at 20 cents per 100 pounds	Total value of products	Amount of meal at $2 per 100 pounds	Amount of roots at $3.00 per ton	Amount of silage at $4.10 per ton	Amount of green feed at $2.40 per ton	Amount of beet pulp at $39.00 per ton	Amount of hay at $7.75 per ton	Amount of oat hay at $10.00 per ton	Months of pasture at $2 per month	Total cost of feed for period	Cost to produce 100 pounds of milk	Cost to produce 1 pound of butter, skim-milk neglected	Profit on cow during period, labour and calf neglected
		years	days	lb.	%	lb.	$	$	$	lb.	lb.	lb.	lb.	lb.	lb.	lb.		$	$	cts.	$
Floss of Elmbrook—72578	21-5-28	8	330	11,939	4·17	585·7	228 42	20 30	248 72	2,964	5,960	7,900	650	30	2,350	630	4	106 05	0 89	18·1	142 67
Springburn Lovely Actress—63540	11-6-28	9	365	11,329	4·21	561·1	218 83	19 26	238 09	2,648	5,586	5,065	1,050	130	3,931	200	5	101 75	0 90	18·1	136 34
Springburn Primrose—94321	20-2-28	3	371	10,124	4·26	507·4	197 89	17 21	215 10	2,566	5,965	8,145	850	.....	2,640	380	4	98 12	0 97	19·3	116 98
Ste. Anne Lady Jane—105302	9-10-28	2	365	9,887	4·59	533·9	208 22	16 81	225 03	2,243	4,789	3,670	1,850	100	3,745	300	4	87 74	0 89	16·4	137 29
Queenie of Lawndale—82120	17-5-28	6	301	9,690	4·20	478·8	186 73	16 47	203 20	2,376	5,240	5,725	950	.....	2,757	430	4	89 09	0 92	18·6	114 11
Ste. Anne Doreen 4—105303	4-8-28	2	365	9,208	4·60	498·3	194 34	15 65	209 99	2,216	5,452	3,420	2,350	115	3,680	330	5½	91 15	0 99	18·3	118 84
Ste. Anne Finette—83980	28-9-28	5	301	9,040	3·74	397·8	155 14	15 37	170 51	2,134	4,730	2,725	450	.....	3,657	200	3⅓	78 42	0 87	19·7	92 09
Lady Jane—63224	9-4-28	11	318	8,735	3·95	405·9	158 30	14 86	173 16	2,291	5,045	5,970	950	.....	2,977	280	4	87 71	1 00	21·6	85 45
Briery Lass—85707	5-5-28	12	357	8,413	3·84	380·1	148 24	14 30	162 54	2,357	5,545	6,695	950	30	3,463	660	4	95 63	1 14	25·2	66 91
Ravensdale Queen Bess—67093	28-8-28	9	357	8,333	4·17	408·8	159 43	14 17	173 60	1,908	5,901	3,465	1,450	130	4,180	180	5	85 49	1 03	20·9	88 11
Ste. Anne Fadette 2—87702	19-3-28	4	319	8,224	4·26	412·1	160 72	13 98	174 70	1,975	5,205	6,950	900	.....	2,430	180	4	80 96	0 98	19·6	93 78
Ste. A Primerose 2—92071	5-3-28	3	361	7,740	4·24	386·1	150 58	13 16	163 74	2,117	5,565	8,150	500	.....	2,630	340	4	87 89	1 34	22·8	75 85
Ste. Anne Daisy 2—92070	26-1-28	3	338	7,542	4·46	395·7	154 32	12 82	167 14	1,880	7,370	4,520	950	.....	4,333	50	4	84 11	1 12	21·3	83 03
Ste. Anne Flavia 3—86193	11-6-28	4	324	6,649	3·80	297·2	115 91	11 30	127 21	1,776	5,256	6,920	950	15	1,915	515	4	77 06	3 16	25·9	50 15
Total	.....	.....	4,772	126,853	.....	6,248·9	2,437 07	215 66	2,652 73	31,452	77,618	79,320	14,800	550	44,688	4,675	59	1,251 17	.....	.....	1,401 63
Average of the herd	.....	5·8	341	9,061	4·19	446·4	174 08	15 40	189 48	2,247	5,544	5,666	1,057	39	3,192	334	4·2	89 37	0 99	20·0	100 11

The preceding table deserves a close scrutiny; it shows clearly that there is a close relation between heavy production of milk and butterfat, good feeding and profits over costs of food. The profit on each cow is more in proportion to the quantity of butter produced than to the quantity of milk. Therefore the production of butterfat or butter is a truer index of the real value of a cow than the production of milk. Breeders of dairy cattle, either grade or pure-bred, should never fail to keep a record of the individual production of milk and butterfat of each cow in the herd.

AVERAGE PRODUCTION OF THE HERD SINCE 1921

Year	Number of cows	Average production of milk	Average production of butter
		lb.	lb.
1921	17	5,452	250·22
1922	9	5,251	238·00
1923	12	5,870	272·10
1924	19	7,868	344·56
1925	13	9,764	494·39
1926	20	10,072	527·00
1927	24	8,713	430·15
1928	18	8,522	422·06
1929	14	9,061	446·40

COST OF RAISING DAIRY BULLS AND HEIFERS

As in the past years, the object of this experiment was to determine the cost of raising heifers and bull calves up to the age of one year, and of heifers from birth up to their first calving; the quantity of feed consumed by each animal was carefully noted.

The cost of raising these different classes of cattle, as shown in the following tables, appears to be rather high but it should be noted that all these calves were pure-bred and that they were fed liberally, to insure good development, as may be seen by the quantity of feed consumed. The bulls were sufficiently developed to be used for breeding purposes at the age of one year and the heifers were ready to calve when two years and a half old.

FEED COST OF HEIFERS, FROM BIRTH TO ONE YEAR OF AGE

Name of heifers and numbers	Amount of whole milk at $1.65 per cwt.	Amount of skim-milk at 20cts. per cwt.	Amount of hay at $7.75 per ton	Amount of roots at $3.00 per ton	Amount of silage at $4.10 per ton	Amount of meal at $2 per cwt.	Amount of Blatch-ford meal at $4.75 per cwt.	Amount of Gro-fast at $6 per cwt.	Months of pasture at $1.50 per month	Total cost of feed
	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	months	$
Ste. A. Rose de Kyle—120730	250	2,422	894	635	.....	741	4	.....	1	29 89
Ste. A. Frivole de Kyle—120738	277	2,717	818	378	183	741	56	.....	1	33 10
Ste. A. Ida de Supreme—120734	242	2,092	1,264	1,205	540	862	3	.....	.....	33 37
Ste. A. Fameuse de Sup.—120727	295	2,692	815	348	156	768	57	.....	1	34 25
Ste. A. Martha de Kyle—120733	268	2,112	1,198	1,290	495	894	3	.....	.....	35 40
Ste. A. Amelia de Sup.—120735	315	1,849	1,268	1,200	590	829	.....	.....	.....	36 34
Ste. A. Primerose de S.—120731	347	2,544	1,068	925	200	910	8	.....	2/3	37 23
Ste. A. Jeannette de S.—130952	360	2,256	516	.....	.....	515	.....	143	4	37 23
te. A. Favorite de S.—120732	405	2,439	1,253	1,205	75	920	3	.....	2/3	38 28
te. A. Finette de Sup—130953	260	2,156	561	.....	160	505	.....	185	4	41 64
Ste. A. Primevere de Sup.—130951	360	2,668	670	.....	.....	585	.....	191	2 2/3	
Average (1929)	310	2,362	939	653	218	752	12	47	1 37	35 49
Two-year average (for 18 heifers)	316	2,301	929	781	228	741	7	29	0·98	33 41

FEED COST OF HEIFERS FROM BIRTH TO FIRST CALVING

Name and number of heifers	Amount of whole milk at $1.65 per cwt.	Amount of skim-milk at 20 cts. per cwt.	Amount of hay at $7.75 per ton	Amount of silage at $4.10 per ton	Amount of roots at $3 per ton	Amount of oat hay at $10 per ton	Amount of meal at $2 per cwt.	Amount of Blach-ford meal at $4.75 per cwt.	Months of pasture at $1.50 per month	Total cost of feed
	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	months	$
Ste. A. Doreen de Supreme—113480	239	1,920	2,461	6,805	5,405	985	552	.....	9	68 77
Ste. A. Milkmaid—113482	595	2,185	1,947	6,835	4,705	740	602	.....	9	72 05
Ste. A. Ranevette de Sup.—113468	246	2,600	2,636	7,725	4,940	845	591	44	8	72 88
Ste. A. Flavia de Supreme—113476	242	2,460	2,700	6,815	5,410	670	602	.....	7·66	68 37
Average for 1929	331	2,291	2,436	7,045	5,115	810	587	11	8·42	70 52
Average for three years (17 heifers)	362	2,436	2,785	5,912	2,773	384	1,153	27	7·59	75 63

FEED COST OF CALVES (MALES) FROM BIRTH TO ONE YEAR OF AGE

Name of bulls and numbers	Amount of whole milk at $1.65 per cwt.	Amount of skim-milk at 20cts. per cwt.	Amount of hay at $7.75 per ton	Amount of roots at $3 per ton	Amount of meal at 2c. per lb.	Amount of Blach-ford meal at $4.75 per cwt.	Amount of Gro-fast at $6 per cwt.	Months of pasture at $1.50 per month	Total cost of feed
	lb.	lb.	lb.	lb.	lb.	lb.	lb.	months	$
St. A. Supreme 19—'119900	324	2,314	1,516	1,947	899	9	.....	.....	37 18
Ste. Anne Lord Kyle 31—119897	290	2,712	1,041	635	955	9	.....	1 2/3	37 67
Average (1929)	307	2,513	1,279	1,441	927	9	.....	0·83	37 44
Average for 3 years (16 calves)	354	2,484	1,112	1,170	837	6	3	0·25	34 09

FEEDING EXPERIMENTS

Value of skim-milk in ration for growing calves.

Comparison of special meal mixtures for growing calves.

Three systems of feeding for the calves were tried this year.

(1) No skim-milk—This plan consists in giving whole milk until the age of four or five weeks; from then on, no milk is given, either skimmed or whole; the ration is made up exclusively of a special meal mixture and hay.

(2) No substitute in the skim-milk—The whole milk is replaced by skim-milk at the age of three or four weeks, but no substitute is used in place of the butterfat which has been removed. A dry meal mixture and hay is fed to the calves when they are changed from whole milk to skim-milk; the latter is given until the calves are six months old.

(3) With substitute (grofast) in the skim-milk—Same as No. 2, with the exception that a commercial meal (grofast) for calves is added to the skim-milk to replace the butterfat that has been removed.

The liquid and solid feeds were weighed and the calves were weighed at birth and at six months of age.

The details are shown in the following table:—

FEED TESTS OF CALVES

—	Lot 1	Lot 2	Lot 3
	No skim-milk	No substitute in the skim-milk	With substitute (Grofast) in the skim-milk
Number of calves ..... No.	2	5	5
Number of days feeding period ..... months	6	6	6
Whole milk consumed per calf during the period ..... pounds	380	295	331
Skim-milk consumed per calf during period ..... pounds	.....	1,933	1,776
Grofast ..... pounds	.....	.....	181
Hay ..... pounds	320	267	263
Dry meal ..... pounds	448	330	272
Average weight per calf at birth ..... pounds	54	71	58
Average weight per calf at six months ..... pounds	335	269	380
DEDUCTIONS			
Cost of feed per calf during the period ..... $	19 15	16 87	26 81
Gain in weight per calf during the period ..... pounds	281	198	322
Cost of feed per pound of gain ..... cts.	6·8	8·5	8·3

COSTS OF FEEDS

Whole milk	$1 65 per 100 pounds
Skim-milk	0 20 per 100 "
Grofast (Commercial calf meal)	6 00 per 100 "
Dry Meal:—	
Lot 1	$2 60 per 100 "
Lots 2 and 3	2 15 per 100 "
Hay	7 75 per ton

MEAL MIXTURES USED

Lot 1—
- 50 pounds of ground corn.
- 75 pounds of ground oats.
- 50 pounds of bran.
- 50 pounds of oilmeal
- 50 pounds of tankage.
- 4 pounds of bone meal.
- 4 pounds of limestone *finely* ground.
- 4 pounds of salt.

Lots 2 and 3—
- 5 parts ground oats.
- 1 part of ground corn.
- 3 parts of bran.
- 1 part of oilmeal.

The above table shows the increase in weight per head for every group and the feed cost per pound of gain. In group 3, which received grofast as a substitute in the skim-milk, the increase in weight per head, from birth up to 6 months of age was 322 pounds, compared with 281 pounds for the calves without skim-milk and 198 pounds for those not receiving any substitute in the skim-milk. The correlation between these different weights is shown fairly well by the development attained by the calves of each group at the age of six months, because at that age they all were pretty much in the same condition of flesh. The feed cost per pound of gain is much lower for the calves which were not fed skim-milk than for the other lots.

The results obtained with the calves raised without skim-milk are very interesting; some breeders or farmers cannot feed skim-milk to their calves, either because the milk is sold as whole milk, or made into cheese, or because the accreditation regulations forbid the use of unpasteurized milk as a feed.

VALUE OF ROOTS AS A SUBSTITUTE FOR PART OF THE MEAL RATION FOR MILCH COWS

An experiment with the object of ascertaining the value of roots as a substitute for part of the meal ration of milch cows was repeated this year for the second time. Two different groups of cows were used each year; one group was fed swedes and the other beets.

The feeding experiment included three consecutive periods of three weeks for each kind of roots; during the second period, the cows received a balanced ration of hay and meal and in the first and third periods, hay, roots and from 60 to 65 per cent of the quantity of meal given during the second period.

The roots were fed at the rate of three pounds per hundred pounds live weight, by replacing each pound of meal by nine pounds of swedes or eleven pounds of beets. The quantity of hay has always remained the same, at 2 pounds per 100 pounds live weight.

The following tables show the results for 1928 and 1929:—

SWEDES AS A SUBSTITUTE FOR MEAL—YEAR 1928

Feeding experiment		Period 1 Swedes and meal	Period 2 Meal	Period 3 Swedes and meal	Average for periods 1 and 3
Number of cows	No.	6	6	6	6
Duration of test	days	14	14	14	14
Milk produced	lb.	2,704	2,295	2,423	2,563
Average per cent butterfat	%	4·23	4·44	3·98	4·11
Total pounds butterfat	lb.	114·39	101·86	96·58	105·48
Fat corrected milk*	"	2,797	2,446	2,418	2,607
Total pounds skim-milk produced	"	2,296	1,940	2,059	2,177
Total pounds meal consumed	"	414	808	414	414
Total pounds swedes consumed	"	3,766	.....	3,766	3,766
Total pounds hay consumed	"	1,887	1,887	1,887	1,887
Pounds meal consumed per 100 pounds fat corrected milk	"	14·8	33·0	17·1	15·9
Pounds swedes consumed per 100 pounds fat corrected milk	"	135·0	.....	155·7	144·4
Pounds hay consumed per 100 pounds fat corrected milk	"	67·5	77·1	78·0	72·4
COST OF FEED					
Cost of meal at $38 per ton	$	7 87	15 35	7 87	7 87
Cost of swedes at $2.77 per ton	$	5 19	.....	5 19	5 19
Cost of hay at $7.75 per ton	$	7 30	7 30	7 30	7 30
Total cost of feed	$	20 36	22 65	20 36	20 36
VALUE OF PRODUCTS					
Value of butterfat at 42 cents per pound	$	48 04	42 78	40 56	44 30
Value of skim-milk at 20 cents per cwt	$	4 59	3 88	4 12	4 36
Total value of products	$	52 63	46 66	44 68	48 66
Profit realized during each period	$	32 27	24 01	24 32	28 30

*"Fat corrected milk"—Milk converted to a standard percentage of fat: 4%.

SWEDES AS A SUBSTITUTE FOR MEAL—YEAR 1929

Feeding experiment		Period 1 Swedes and meal	Period 2 Meal	Period 3 Swedes and meal	Average for periods 1 and 3
Cows in test	No.	8	8	8	8
Length of test	days	14	14	14	14
Pounds milk produced	lb.	2,958	2,698	2,497	2,728
Average per cent butterfat	%	4·2	4·12	4·33	4·26
Total pounds butterfat	lb.	124·24	111·16	108·12	116·18
Fat corrected milk*	"	3,047	2,747	2,621	2,834
Pounds skim-milk produced	"	2,515	2,294	2,122	2,319
Total pounds meal consumed	"	462	840	462	462
Total pounds swedes consumed	"	3,402	.....	3,402	3,402
Total pounds hay consumed	"	2,492	2,492	2,492	2,492
Pounds meal consumed per 100 pounds fat corrected milk	"	15·2	30·6	17·6	16·3
Pounds swedes consumed per 100 pounds fat corrected milk	"	111·7	.....	129·8	120·0
Pounds hay consumed per 100 pounds fat corrected milk	"	81·1	90·7	95·1	87·9
COST OF FEED					
Cost of meal at $40 per ton	$	9 24	16 80	9 24	9 25
Cost of swedes at $3 per ton	$	5 10	.....	5 10	5 10
Cost of hay at $7.75 per ton	$	9 67	9 67	9 67	9 67
Total cost of feed	$	24 01	26 47	24 01	24 01
VALUE OF PRODUCTS					
Value of butterfat at 42 cents per pound	$	58 39	52 25	50 82	54 60
Value of skim-milk at 20 cents per cwt	$	5 03	4 59	4 24	4 64
Total value of products	$	63 42	56 84	55 06	59 24
Profit for each period	$	39 41	30 37	31 05	35 23

BEETS AS A SUBSTITUTE FOR MEAL—YEAR 1928

Feeding experiment		Period 1 Beets and meal	Period 2 Meal	Period 3 Beets and meal	Average for periods 1 and 3
Cows in test	No.	6	6	6	6
Length of test	days	14	14	14	14
Pounds milk produced	lb.	2,954	2,757	2,680	2,817
Average per cent butterfat	%	4·5	4·15	4·45	4·47
Total pounds butterfat	lb.	132·97	113·99	119·16	126·01
Fat corrected milk*	"	3,177	2,813	2,858	3,017
Pounds skim-milk produced	"	2,509	2,426	2,279	2,394
Total pounds meal consumed	"	476	860	476	476
Total pounds beets consumed	"	4,270	.....	4,270	4,270
Total pounds hay consumed	"	1,890	1,890	1,890	1,890
Pounds meal consumed per 100 pounds fat corrected milk	"	15·0	30·6	16·7	15·8
Pounds beets consumed per 100 pounds fat corrected milk	"	134·4	.....	149·4	141·5
Pounds hay consumed per 100 pounds fat corrected milk	"	59·5	67·2	66·1	62·6
COST OF FEED					
Cost of meal at $38 per ton	$	9 04	16 34	9 04	9 04
Cost of beets at $2.77 per ton	$	5 89	.....	5 89	5 89
Cost of hay at $7.75 per ton	$	7 31	7 31	7 31	7 31
Total cost of feed	$	22 24	23 65	22 24	22 24
VALUE OF PRODUCTS					
Value of butterfat at 42 cents per pound	$	55 83	47 88	50 00	52 91
Value of skim-milk at 20 cents per cwt	$	5 02	4 85	4 56	4 79
Total value of products	$	60 85	52 73	54 56	57 70
Profit for each period	$	38 61	29 08	32 32	35 46

*"Fat corrected milk"—Milk converted to a standard percentage of fat: 4%.

BEETS AS A SUBSTITUTE FOR MEAL, YEAR 1929

Feeding experiment		Period 1 Beets and meal	Period 2 Meal	Period 3 Beets and meal	Average for periods 1 and 3
Cows in test	no.	8	8	8	8
Length of test	days	14	14	14	14
Pounds milk produced	lbs.	3,285	3,055	3,043	3,164
Average per cent butterfat	%	4·53	4·12	4·25	4·40
Total pounds butterfat	lbs.	148·81	125·87	129·33	139·09
Fat corrected milk	"	3,546	3,110	3,157	3,352
Pounds skim-milk produced	"	2,793	2,597	2,586	2,690
Total pounds meal consumed	"	568	931	568	568
Total pounds beets consumed	"	4,004	.....	4,004	4,004
Total pounds hay consumed	"	2,408	2,408	2,408	2,408
Pounds meal consumed per 100 pounds fat corrected milk	"	16·0	29·9	18·0	16·9
Pounds beets consumed per 100 pounds fat corrected milk	"	112·9	.....	126·8	119·5
Pounds hay consumed per 100 pounds fat corrected milk	"	67·9	77·4	76·3	71·8
COST OF FEED					
Cost of meal at $40 per ton	$	11 36	18 62	11 36	11 36
Cost of beets at $3 per ton	$	6 01	.....	6 01	6 01
Cost of hay at $7.75 per ton	$	9 34	9 34	9 34	9 34
Total cost of feed	$	26 71	27 96	26 71	26 71
VALUE OF PRODUCTS					
Value of butterfat at 42 cents per lb	$	69 94	59 16	60 79	65 37
Value of skim-milk at 20 cents per cwt	$	5 59	5 19	5 17	5 38
Total value of products	$	75 53	64 35	65 96	70 75
Profit for each period	$	48 82	36 39	39 25	44 04

It is seen in these tables that roots replaced a large quantity of meal and also a part of the hay, thus giving a net increase in profit of $2.56 per ton of swedes and $3.39 per ton of beets.

The results obtained are partly due to the substitution of roots for grain and partly to the succulence added to the ration.

A summary of these figures shows that 7,168 pounds of swedes replaced 853 pounds of meal and 204 pounds of hay, which, at the prices shown in the tables, would give a food value of $4.85 per ton to the swedes; that 8,274 pounds of beets were equivalent to 883 pounds of meal and 326 pounds of hay, and had a value of $4.46 per ton. The average cost of producing roots during a five-year period on this Stations is only $3 per ton. Under these conditions, the growing of swedes and beets insure substantial profits and should be specially profitable in Lower Quebec, where the growing season is much too short to ripen good corn silage.

Although very interesting results have been obtained during the last two years, this experiment will be continued with a view to further confirming the facts brought to light and which are of high importance for this district.

SWINE

BREEDING AND REARING YORKSHIRE PIGS

All the pigs kept on this Station are Yorkshires; the herd numbered forty-eight head at the beginning of the year, twelve of which are brood sows, two boars, and thirty-four pigs used in different experiments.

The brood sows are kept outside all year round; in winter, in paddocks near the piggery, where portable shelters are available. These shelters are

placed at a certain distance from the feed troughs, so as to compel the sows to take as much exercise as possible. The winter ration consists of one part of bran, one part of middlings, and two parts of shorts. Roots and clover hay are added to this ration.

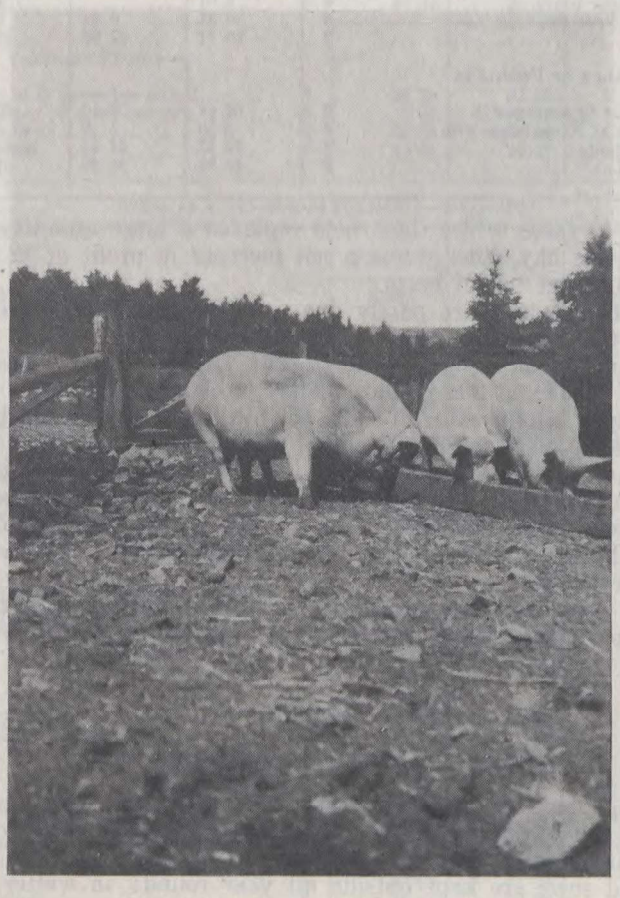
In summer the brood sows are placed on a permanent pasture where they have an abundance of shade and water. As a supplement to this pasture, which is very poor, they receive, at the beginning, clover hay fed in troughs, green fodder later in the season and roots in the fall.

The meal mixture fed during the summer months is as follows: one part of bran, two parts of shorts, and one part of ground screenings.

Young pigs farrowed and reared during the year:—

Number of sows	11
Number of young pigs farrowed	151
Number of young pigs per sow	13·7
Number of healthy and vigorous young pigs	118
Number of weak young pigs	17
Number of still-born	16
Number of pigs raised until weaning age	116
Number of pigs raised per sow	10·5

Of the 116 pigs raised, 35 were sold for breeding purposes, 37 were allotted to various experiments, and the rest were sold after having been fattened in several feeding tests. The demand for boars and sows for breeding purposes



A group of Yorkshire brood sows wintered outside in sheds.

is much larger than the supply; many requests could not be satisfied, on account of the number of pigs that have to be kept for the continuation of our experiments.

FEED COST FOR MAINTENANCE OF BROOD SOWS

Number of sows, 11.

Cost per sow—

336	pounds	bran at $1.70	$ 5 71
791	"	shorts at $1.80	14 24
525	"	middlings at $2.30	12 08
244	"	oat meal at $2.25	5 49
72	"	ground barley at $2.40	1 73
77	"	ground corn at $2.45	1 89
1,062	"	turnips at $3	1 59
479	"	hay at $7.75	1 87
884	"	green fodder at $2.40	1 06
616	"	skim-milk at 20 cents per cwt.	1 23
18	"	tankage at $3.30	0 59
5	"	linseed cake at $2.75	0 14
		Total cost of feed	$ 47 62
		Average cost over a six-year period	42 15

The above table shows that the feed cost for a brood sow was $47.62 and the average cost over a six-year period, $42.15. The high cost of the feed is due to the fact that there are no pastures available for the sows, therefore necessitating the use of a large quantity of concentrates. Some sows produce two litters per year, and naturally they must be fed heavier than those bearing only one litter. On the other hand, a sow should always be in good flesh, in order to be able to farrow a good litter of strong and uniform young pigs and feed them well when they are born. A sow which is not in good condition when bred seldom bears a numerous and uniform litter; if in poor condition at farrowing, she will be unable to rear healthy young ones.

FEED COST FOR MAINTENANCE OF PIGS UNTIL WEANING AGE

Number of sows	8
Number of litters	11
Number of pigs born	110
Number of pigs raised	94
Number of pigs raised per litter	8·5

Feed consumed—

18,050	pounds	of meal at $1.97	$ 355 80
50	"	linseed cake at $2.75	1 38
80	"	tankage at $3.30	2 64
4,580	"	skim-milk at 20 cents per cwt.	9 16
7,000	"	green fodder at $2.40 per ton	8 40
3,075	"	clover hay at $7.75 per ton	11 99
7,910	"	turnips at $3 per ton	11 87
		Total cost of feed	$ 401 24
		Average cost of feed per head up to weaning	4.27
		Average cost over a seven-year period	3 87

COST OF PRODUCTION OF A POUND OF PORK

In order to ascertain the cost of production of a pound of pork, sixteen young pigs taken from two litters were selected at weaning age for this experiment, and all the feed they received from then on until they were slaughtered was carefully noted.

The meal mixtures used in this experiment are as follows:—

First sixty days—

200 pounds middlings.
100 " ground oats.
50 " ground barley.
50 " shorts.
25 " bran.
14 " linseed cake.
14 " tankage, 45 per cent protein.
4½ " ground bone.
2¼ " salt.
Skim-milk.

Sixty days to ninety days—

100 pounds middlings.
150 " ground oats.
100 " ground barley.
50 " shorts.
25 " bran.
14 " linseed cake.
14 " tankage.
4½ " ground bone.
2¼ " salt.
Skim-milk.

Ninety days to end of experiment—

150 pounds ground oats.
200 " ground barley.
100 " shorts.
14 " linseed cake.
14 " tankage.
4½ " ground bone.
2¼ " salt.
Skim-milk.

COST OF ONE POUND OF PORK

Number of pigs fed	16	
Weight of lot at beginning	436	pounds
Average initial weight	27·25	"
Final weight of lot	3,425	"
Average final weight	214	"
Total gain per period	2,989	"
Gain per head per period	168·8	"
Days fed	183	
Gain per head per day	1·02	pounds
Feed consumed—		
9,387 pounds meal at $2.20 per cwt	$ 206 51	
5,100 " skim-milk at 20c. per cwt	10 20	
306 " tankage at $3.30	10 10	
306 " linseed cake at $2.75	8 43	
1,150 " hay at $7.75	4 46	
Meal consumed per pound of gain	3·14	pounds
Skim-milk consumed per pound of gain	1·70	"
Total cost of feed	$ 239 69	
Cost per head	14 98	
Cost per pound gain	0 08	

This statement shows that the pigs were fed for 183 days and that 3·14 pounds meal and 1·7 pounds skim-milk were necessary to produce one pound gain. The average increase per day was 1·02 pounds. Adding the price of these young pigs at weaning—$4.27—to the feed consumed, the total cost of these pigs at slaughtering amounts to $308.01. Therefore, the cost of a pound of pork comes to 10·3 cents.

ONE LITTER VS. TWO LITTERS PER YEAR—AVERAGE COST OVER A SIX-YEAR PERIOD

Years	Number of sows 1 litter	Pigs raised per sow	Cost of young pigs at weaning	Number of sows 2 litters	Pigs raised per sow	Cost of young pigs at weaning
			$			$
1929	9	8·0	6 16	4	15·2	3 33
1928	5	8·0	6 48	4	17·0	3 15
1927	5	8·6	5 73	4	17 7	2 83
1926	8	7·1	5 03	2	14·5	3 35
1925	4	6·5	4 25	3	22·6	1 87
1924	5	5·0	5 84	2	13·0	3 77
Average	.....	7·2	5 41	.....	16·6	3 05

The above figures show clearly the advantage of having the sows bred twice per year. The number of young pigs is doubled without increasing the number of brood sows, and the cost of production is cut to half what it would be at weaning if only one litter was obtained. According to the above table, the number of young ones raised per sow (one litter) is 7·2, costing $5.41 per head, while a sow farrowing twice per year raised, on an average, 16·6 young pigs, costing $3.05 each at weaning.

Another advantage of obtaining fall litters is that the price of pork is generally higher in the spring because the market is not glutted with pork.

MINERAL MIXTURES AND POTASSIUM IODIDE FOR BROOD SOWS

The object of these experiments was to determine the advantage, if any, of giving mineral mixtures and potassium iodide to pregnant sows, noting the effect on the pigs to which they gave birth. These experiments have been conducted for five years; the results obtained are as follows:—

VALUE OF MINERAL MIXTURES AND POTASSIUM IODIDE FOR BROOD SOWS

—		Mineral mixtures	Check	Potassium iodine
Number of sows	No.	9	11	11
Number of pigs born	"	97	125	118
Number of pigs per litter	"	10·8	11·4	10·7
Number of undersized and weak pigs	"	11	19	16
Number of pigs still-born	"	4	42	11
Number of pigs raised	"	82	61	95
Average weight at birth	lb.	2·84	2·36	2·72
Average weight at weaning	lb.	21·5	21·2	25·3
Condition of pigs at weaning	"	2 smaller	3 smaller	4 smaller

This table shows that mineral mixtures and potassium iodide appear to have decreased the percentage of mortality at birth, while the young pigs were thriftier.

It is possible that the individuality of the sows may have influenced the results, but as these results have been consistent from year to year, and as they have been obtained with different sows, it may safely be concluded that sows have benefited from the use of these ingredients.

FEEDING EXPERIMENTS

These tests were conducted in order to find out the benefits derived from the use of different meal mixtures, tankage, swedes and small or unmarketable potatoes for growing and fattening swine.

In these experiments, the value of the meals given during the first fattening period and the second period was not the same; for lot 1, 1·8 cents per pound was charged for the first period and 2 cents for the second period. As regards the other five lots, the prices charged for the meals were 1·6 cents and 1·9 cents per pound during the first and second period respectively. For all lots and during both periods the charges were as follows: clover hay, $7.75 per ton; swedes, $2.77 per ton; tankage, $55 per ton; skim-milk, 20 cents per cwt.; cull potatoes, 30 cents per cwt.

COMMERCIAL MEALS VS. MEALS MIXED ON THE FARM FOR THE PRODUCTION OF BACON

The object of this experiment was to find out if the use of home-grown meals in the growing and finishing of bacon pigs is as profitable as the use of commercial meals.

PLAN OF EXPERIMENT

Lots	Meals consumed	Other feeds
I..... Commercial feeds	For sixty days.....	
	2 parts shorts.....	Skim-milk.
	2 parts middlings.....	Clover hay.
	Next period—	
	1 parts shorts.....	
	2 parts middlings.....	Skim-milk.
	2 parts cornmeal.....	Clover hay.
II..... Home-mixed meals.	First sixty days—	
	2 parts ground oats.....	Skim-milk.
	1 part ground barley.....	Clover hay.
	1 part ground shorts.....	
	Next period—	
	1 part ground oats.....	Skim-milk.
	2 parts shorts.....	Clover hay.
	2 parts barley meal.....	
	2 parts peameal.....	

COMMERCIAL FEEDS VS HOME-GROWN MEALS FOR THE PRODUCTION OF BACON

—		Lot I, commercial feeds	Lot II, home-mixed meals
Pigs in test	No.	8	8
Total initial weight	lb.	283	282
Average initial weight	"	35·4	35·2
Days on test	"	143	143
Total final weight	"	1,624	1,516
Average final weight	"	203	189·5
Total gain	"	1,341	1,234
Average gain per pig	"	167·6	154·3
Average gain per pig per day	"	1·17	1·08
Feed consumed—			
Meal	"	4,698	5,023
Skim-milk	"	1,655	1,655
Hay	"	814	814
Meal consumed per pound gain	"	3·50	4·07
Milk consumed per pound gain	"	1·23	1·34
Total cost of feed	$	98 12	97 70
Cost of feed per pound gain	$	0 073	0 079
Cost of feed per pig per day	$	0 086	0 085

CONCLUSIONS

The pigs receiving commercial meals made an average daily gain of 1·17 pounds per head, compared with 1·08 pounds for those fed on the home-grown meal. Group II consumed 4·07 pounds meal per pound gain while group I consumed only 3·50 pounds, a difference of 0·57 pound or nearly half a pound less. Cost per pound gain: group I, 7·3 cents, group II, 7·9 cents, a margin of 0·6 cent in favour of the lot fed on commercial mixtures.

These pigs were graded by the William Davis graders at Montreal with the following results:—

Group I—6 choice bacon.
2 thick smooth.

Group II—4 choice bacon.
2 thick smooth.
2 heavy.

VALUE OF SWEDES FOR FATTENING PIGS

This experiment was undertaken to ascertain the value of swedes for the production of bacon hogs.

Sixteen pigs were divided into two lots of eight each; the two groups received the same ration, but group II was fed in addition 1½ pounds swedes per head per day during the first period and 2 pounds during the second period.

PLAN OF EXPERIMENT

Lot No.	Meals	Other feed
II	First sixty days—	
	2 parts ground oats	Skim-milk.
	1 part ground barley	Clover hay.
	1 part ground shorts	
	Second period—	
	1 part ground oats	Skim-milk.
	2 parts shorts	Clover hay.
	2 parts ground barley	
	2 parts peameal	
III	First sixty days—	
	2 parts ground oats	Clover hay.
	1 part ground barley	Swedes, 1½ pounds per pig per day.
	1 part shorts	
	Second period—	
	1 part ground oats	Clover hay.
	2 parts shorts	Swedes, 2 pounds per pig per day.
	2 parts ground barley	
	2 parts peameal	Skim-milk.

VALUE OF SWEDES FOR FEEDING PIGS

—		Lot II check	Lot III swedes
Pigs in test	No.	8	8
Total initial weight	lb.	282	284
Average initial weight	"	35·2	35·5
Days on test	days	143	143
Total final weight	lb.	1,516	1,630
Average final weight	"	189·5	203·7
Total gain	"	1,234	1,346
Average gain per pig	"	154·3	168·3
Average gain per pig per day	"	1·08	1·18
Feed consumed—			
Meal	"	5,023	4,902
Skim-milk	"	1,655	1,655
Hay	"	814	814
Roots (swedes)	"	.....	1,505
Meal consumed per pound gain	"	4·07	3·64
Skim-milk consumed per pound gain	"	1·34	1·23
Total cost of feed	$	97 70	97 66
Cost of feed per pound gain	$	0 079	0 073
Cost of feed per pig per day	$	0 085	0 085

DEDUCTIONS

The lot receiving swedes made an average daily gain of 1·18 pounds compared with 1·08 pounds for the check lot; the latter consumed 4·07 pounds meal per pound gain, while lot III, swede-fed, only consumed 3·64 pounds or a difference of 0·43 pound less.

The cost per pound gain was 7·9 cents for the check lot and 7·3 cents for lot III (swede-fed), or a margin of 0·6 cents in favour of the latter.

The live hogs graded as follows:—

Lot II—4 choice bacon.
2 thick smooth.
2 heavy.
Lot III—7 choice bacon.
1 smooth.

VALUE OF TANKAGE FOR GROWING AND FATTENING PIGS

This experiment was undertaken to ascertain the value of tankage for fattening hogs. In this experiment, the tankage was fed at the rate of 6 per cent of the ration during the first period and 3 per cent from then on until the pigs are ready for market.

PLAN OF EXPERIMENT

Lot No.	Meals	Other feed
II	First sixty days—	
	2 parts ground oats	Skim-milk.
	1 part ground barley	Clover hay.
	1 part shorts	
	Second period—	
	1 part ground oats	Skim-milk.
	2 parts shorts	Clover hay.
	2 parts ground barley	
	2 parts peameal	
IV	First sixty days—	
	2 parts ground oats	Skim-milk.
	2 parts ground barley	Clover hay.
	1 part shorts	Tankage 6 per cent.
	Second period—	
	1 part ground oats	Skim-milk.
	2 parts shorts	Clover hay.
	2 parts ground barley	Tankage 3 per cent.
	2 parts peameal	

VALUE OF TANKAGE FOR GROWING AND FATTENING PIGS

—		Lot II check	Lot IV tankage
Pigs in test	No.	8	8
Total initial weight	lb.	282	280
Average initial weight	"	35·2	35·0
Days on test	days	143	143
Total final weight	lb.	1,516	1,683
Average final weight	"	189·5	210·3
Total gain	"	123·4	140·3
Average gain per pig	"	154·3	175·4
Average gain per pig per day	"	1·08	1·22
Feed consumed—			
Meal	"	5,023	4,656
Skim-milk	"	1,655	1,655
Hay	"	814	757
Tankage	"	.....	138
Meal consumed per pound gain	"	4 07	3·32
Skim-milk consumed per pound gain	"	1·34	1·18
Total cost of feed	$	97 70	94 91
Cost of feed per pound gain	$	0 079	0 068
Cost of feed per pig per day	$	0 085	0 083

DEDUCTIONS

The pigs receiving tankage made an average daily gain of 1·22 pounds, compared with 1·08 pounds for the check lot. The meal consumed per pound gain amounted to 3·32 pounds for lot IV, compared with 4·07 pounds for lot II, or 0·75 pounds less. The cost per pound gain was 6·8 cents for the tankage-fed lot and 7·9 cents for the check lot, a margin of 1·1 cents in favour of tankage.

Both groups graded the same: 4 choice bacon, 2 thick smooth, 2 heavy.

VALUE OF CULL AND UNMARKETABLE POTATOES FOR FATTENING PIGS

The object of this experiment was to determine the value of small unmarketable potatoes in the feeding of pigs and to see whether good bacon hogs can be produced on this feed.

Thirty-two pigs were divided into two lots of sixteen each. Another lot of eight pigs received also the same feed, but without the potatoes, so as to permit a better comparison of the value of the latter.

PLAN OF THE EXPERIMENT

Lot No.	Meals	Other feed
II	First sixty days—	
	2 parts ground oats	Skim-milk.
	1 part ground barley	Clover hay.
	1 part shorts	
	Second period—	
	1 part ground oats	Skim-milk.
	2 parts shorts	Clover hay.
	2 parts ground barley	
	2 parts peameal	
V	Same as No. II	Potatoes (4 pounds per pound meal). Skim-milk.
VI	First sixty days—	
	2 parts ground oats	Potatoes: 2 pounds per pound meal. Skim-milk. Clover hay.
	1 part ground barley	
	1 part shorts	
	Second period—	
	1 part oats	
	2 parts shorts	
	2 parts barley	
	2 parts peas	

VALUE OF UNMARKETABLE POTATOES FOR FATTENING PIGS

—		Lot II, check	Lot V, potatoes, 4 pounds per pound meal	Lot VI, potatoes, 2 pounds per pound meal
Pigs in test	No.	8	16	16
Total initial weight	lb.	282	578	575
Average initial weight	"	35·2	36	36
Days on test	days	143	125	125
Total final weight	lb.	1,516	2,649	2,721
Average final weight	"	189·5	166	170
Total gain	"	1,234	2,071	2,146
Average gain per pig	"	154·3	129·4	134·1
Average gain per pig per day	"	1·08	1·04	1·07
Feed consumed—				
Meal	lb.	5,023	4,814	5,540
Skim-milk	"	1,655	1,585	1,618
Hay	"	814	1,232	1,230
Potatoes	"	.....	13,809	8,735
Meal consumed per pound gain	"	4·07	2·32	2·58
Skim-milk consumed per pound gain	"	1·34	0·77	0·75
Potatoes consumed per pound gain	"	.....	6·67	4·07
Total cost of feed	$	97 70	134 19	132 15
Cost of feed per pound gain	$	0 079	0 0648	0 062
Cost of feed per pig per day	$	0 085	0 067	0 066

DEDUCTIONS

As may be seen in the above table, the average daily gain per pig varies little between the various lots; lot II has made a daily gain of 1·08 pounds, lot V 1·04 pounds and lot VI 1·07 pounds, a difference of only 0·04 pound between lots II and V.

The amount of meal consumed per pound gain shows more variation; lot II needed 4·07 pounds meal to produce one pound gain while lots V and VI only consumed 2·32 and 2·58 pounds respectively.

The cost of feed per pound gain is lower for the two lots receiving potatoes; this cost was 7·9 cents for lot II, 6·5 cents for lot V and 6·2 cents for lot VI. The two lots receiving potatoes in addition to their ration show little difference; on the other hand, there is a difference of 1·7 cents when compared with lot II.

This last experiment, as well as the preceding ones, has not been carried on long enough to allow for more definite and more reliable conclusions; these experiments will be continued next year and perhaps longer in order that the information secured may be reliable.

ADVANCED REGISTRATION FOR SWINE

The object of advanced registration for swine is the same as for dairy cattle, i.e., to increase the value of pedigrees by registering the productiveness as well as the purity of the breed.

This system of control and registration is only in its experimental stage; its practicability and usefulness are under test.

Five sows comprising part of our herd were used for this experiment. The quantity of feed given and the weight of the sows were carefully noted in each case; the results are given in the following table:—

ADVANCED REGISTRATION OF SWINE

—		Ste. Anne Blanche 18 —119913— M.C. 19	Ste. Anne Alerte 5 —108065— M.B. 19	Ste. Anne Blanche 45 —131710— M.F. 19	Ste. Anne Alerte 13 —126802— M.D. 19	Ste. Anne Blanche 48 —133432— M.G. 19
Pigs in the test	No.	5	5	5	3	5
Total initial weight	lb.	140	132	124	74	128
Average initial weight	"	28	26	25	24	26
Days on test	days	188	192	185	170	171
Total final weight	lb.	1,140	1,151	1,056	591	1,056
Average final weight	"	228	230	211	197	211
Total gain per period	"	1,000	1,019	932	517	928
Average gain per pig	"	200	204	186	172	186
Average gain per pig per day	"	1·06	1·06	1·00	1·00	1·09
Total meal consumed per lot	"	2,886	3,089	2,942	1,848	2,873
Skim-milk consumed	"	1,446	1,785	1,444	519	1,363
Hay consumed	"	84	109	84	.....	.....
Green fodder consumed	"	278	250	278	120	182
Roots consumed	"	.....	.....	.....	630	954
Meal consumed per pound gain	"	2·89	3·03	3·16	3·57	3·10
Milk consumed per pound gain	"	1·45	1·75	1·55	1·00	1·47
Total cost of feed	$	68 77	74 10	69 45	43 89	69 31
Average cost of feed per pig per day	$	0 073	0 077	0 075	0 086	0 081
Average cost of feed per pound gain	$	0 069	0 073	0 075	0 085	0 075

DEDUCTIONS

—	Average daily gain per pig	Meal consumed per pound gain	Cost per pound gain
	lb.	lb.	$
Ste. Anne Blanche 18—119913—M.C. 19	1·06	2·89	0 069
Ste. Anne Alerte 5—108065—M.B. 19	1·06	3·03	0 073
Ste. Anne Blanche 45—131700—M.F. 19	1·00	3·16	0 075
Ste. Anne Alerte 13—126802—M.D. 19	1·00	3·57	0 085
Ste. Anne Blanche 48—133432—M.G. 19	1·09	3·10	0 075

LIST OF PROJECTS UNDERTAKEN FOR THE ANIMAL HUSBANDRY DIVISION—SWINE

A 513—Breeding Yorkshire swine.
A 158—Feed cost of brood sows.
A 160—Feed cost of pigs up to weaning.
A 163—Cost of pork production.
A 423—One litter vs. two litters per year.
A 114—Mineral mixtures for brood sows.
A 476—Value of potassium iodide for brood sows.
A 165—Value of unmarketable potatoes for hogs.
A 382—Value of tankage for feeding hogs.
A 638—Value of turnips for feeding hogs.
A 639—Commercial feeds vs. home-mixed meal for bacon production.
A 679—Advanced registry policy for pure-bred swine.

SHEEP

LEICESTERS—BREEDING AND REARING

Our herd of Leicesters continues to grow and good results are being obtained. At the beginning of the year, the flock included 38 head, 36 of which were ewes and ewe-lambs and 2 imported rams.

During the spring, 28 ewes and ewe-lambs gave birth to 46 lambs, 34 of which were raised; 19 of the latter were sold for breeding purposes, 4 were slaughtered for the market and 11 were kept in the herd and used for breeding. Seven ewes ranging in age from one to five years were also sold for breeding. Fifty ram-lambs of high quality have been sold to Farmers Clubs and farmers of the district for breeding purposes since 1922.

The spring crop of wool amounted to 319 pounds, or 8·4 pounds per sheep. The heaviest fleeces weighed 10½ pounds and were shorn from the imported ram "Morning Glory"—19248—and the 4-year old ewe "22178." All the wool was graded and sold through the Canadian Co-operative Wool Growers' Association of Lennoxville. Thirty-five fleeces were graded medium combing and three common and glossy. The average price received for the wool was 23½ cents per pound.

COST OF MAINTAINING FLOCK

Number of sheep wintered		38
Feed consumed—		
20,400 pounds hay at $7.75	$	79 05
8,000 " turnips at $3.00		12 00
3,665 " oats at 2c		73 30
3,544 " bran at $34		60 25
5 months pasture at 20 cents per head per month		38 00
Total cost of feed		262 60
Cost per sheep		6 91

The average cost of feed per sheep over an eight-year period is as follows:—

1929	38 sheep	$	6 91
1928	37 sheep		7 00
1927	57 sheep		6 27
1926	42 sheep		6 38
1925	51 sheep		4 89
1924	55 sheep		5 73
1923	51 sheep		6 99
1922	51 sheep		6 61
Average cost for eight years		$	6 35

It will be noted that the feed cost is rather high on this station; this is due to the poor condition of the pastures available, which compelled us to keep the sheep in the barn until late in the spring each year and to bring them in early in the fall. It was also necessary to feed them very well during the winter months in order to enable them to put on a little flesh. On the other hand, the sheep sent here in 1921 lacked quality and were much too light for the breed; the ewes weighed, on an average, 98 pounds and the ewe-lambs 73·8 pounds. The following year, we started to improve this herd by the introduction of a pure-bred ram and the use of a more rational and liberal method of feeding. This practice and a judicious selection of the lambs every year yielded good results; this fall, the ewes averaged 170 pounds in weight and the ewe-lambs 98·4 pounds.

A few years ago, a beginning was made in the improvement of the sheep pasture, so as to render the sheep more productive. It is hoped that a clover pasture will be available in a few years' time, which will certainly help to keep the sheep in better condition during the summer and therefore decrease the consumption of hay and grain during the winter

COST OF MAINTAINING LAMBS

These tests were undertaken to determine the feed cost of ram and ewe-lambs, raised for breeding purposes and for the market. As these lambs are generally sold in November, their cost of production has been figured up to this month.

The average cost over a four-year period is as follows:—

Number of ewes	59	
Number of lambs	90	
Average number of lambs per ewe	1·5	
Average weight at birth	8·2	pounds
Average weight on Nov. 1	91·2	"
Feed cost of lambs, less value of fleece	$ 275 08	
Pasture, 90 head, 3 months, at 20 cents per head per month	54 00	
Total cost	329 08	
Cost per head	3 68	

EWE-LAMBS BRED AT THE AGE OF ONE YEAR *vs.* EWE-LAMBS BRED AT THE AGE OF TWO YEARS

The object of this experiment is to determine whether ewe-lambs may be bred at the age of one year without loss in quality, growth or weight of the ewes when they reach maturity.

This test was undertaken some years ago and no definite results have yet been obtained. Up to date, the few ewes which were bred gave birth to their lambs very late in the spring, and as a result the males could not be sold in the fall on account of their lack of size. The females were kept in the herd. This experiment has not been under way long enough to allow us to draw any conclusions.

EARLY *vs.* LATE LAMBING IN THE SPRING

In this experiment, the lambs born from March 1 to March 20 were grouped into one lot, and those born from April 20 to May 10 in a second lot. They compare as follows:—

—		Lot I, March 1 to March 20	Lot II, April 20 to May 10
Number of ewes		10	10
Number of lambs born		18	17
Average number per ewe		1·8	1·7
Average weight at birth	lb.	10·8	10·2
Average weight at 7 months	"	82	77·9

The results obtained favour the early born lot, although the difference was very slight. This test will be continued in order to obtain more conclusive data.

LIST OF EXPERIMENTS CARRIED ON FOR THE ANIMAL HUSBANDRY DIVISION—SHEEP

A. 510—Breeding of Leicesters.
A. 328—Ewe-lambs vs. yearling ewes for breeding purposes.
A. 311—Maintenance cost of breeding ewes.
A. 316—Cost of rearing ewe-lambs to breeding age.
A. 338—Cost of rearing market lambs.
A. 408—Early spring lambing *vs.* late spring lambing.
A. 596—Cost of rearing ram lambs for breeding purposes.

HORSES

On December 31, 1929, the number of pure-bred Percherons on this station was as follows:—ten registered mares, one-two-year old filly, three yearling fillies and one imported stallion, "Chacal"—12951-165195—whose services were offered to draught horse breeders of the locality at a nominal price; two splendid fillies were sired by this stallion in 1929.

As in the past, a group of Percherons were exhibited with success at the Quebec Exhibition and at the Special Horse Show at Ste. Anne de la Pocatière. Championships for males and females were won at both places.

The different experiments on rearing, feeding, wintering and the cost of horse labour were continued; for more detailed information on these tests, the reader is referred to the report for 1928.

In the fall, two select mares were shipped to the Fredericton Experimental Station, to establish a stud of Percherons there.

LIST OF PROJECTS UNDERTAKEN FOR THE ANIMAL HUSBANDRY DIVISION—HORSES

A. 531—Breeding of Percherons.
A. 294—Cost of rearing colts.
A. 331—Maintenance cost of draught horses.
A. 409—Wintering horses in the barn *vs.* in the open.
A. 547—Economy of rearing fall and spring foals.
A. 293—Cost of horse labour.

FIELD HUSBANDRY

The spring of 1929 was of rather long duration and cold. The first grain was sown on drained land on May 13. From then on, the weather was favourable for seeding which was completed towards the middle of June. There was abundant rainfall during the latter part of June and the first two weeks in July, to such an extent that cereals and hoed crops were badly damaged, especially those crops sown on low land. The rest of the summer, however, was very favourable to growth, and most of the crops gave a yield equal to the average for the preceding years.

The hay crop was 12 per cent higher than the average and was in very good condition. The cereals and hoed crops, with the exception of corn, the yield of which was very poor, gave average returns.

The field husbandry experiments under way are as follows:—cost of production of crops, rotations, cultural operations and the use of chemical fertilizers.

LIST OF EXPERIMENTS FOR THE FIELD HUSBANDRY DIVISION

F. 305—Meteorological observations.
F. 91—Cost of production of farm crops.
F. 88—Yields of root and silage crops and profits.
F. 86—Yields of different grain crops and profits.
F. 7—Three-year rotation—sunflowers, corn, wheat and clover.
F. 16—Four-year rotation—corn, sunflowers and roots, wheat, clover and timothy.
F. 24—Four-year rotation—corn and sunflowers, oats, clover and alfalfa, pasture.
F. 30—Five-year rotation—roots, wheat, clover, timothy and O.P.V.
F. 72—Drained *vs.* undrained land.
F. 67—Renovation of pastures.
F. 79—Manure and chemical fertilizers *vs.* no manure.
F. 81—Chemical fertilizers and manure for the production of hay.
Chemical fertilizers and manure for production of potatoes.

METEOROLOGICAL OBSERVATIONS

Month	Average temperature	Date of last spring frost and of first autumn frost	Sunshine	Rainfall
	°F		Hrs.	in.
April	34·3	.....	134	1·12
May	48·3	22	159	3·29
June	55·9	.....	157	3·19
July	63·6	.....	242	5·08
August	60·8	.....	198	3·11
September	52·9	19	165	2·45
October	41·8	.....	74	3·61

As shown in the above table, the weather remained rather cold until June; the last spring frost took place on May 22. There was an excess of rain during the latter part of June and especially during the first part of July. The weather was fairly warm until September 19, when the first autumn frost was recorded.

MANURE APPLIED TO ROTATIONS

Rotation	Crop year	Quantity of manure applied per acre	Percentage of value of the manure for each crop
			%
Three years	1st year...	12 tons...	50
	2nd year...		30
	3rd year...		20
Four years	1st year...	16 tons...	40
	2nd year...		30
	3rd year...		20
	4th year...		10
Five years	1st year...	20 tons...	40
	2nd year...		25
	3rd year...		20
	4th yeary..		10
	5th year...		5

PERCENTAGE OF VALUE OF THE CHEMICAL FERTILIZERS FOR EACH CROP

First crop—55 per cent of cost.
Second crop—30 per cent of cost.
Third crop—10 per cent of cost.
Fourth crop—5 per cent of cost.

DISTRIBUTION OF THE COST OF CLOVER AND GRASS SEED

The cost of red clover seed is charged to the first crop of hay, while the cost of the other seed is evenly distributed between the other hay and the years of pasture.

FIXED CHARGES IN PRODUCING FARM CROPS

Rent of land (including taxes), $6.25 per acre.

Manure, $1.50 per ton (including 50 cents for the cost of applying).

Ensiling, $1.50 per ton (including hauling, machinery, gas, man labour).

Threshing: Oats, 4 cents per bushel; barley, wheat, and peas, 8·8 cents (for use of machinery and operator's time).

Use of machinery, $2.85 per acre.

Labour, labourer and teamster, 26 and 27 cents per hour.

Horse labour, 10 cents per hour.

Twine, 14½ cents per pound.

Seed:—

Oats	$1 50 per bushel.
Wheat	$2 60 per bushel.
Barley	$2 00 per bushel.
Peas	$3 50 per bushel.
O.P.V.	$1 83 per bushel.
Corn	$3 60 per bushel.
Sunflowers	12 cents per pound
Swedes	60 cents per pound.
Beets	50 cents per pound.
Red clover	35 cents per pound.
Alsike	31 cents per pound.
Alfalfa	42 cents per pound.
Timothy	9½ cents per pound.

COST OF PRODUCING CROPS

COST OF PRODUCING INTERTILLED CROPS PER ACRE

Details	Corn	Sunflowers	Sunflowers and corn	Swedes	Beets
	$	$	$	$	$
Rent and taxes	6 25	6 25	6 25	6 25	6 25
Share of cost of maure	9 40	9 40	9 60	10 93	11 20
Seed	1 90	1 44	1 53	1 20	2 00
Manual labour	9 96	9 96	9 56	36 18	39 93
Horse labour	5 26	5 26	5 28	6 61	6 96
Ensiling	9 09	16 38	15 54	.....	.....
Machinery	2 85	2 85	2 85	2 85	2 85
Twine	0 27	0 54	0 49	.....	.....
Cost per acre	44 98	52 08	51 10	64 02	69 19
Yield per acre	tons lb. 8 1,320	tons lb. 15 1,200	tons lb. 14 1,600	tons lb. 19 600	tons lb. 24 200
Cost per ton	$ 5 19	$ 3 34	$ 3 45	$ 3 32	$ 2 87

The above table shows that corn containing 14·87 per cent dry matter cost $5.19 per ton; sunflowers containing 14·34 per cent dry matter, $3.34 per ton; mixture of sunflowers and corn containing 16·29 per cent dry matter, $3.45 per ton; swedes, $3.32 per ton; beets, $2.87 per ton. Special attention should be paid to the high cost of producing corn in this locality, which is higher than that of any of the other succulent crops grown. This is due to the low yield per acre on account of the growing season, which is cool and generally short.

COST OF PRODUCING GRAIN

Details	Oats	Wheat	Barley	Peas
	$	$	$	$
Rent and taxes	6 25	6 25	6 25	6 25
Share of cost of manure	7 20	6 30	7 20	9 21
Seed	5 55	4 51	4 50	10 06
Manual labour	7 41	7 41	7 41	11 11
Horse labour	3 86	3 86	3 86	3 14
Threshing	2 85	2 84	3 36	2 61
Machinery	2 85	2 85	2 85	2 85
Twine	0 52	0 42	0 49	.....
Total cost per acre	36 49	34 44	35 92	45 23
Cost of straw per acre	4 11	2 10	2 07	.....
Cost of producing grain per acre	32 38	32 34	33 85	.....
	bush. lb.	bush. lb.	bush. lb.	bush. lb.
Yield of grain per acre	71 10	35 54	42 —	32 36
Cost per bushel $	0 46	0 90	0 81	1 39

As shown in this table, oats yielded at the rate of 71·3 bushels per acre, costing 45 cents per bushel; wheat, 35·9 bushels, costing 90 cents; barley, 42 bushels, costing 81 cents; and peas, 32·6 bushels, costing $1.39 per bushel.

Registered seed of high quality was used for these crops; they were sown on well-drained clay land, in the second year of the rotation, following a hoed crop which had been manured at the rate of 16 tons per acre.

COST OF PRODUCING HAY

Details	Clover	Alfalfa and clover	Timothy	Oat and pea hay
	$ cts.	$ cts.	$ cts.	$ cts.
Rent and taxes	6 25	6 25	6 25	6 25
Share of cost of manure	5 20	4 80	2 60	9 60
Seed	2 80	3 36	1 57	7 31
Manual labour	4 13	6 89	4 14	9 25
Horse labour	0 85	1 47	0 85	4 33
Machinery	2 85	2 85	2 85	2 85
Cost per acre	22 08	25 62	18 26	39 59
	tons lb.	tons lb.	tons lb.	tons lb.
Yield per acre	2 1,780	4 1,200	2 1,780	3 1,000
Cost per ton $	7 64	5 57	6 32	11 31

The hay crops gave very good desults; the following yields were obtained: clover 2 tons 1,780 pounds; mixture of clover and alfalfa, 4 tons 1,200 pounds; timothy, 2 tons 1,780 pounds; mixture of peas and oats, 3 tons 1,000 pounds. By comparing these yields, one can readily see that the growing of clover or of a mixture of clover and alfalfa is as profitable as the growing of timothy. It is also well known that leguminous hay is much more valuable than timothy hay. However, if a farmer wishes to produce mostly clover hay, he must follow a rotation not longer than five years.

The outstanding fact in the above table is the high yield and the low cost of production of the mixture of alfalfa and clover. Two cuts were made; the first gave 2 tons 1,200 pounds and the second, 2 tons. There is another factor to be considered here: not only does alfalfa yield highly, but it contains also a large proportion of protein, a fact indicating that this crop supplies the best

hay for milch cows. By adding five or six pounds per acre of alfalfa to the regular hay mixture, farmers would be able to improve their hay crops, provided the land is well drained and not lacking in lime; this practice is followed on this Station.

Generally, the majority of dairy farms hardly ever have sufficient clover or alfalfa hay; mixed peas and oats is a valuable substitute, even at the cost of $11 per ton. This hay has a high protein content and is succulent when cut before it becomes over-ripe. Besides being used as hay, this mixture may also be utilized as a complement to pasture during part of the summer; it may also be made into silage or cut for grain when there is a sufficient quantity of hay available.

CROPS—COST OF PRODUCTION PER ACRE—SIX YEAR AVERAGE

Crops	Average yield, 6 year	Average cost per ton or bushel, 6 years
	tons lb.	$
Hoed crops		
Corn	11 1,720	4 46
Sunflowers	15 1,800	3 42
Sunflowers and corn	13 1,380	3 97
Swedes	19 300	3 10
Grain crops	bush. lb.	
Oats	75 24	0 39
Wheat	30 54	1 03
*Barley	38 19	0 87
*Peas	47 36	1 21
Hay crops	tons lb.	
Clover	3 197	8 12
Clover and alfalfa	3 1,017	7 17
Timothy	2 1,197	7 94
Oats and peas	3 533	10 36

*Five year average.

YIELD PER ACRE AND COST OF DRY MATTER PER 100 POUNDS OF THE FOLLOWING CROPS

Crops	Yield, 1929	Dry matter percentage	Dry matter per acre		Cost per 100 pounds of dry matter	
			1929	Average 6 years	1929	Average 6 years
Hoed crops	tons lb.	%	lb.	lb.	$ cts.	$ cts.
Corn	8 1,320	14·87	2,575	3,470	1 75	1 51
Sunflowers	15 1,200	14·34	4,474	4,478	1 16	1 24
Sunflowers and corn	14 1,600	16·29	4,822	3,725	1 06	1 40
Swedes	19 600	10·25	3,957	3,905	1 62	1 60
Beets	24 200	13·54	6 526	.....	1 06	.....
Grain crops	bush. lb.					
Oats	71 710	90·8	2,201	2,345	1 47	1 30
**Barley	42 —	90·7	1,829	1,675	1 85	1 85
**Peas	32 36	90·8	1,776	2,608	2 56	1 62
Wheat	35 54	88·9	1,915	1,658	1 69	1 95
Hay crops	tons lb.					
Green fodder hay	3 1,000	83·4	5,838	5,585	0 68	0 62
Clover	2 1,780	87·1	5,034	5,397	0 44	0 47
Clover and alfalfa	4 1,200	90·8	8,354	6,371	0 31	0 39
Timothy	2 1,780	88·4	5,110	4,590	0 36	0 46

*2 crops. **Five-year average.

The average yield and cost of the various farm crops over a six-year period are given in the two preceding tables; these figures, taken during good and poor crop years, give a very good indication of the relative economical value and suitability of crops in this district.

It will be noted that the average yield of corn, over a six-year period, is only 11 tons 1,720 pounds per acre, containing 14·87 per cent dry matter and costing $4.46 per ton; according to the experiments conducted on this Station, the sole reason for this poor yield is the prevailing climatic conditions. The growing season is short and corn does not reach an advanced stage of maturity, even when the earliest varieties are planted. When sown alone, this crops does not seem to be profitable here; however, a mixture of corn and sunflowers, for mixed silage, gives very satisfactory yields at reasonable cost. A five-year feeding experiment on this Station shows that this mixed silage can be compared to roots as regards the economical production of milk (see our report for 1927, page 9). Experience has already shown that roots fed as a substitute for meal have shown a net average profit of $2.97 per ton consumed, for swedes, and $3.39 for beets. Corn and sunflowers silage and roots are two equally profitable crops; not only can they be used to replace a large proportion of the meal, but they also supply the watery or succulent part of the ration. However, this silage is only recommended for farms of large acreage and specializing in dairy farming; for the ordinary farm of the district, where the number of cattle is rather limited, roots will be found more economical.

Sunflowers alone produce a higher yield and supply dry matter far cheaper than a mixture of sunflowers and corn; however, their silage is not as well liked by cattle.

It will be noted, when studying the yields and cost price of the other crops which have been mentioned, that all of them are suitable for this section of the country and that the yields obtained are far superior to the average. This is due to the use of good methods of cultivation, such as crop rotations, judicious cultivation, the use of good seed and of a suitable amount of manure or chemical fertilizers. On the other hand, one should bear in mind that the cost of a bushel of grain, of a ton of hay or of root or silage, depends largely upon the yield obtained. In fact most of the fixed charges which constitute the cost of production of a crop—rent of land, cost of manure, seed, and use of machinery—are always the same, regardless of the yield. In farming, as in other activities, the main object is to try and reduce the cost of production by increasing the production per unit.

CROP ROTATIONS

Three, four, and five-year rotations have been on trial for the last few years, in order to find out which is the most profitable for the ordinary farm of the district.

The yields and cost of production of the crops in each rotation are given in the following tables:—

THREE-YEAR ROTATION

First year—Corn and sunflowers.

Second year—Wheat.

Third year—Clover hay.

YIELDS AND COST OF PRODUCTION

Crops	Yield per acre in 1929	Cost per acre in 1929	Cost per ton or bushel in 1929	Average yield per acre, for 7 years	Average cost per ton or per bushel for 6 years
		$ cts.	$ cts.		$ cts.
Corn	10 tons 200 pounds	48 01	4 75	12 tons 200 pounds	4 71
Sunflowers	20 tons 800 pounds	59 42	2 91	16 tons 1,520 pounds	3 37
Wheat	39 bush. 54 pounds	34 09	0 80	31 bush. 54 pounds	1 00
Clover	2 tons 1,960 pounds	23 77	8 00	2 tons 1,040 pounds	8 98

The outstanding fact in the above table is the difference of 50 per cent between the yields of sunflowers and corn for 1929.

This rotation is too short for ordinary farming on clay land; it is only recommended for intensive farming, on very light soil, or for a part of the farm which cannot be included in the regular rotation.

FOUR-YEAR ROTATION—UNDRAINED LAND

First year—Swedes, corn and sunflowers.
Second year—Wheat.
Third year—Clover hay.
Fourth year—Timothy hay.

YIELDS AND COST OF PRODUCTION

Crops	Yield per acre in 1929	Cost per acre in 1929	Cost per ton or bushel in 1929	Average yield per acre for 6 years	Average cost per ton or per bushel for 6 years
	tons lb.	$	$	tons lb.	$
Swedes	13 1,000	55 99	4 36	13 840	4 28
Corn	7 1,160	43 37	5 72	8 280	5 79
Sunflowers	13 100	48 77	3 74	13 1,760	3 79
	bush.			bush.	
Wheat	19 36	34 42	1 64	22 42	1 47
	tons			tons	
Clover	2 1,320	21 37	8 03	2 280	8 64
Timothy	2 1,720	18 02	6 30	2 830	7 81

FOUR-YEAR ROTATION—DRAINED LAND

Same rotation as preceding one on undrained land

YIELDS AND COST OF PRODUCTION

Crops	Yield per acre in 1929	Cost per acre in 1929	Cost per ton or bushel in 1929	Average yield per acre, for 6 years	Average cost per ton or per bushel for 6 years
	tons lb.	$	$	tons lb.	$
Swedes	13 800	58 99	4 40	15 1,300	3 66
Corn	8 600	44 14	5 32	10 840	4 75
Sunflowers	13 400	48 94	3 71	14 40	3 36
	bush.			bush.	
Wheat	30 36	34 72	1 07	31 30	1 09
	tons			tons	
Clover	2 1,440	21 46	7 89	2 1,160	8 59
Timothy	2 1,780	18 05	6 23	2 740	7 40

This four-year rotation does not provide any pasture, and it should only be followed on dairy farms having sufficient permanent pastures; it insures an abundant supply of fodder for winter feeding.

FOUR-YEAR ROTATION (27 ACRES) PART DRAINED AND PART UNDRAINED

1st year—Mixture of corn and sunflowers and peas and oats hay.
2nd year—Oats.
3rd year—Mixture of alfalfa and clover.
4th year—Pasture.

YIELDS AND COST OF PRODUCTION

Crops	Yield per acre in 1929		Cost per acre in 1929	Cost per ton or bushel in 1929	Average yield per acre, for 6 years		Average cost per ton or per bushel for 6 years
	tons	lb.	$	$	tons	lb.	$
Corn and sunflowers	14	1,600	51 10	3 45	13	1,400	3 66
Oats and pea hay	3	1,000	39 59	11 31	.....		.....
	bush.				bush.		
Oats	71	10	36 49	0 46	76	6	0 39
	tons				tons		
Alfalfa and clover hay(1)	4	1,200	25 62	5 56	3	1,260	7 04
Alfalfa and clover hay and pasture(2)	2	1,400	19 56	7 25	.....		.....

(1) Cuttings.
(2) The equivalent of the pasture for one cow during three months.

The object of this experiment was to determine the advantages of a short rotation with the fourth year in pasture, on farms where no permanent pastures are available. This rotation covers a total area of 27 acres, or 6·75 acres per field. The first year is taken up by hoed crops of different nature, according to the farmer's needs. For instance, this year there were five acres in sunflowers and corn and the rest in green fodder, part of which was used green and the remainder dried for hay. The second-year crop was oats seeded down at the rate of 10 pounds of timothy, 6 pounds of red clover, 2 pounds of alsike clover, 6 pounds of alfalfa and 1 pound of white clover per acre. The third year crop is alfalfa and clover hay, which is harvested in two cuttings, yielding over two tons per cutting. The fourth year, a cut of alfalfa and timothy is taken and the second growth is left in pasture. Thus, in 1929, the first cut gave 2 tons 1,400 pounds of hay per acre and the second growth made an excellent pasture for twenty cows for one month.

In 1929, the twenty-six acres included in this rotation gave a total yield of 74 tons of silage, 6 tons 240 pounds of oats and peas hay, 481 bushels of oats and 49 tons of hay, not including the pasture for 20 cows for one month. These twenty-six acres yielded as much fodder and grain as would be obtained on the average farm of 75 to 100 acres. At the usual market valuation, these crops would bring a total amount of $1,218.17 at a cost of $872.04, leaving a net profit of $346.13.

No special means, other than those that can be used by the average farmer, were employed to secure these high yields; no lime or chemical fertilizer were applied; only an application of manure is made at the rate of 16 tons per acre on the hoed crops, for the whole period of the rotation. The results may be explained by the following: crops in proper sequence, good surface and under draining, the physical and chemical improvement of the soil through the growing of alfalfa, the influence of hoed crops on the following crops, the use of good seed and inoculation of alfalfa seed.

This four-year rotation, as practised on this Station, may be put forward as an example of what might be done on a larger scale on many farms of this district.

FIVE-YEAR ROTATION—UNDRAINED LAND

1st year—Swedes.
2nd year—Wheat
3rd year—Clover.
4th year—Timothy.
5th year—O.P.V. hay.

YIELDS AND COST OF PRODUCTION

Crops	Yield per acre in 1929		Cost per acre in 1929	Cost per ton or bushel in 1929	Average yield per acre, for 6 years		Average cost per ton or per bushel for 6 years
	tons	lb.	$	$	tons	lb.	$
Swedes	16	400	63 52	3 94	14	400	4 11
	bush.				bush.		
Wheat	24	48	35 22	1 52	21	18	1 48
	tons				tons		
Clover	3	300	23 24	7 38	2	900	8 92
Timothy	2	1,900	18 74	6 35	2	1,180	9 11
Oats and pea hay	4	360	32 23	7 71	3	640	9 76

The main advantage of this rotation is that it includes swedes and a mixture of peas and oats as a substitute for silage crops. If necessary the mixture of peas and oats can be used as a supplement to pasture during the summer months, or made into hay, or again left to ripen and cut as grain. If there is no permanent pasture, the second year in hay can be used as a pasture.

INFLUENCE OF DIFFERENT HOED CROPS ON SUBSEQUENT CROPS

Hoed crop, first year of rotation	Yield per acre of succeeding crops 6 year average					
	Wheat		Clover		Timothy	
	bush.	lb.	tons	lb.	tons	lb.
Sunflowers	25	25	2	1,940	2	1,120
Corn	27	12	2	1,920	2	1,360
Swedes	25	24	2	1,800	2	1,200

The above table shows that sunflowers, corn and swedes, grown at the first crop of the rotation, have practically the same influence on the following crops; which is shown by an improvement in tilth and the destruction of weeds.

CULTURAL OPERATIONS

DRAINAGE EXPERIMENT

This experiment was undertaken to ascertain the difference in yield resulting from drainage; two four-year rotations, one on drained land and the other on undrained land, both including the same sequence of crops were put into operation eight years ago.

The average yield over eight years and the average cost of production over six years of each crop are shown in the following table:—

FOUR YEAR ROTATION—DRAINED VS UNDRAINED LAND

Crops	Drained land		Undrained land	
	Average yield per acre, for 8 years	Average cost per ton or per bushel for 6 year	Average yield per acre for 8 years	Average cost per ton or per bushel for 6 years
	tons lb	$	tons lb.	$
Swedes	15 1,300	3 66	13 840	4 28
Corn	10 840	4 75	8 280	5 79
Sunflowers	14 40	3 36	13 1,760	3 79
Wheat	31 bush. 30	1 09	22 bush. 42	1 47
	tons		tons	
Clover	2 1,160	8 59	2 280	8 64
Timothy	2 740	7 40	2 320	7 81

With the exception of hay crops, it will be noted that, over an eight-year period, underdrainage on this heavy clay land has greatly increased the yield and reduced the cost of production. In consulting these results, one should always bear in mind that this land suffers from an excess of moisture and that surface drainage cannot be done satisfactorily by means of open ditches.

RENOVATION OF PASTURES

In 1927, an experiment was started to find the most suitable and profitable means of renovating an old permanent pasture.

The field used in this experiment was first of all divided into three parts, one of which was ploughed, one disked and one kept as a check. Each of these parts was again divided in three sections; one of these sections was seeded down in March or at the beginning of April, the other in June and the last one in September. A part of each section was fertilized and a part left unfertilized.

The grass mixture was as follows:—

Timothy	4 pounds
White clover	2 pounds
Alsike clover	2 pounds
Red top	3 pounds
Sweet clover	5 pounds
Orchard grass	5 pounds
Canada blue grass	3 pounds
Tall oat grass	5 pounds

The hay yields for two years, as given in the following table, show the relative value of the different methods under test.

RENOVATION OF PASTURE

Date of seeding	Treatment	Average yield of hay per acre for 2 years		
		Check	Ploughed	Disked
		lb.	lb.	lb.
March or beginning of April	1 ton lime, 600 pounds Thomas phosphate	750	1,862	1,450
	Check	287	1,100	600
June	1 ton lime, 600 pounds Thomas phosphate	650	1,700	950
	Check	562	1,540	737
September	1 ton lime, 600 pounds Thomas phosphate	1,575	2,725	2,287
	Check	312	800	475
	Averages	689	1,621	1,083

The ploughed and fertilized plots gave the best results, specially the plot seeded down in September. Disking, accompanied by an application of lime and of Thomas phosphate, also gave good results.

Similar experiments will be started next year so that more definite conclusions may be drawn.

CHEMICAL FERTILIZERS EXPERIMENT

APPLICATION OF FERTILIZERS FOR HAY

The object of this experiment was to determine the value of chemical fertilizers and barnyard manure on meadows.

A five-year rotation was established on a field covering an area of approximately nine acres, heavy clay land.

Section 1 received 16 tons of manure per acre; 8 tons were applied as a covering on the oat stubble for clover hay and 8 tons in the autumn for third-year timothy.

Section 2 was fertilized as follows:—first and second years, no fertilizer; third year, 200 pounds superphosphate, 100 pounds nitrate of soda, 75 pounds muriate of potash applied in the spring; fourth year, 200 pounds superphosphate, 100 pounds nitrate of soda, 72 pounds muriate of potash applied in the spring; fifth year, 100 pounds nitrate of soda.

Section 3 was a check; no manure or chemical fertilizers of any kind were applied.

APPLICATION OF FERTILIZERS FOR HAY

YIELDS AND COST OF PRODUCTION—5 YEAR AVERAGE

Rotation year	Crop	Manure		Fertilizers		Check	
		Yield per acre	Cost per ton or bushel	Yield per acre	Cost per ton or bushel	Yield per acre	Cost per ton or bushel
		tons lb.	$	tons lb.	$	tons lb.	$
1st	Oats and pea hay	2 1,580	12 73	2 1,300	11 65	2 660	12 51
2nd	Oats (1)	64 bush. 7	0 42	64 bush. 31	0 38	58 bush. 31	0 38
		tons		tons		tons	
3rd	Clover hay	2 840	9 53	2 1,140	7 61	2 420	7 49
4th	Timothy hay	2 1,080	8 06	2 1,720	7 01	2 480	6 90
5th	Timothy hay	2 740	9 25	2 1,120	7 34	2 120	7 26

(1) 4-year average.

This table shows that the results obtained on both fertilized and unfertilized soils were equally good; this can be readily explained: the experiment was conducted on clay land which was quite fertile when the experiment was started in 1922. However, when the second cycle of the rotation was entered upon, there was a large decrease in yields on unfertilized soil and there is no doubt that in a few years the difference will be much greater.

MANURE *vs.* SPENT HOPS AND YEAST *vs.* CHEMICAL FERTILIZERS

The object of this experiment is to compare the fertilizing value of manure, manure and chemical fertilizers and chemical fertilizers alone, applied to fodder plants, grain and hay grown on poor gravelly and sandy loams. Spent hops and yeast, used as fertilizers, were also compared with manure and chemical fertilizers.

This experiment, conducted on a four-year rotation, was started in 1924.

Section 1: 12 tons per acre of spent hops were applied to the first year crop (oats and peas grown for hay), and 8 tons on the oat stubble the following year.

Section 2: 12 tons of manure per acre applied to the first year crop and 8 tons to the oat stubble the following year.

Section 3: 6 tons manure, 100 pounds superphosphate, 100 pounds nitrate of soda and 40 pounds muriate of potash were applied per acre to the first year crop; 100 pounds superphosphate, 50 pounds nitrate of soda and 10 pounds muriate of potash to the second year crop; 4 tons manure, 50 pounds superphosphate and 25 pounds nitrate of soda applied to the third year crop; 25 pounds nitrate of soda to the fourth year crop.

Section 4: 200 pounds superphosphate, 200 pounds nitrate of soda and 75 pounds muriate of potash were applied per acre to the first year crop; 200 pounds superphosphate, 50 pounds nitrate of soda and 25 pounds muriate of potash to the second year crop; 100 pounds superphosphate and 75 pounds nitrate of soda to the third year crop; 75 pounds nitrate of soda to the fourth year crop.

Section 5 was used as a check; it did not receive either manure or fertilizer.

FERTILIZER EXPERIMENT—AVERAGE YIELD OVER FOUR YEARS

Plot No.	Treatment	First year oat and pea hay	Second year, oats	Third year clover	Fourth year, timothy	Value of the four crops cost of fertilizer deducted
		lb.	bush. lb.	lb.	lb.	$
1	Spent hops and yeast	3,557	52 11	4,194	3,595	67 05
2	Manure	2,997	35 3	2,685	2,546	40 11
3	Manure and chemical fertilizers	3,074	37 7	2,899	2,689	50 17
4	Chemical fertilizers	3,042	22 16	2,235	1,974	46 61
5	Check (without fertilizers or manure)	1,271	18 27	664	814	31 50

It is shown by the above that this poor gravelly loam was improved by the application of all the above fertilizers and that all crops were benefitted. Judging from the above spent hops appear to have a great value as fertilizer and the addition of chemical fertilizers as a complement to manure has given better results than the use of manure alone.

CHEMICAL FERTILIZERS APPLIED TO POTATOES

This year, an experiment was started to determine the best formula and the most profitable quantity of fertilizer for potato growing; the following tests were included:—

Check plot: without manure or fertilizer.

Manure: 15 tons per acre.

Manure and fertilizer (3-10-6): manure, 6 tons; fertilizer, 400 pounds. Manure, 6 tons; fertilizer, 700 pounds.

Nitrogen: fertilizer 0-8-8, 500 pounds; fertilizer 3-8-8, 500 pounds; fertilizer 6-8-8, 500 pounds.

Potash: fertilizer 4-8-0, 500 pounds; fertilizer 4-8-4, 500 pounds; fertilizer 4-8-8, 500 pounds.

Phosphoric acid: fertilizer 4-0-8, 500 pounds; fertilizer 4-6-8, 500 pounds; fertilizer 4-12-8, 500 pounds.

Various quantities of fertilizer 3-8-8: 400 pounds; 800 pounds; 1,200 pounds; 1,600 pounds.

Commercial formulae: fertilizer 3-8-8, 500 pounds; Nitrophoska 15-30-15, 250 pounds; Nitrophoska 15-30-15, 500 pounds.

Manner of applying fertilizer 3-8-8: 400 pounds in the rows and 400 pounds broadcast; 800 pounds in the rows.

This experiment will be continued for several years and the reader would be well advised to study the different tests included. Details will be published each year in this report. The operations carried on in 1929 were more of a preparatory nature; however, it may be stated that the best results were obtained on plots receiving an application of fertilizer 3-8-8 in the rows.

HORTICULTURE

FRUIT TREES

APPLE—VARIETY TEST

Very little injury was caused by winter-killing this year on the station. Nine apple trees were damaged by snow; taking into account the number of apple trees planted up to date, 1,076, the loss sustained is insignificant.

The planting of a new orchard started in the spring of 1928 with 106 apple trees and was continued the following spring when 76 trees were added. All these trees were root grafted on this station; they belong to the following varieties: Lobo, Melba and Sandow. The young apple trees made a strong growth, although planted on waste land. The majority of trees in the old orchard were in bloom on June 11. The total crop of apples amounted to 484 barrels; the average for the last three years being 606 barrels. The eight varieties named in the following table are recommended for planting in this district, for productivity and hardiness.

YIELDS OF DIFFERENT VARIETIES OF APPLES—SIX YEAR AVERAGE

Variety	Season	Date of		Years after first crop	Yield	
		Planting	First crop		1 tree, 6-years	6-year average
					gal.	gal.
Crimson Beauty	Summer	1915	1920	5	100	16·67
Yellow Transparent	Summer	1915	1920	5	128	21·34
Duchess	Summer	1913	1917	4	122	20·34
Melba	Early fall	1913	1918	5	96	16·00
Lobo	Fall to mid-winter	1913	1919	6	176	29·34
Wealthy	Fall to mid-winter	1914	1919	5	146	24·34
Fameuse	Fall to mid-winter	1915	1921	6	178	29·67
McIntosh	Fall to mid-winter	1914	1921	7	154	25·67

Three hundred and ten varieties of apples forwarded by the Horticultural Division, Central Experimental Farm, Ottawa are under test on this station. The five following varieties have born fruit and are classed among the best of the entire lot, according to their respective seasons.

RESULTS WITH THE FIVE BEST VARIETIES

Variety	Season	Number of trees	Year planted	Year of first crop	Total yield of two trees
					gal.
Hume	October to mid-December	2	1920	1926	32
Pedro	October to mid-December	2	1916	1922	276
Sandow	Late November to late February	1	1915	1922	142
Niobe	Mid-December to March	2	1913	1920	186
Bruno	Mid-November to April	2	1913	1919	287

The Hume produces a good sized apple, entirely suffused with deep crimson, of good quality and which is useful to fill in the gap while waiting for the McIntosh to ripen.

THINNING EXPERIMENT

Seven apple trees representing seven different varieties were used in this experiment, which covered a period of three years.

As soon as the apples had set, all those which had a bad appearance or appeared to be damaged were picked and only one fruit was left to each spur. Seven trees belonging to the same varieties as the thinned trees were kept under observation and used as checks, not thinned, in order to compare the two crops. The following table contains the average results obtained during four years:—

RESULTS WITH THINNED AND UNTHINNED TREES

Varieties	Thinned trees				Unthinned trees			
	Uniformity as to colour and size	Quality		Total	Uniformity as to colour and size	Quality		Total
		No. 1	No. 2			No. 1	No. 2	
		gal.	gal.	gal.		gal.	gal.	gal.
Yellow Transparent	Good	26·5	12·5	39·2	Poor	22·0	14·5	36·5
Duchess	Good	16·5	5·0	21·5	Medium	14·5	6·5	21·0
Dudley	Good	18·5	5·0	23·5	Medium	13·5	8·5	22·0
Wolf River	Good	28·0	9·0	37·0	Medium	24·0	9·0	33·0
Alexander	Good	25·0	8·0	33·0	Good	24·0	8·0	32·0
Fameuse	Good	23·0	8·5	31·5	Medium	28·5	16·5	44·0
Wealthy	Good	13·0	4·0	17·0	Medium	18·0	9·0	27·0

KEEPING QUALITY TEST

For the last three winters, over two hundred varieties of apples were kept under observation in a cellar, in 1½ bushel boxes, to ascertain how long they would keep and when they would be in their best condition for eating. Daily records were kept of the temperature of the cellar. A few varieties of merit are given in the following table:—

TEST OF KEEPING QUALITY

Variety and origin	Average temperature		Season
		°F	
Swazie seedling, Ottawa	October	48·50	December to mid-February.
Lawyer seedling, Ottawa	November	47·0	November to mid-February.
Walter, Ottawa	December	40·50	October to February.
Rocket, Ottawa	January	38·0	January to mid-March.
Rosalie, Ottawa	February	36·50	January to mid-April.
Cobalt			Late January to late April.

PLUMS—VARIETY TEST

The plum orchard numbered 113 trees, 70 of which bore fruit this year and produced a total crop of 420 gallons, an average of 6 gallons per tree.

The average production over four years is 452 gallons giving, at an average sale price of 28 cents, a revenue of $1.12 per plum tree per year.

The following varieties already mentioned in previous reports gave the best results:—

RESULTS WITH PLUMS

Variety	Colour of fruit	Date of maturity	Yield in 1929
			gal.
Green Gage	Greenish yellow	September 14	11
Bradshaw	Purple red	September 16	17
Blue Damson	Blue	September 18	7
Lombard	Purplish red	September 25	10½
Hudson River	Deep red	September 30	39
Latchford	Purple	October 8-14	12

The fruit bearing period for these six varieties covers thirty days.

CHERRIES—VARIETY TEST

The cherry trees carried very little bloom and yielded poorly. The English Morello gave the highest yield, 7 gallons per tree; a May Duke tree produced 3 gallons, but the cherries of this variety are of better quality than the English Morellos. Of the sixteen varieties under test on this Station, the French Cherry is the only one of which every tree fruited.

PEARS—VARIETY TEST

Flemish Beauty, Clapps Favourite, and Bartlett are the three varieties which gave the most satisfactory results on this Station. Since 1927, the pear trees have yielded three consecutive crops. The results for 1929 are as follows:—

RESULTS WITH PEARS

Variety	Number of trees	Pears		Total yield
		No. 1	No. 2	
		gal.	gal.	gal.
Flemish Beauty	5	12	4	16
Clapps Favourite	6	9	3	12
Bartlett	1	1½	½	2

SPRAYING AND DUSTING

Knowing the advantage of thorough spraying, done at the right time, the fruit trees were sprayed seven times with sulphur spray during last season.

The results were not as satisfactory this year as in the past, on account of frequent rainfalls at the time of spraying.

Commercial sulphur spray was used at the rate of one gallon in nine gallons of water before the appearance of the leaves, and one gallon in 35 gallons of water as soon as growth had started. Arsenate of lead and Paris green are added to the spray to make it poisonous when necessary, in the following proportions: water, 35 gals.; lead arsenate, 1½ pounds; Paris green, ¼ pound.

A sulphur spray composed of one gallon to nine gallons of water, to which two pounds of freshly slaked lime are added, will control the oyster scale. The first application should be made in May and another at the beginning of November.

SMALL FRUITS

RASPBERRIES—TEST OF VARIETIES

Twelve varieties of raspberries have been grown on this Station for the last seven years. The results obtained, as to earliness, quality and yield, enable us to recommend the following varieties for this district; they are given by order of earliness:—

RESULTS WITH RASPBERRIES

Variety	Average duration of fruit bearing period	Yield per acre, 7 year average
	days	lb.
Cuthbert	28½	2,496
Newman No. 23	33½	5,936
Brighton	27	4,007
Superlative	29½	6,189
Latham	28	5,954

CURRANTS—TEST OF VARIETIES

The black currants are the most popular of the three kinds grown in this district; the red and white varieties are not as popular as they should be.

The average results obtained during a seven-year period for a few satisfactory varieties are given here:—

RESULTS WITH CURRANTS

—	Average yield over seven years
	lb.
Black Currants—	
Saunders	4,355
Kerry	3,550
Magnus	3,240
Red Currants—	
Cumberland	5,286
Holland Red	5,106
Red Grape	4,470
White Currants—	
Large White	5,420
Holland White	5,390

White currants ripen earlier than the red; black currants are the last to ripen.

GOOSEBERRIES—VARIETY TEST

Mabel and Industry are the two varieties which have given the most satisfactory results; their average yields over seven years are respectively 3,910 pounds and 3,800 pounds.

FLOWERS

ANNUALS—TEST OF VARIETIES

Two hundred and sixty varieties or strains of flowers were under test this year; these experiments have been conducted for over ten years, during which five hundred varieties or more have been grown.

The observations and notes taken on each variety as to the duration of bloom and the facility of growth enable us to recommend the following flowers, the seed of which was sown on May 15:—

VARIETIES OF ANNUALS RECOMMENDED

Variety	Height of stalk	Duration of bloom
	in.	
Acroclinium	18	July 12–September 30.
Ageratum	14	August 6–September 15.
Balsam	15	August 5–September 20.
Bartonia aurea	12	August 7–September 20.
Coreopsis	24	August 16–September 27.
Cosmos	50	August 6–September 20.
Clarkia	23	July 19–September 12.
Larkspur	28	July 28–September 30.
Datura	30	September 2–September 28.
Dimorphotheca	15	July 15–September 30.
Gaillardia	24	July 30–September 25.
Godetia	17	August 3–September 12.
Stocks	22	July 10–October 10.
Hibiscus	18	July 31–September 2.
Jacobea	24	July 28–September 20.
Linaria	10	July 2–August 20.
Lupin	25	July 15–September 6.
Lobelia	12	August 12–September 20.
Phlox	18	July 24–October 5.

TULIPS—VARIETY TEST

The spring was nearly ideal for tulips; the comparatively cool weather, while delaying the bloom at first, made it last longer.

A good show of bloom was given by the following varieties: single early tulips, double early, cottage, and Darwins.

The tulips started to bloom on May 23 and lasted until June 27. Some of the best varieties are: early single, Bright Vermilion, Chrysolora, and Diana; early double: Snowball, Murillo, and Imperator Rubrorum; cottage: La Candeur, Isabella, and Fairy Queen; parrot: Lutea Major, Perfecta, and Mark Graaf; Darwin: Bartigon, Flamingo, and Philippe de Commines.

CHINA ASTERS—VARIETY TEST

Although China asters bloom in any soil, they do much better on well-cultivated and manured land. They also prefer shady spots.

Forty varieties or strains were tested during the last eight years; the seed was sown in hotbeds during the first days of April and the Snow Queen, Blushing Beauty, Cœur de France, and Reine du Marché were in bloom during the beginning of July; the varieties belonging to the Crego group are not quite as early as the varieties just mentioned, but they bloom before the Ostrich Feather group.

LIST OF PROJECTS UNDERTAKEN FOR THE HORTICULTURAL DIVISION, 1929

Fruit

H. 33—Apples—Test of varieties.
H. 29—Apples—Keeping quality.
H. 413—Apples—Thinning out experiment.
H. 44—Pears—Test of varieties.
H. 48—Plums—Test of varieties.
H. 35—Cherries—Test of varieties.
H. 369—Spraying and dusting experiments.

Small Fruits

H. 11—Raspberries—Test of varieties.
H. 24—Currants—Test of varieties.
H. 6—Gooseberries—Test of varieties.

Flowers

H. 290—Tulips—Test of varieties.
H. 263—China Asters—Annuals—Test of varieties.
H. 261—Annuals—Test of varieties.

VEGETABLES

BEANS—TEST OF VARIETIES

Eighteen varieties of beans were under test; they were planted in thirty-foot rows, 30 inches apart, and at 2 inches distances in the rows.

Of all the various distances tried for bean growing, the above gave the most satisfactory results.

The following varieties may be added to the list of desirable varieties already mentioned in previous reports. The beans were planted on May 21.

BEANS—RESULTS OF VARIETY TEST

Variety	Colour of pods	Season	Date of first picking	Yield per plot, 1929	Average yield per acre, 3 years
				gal.	gal.
Princesse d'Artois	Yellow	Early	July 20	8	3,480
Interloper	Yellow	Early	July 20	7¼	3,190
Pencil Pod	Yellow	Mid-season	July 25	6	2,900
Brittle Wax	Yellow	Mid-season	July 26	5½	2,827
Canadian	Green	Mid-season	July 27	5	2,755
Hodson Long Pod	Yellow	Late	Aug. 6	7¼	3,770

BEETS—TEST OF VARIETIES

Twelve varieties or strains of beets were sown on May 18, each in 30-foot rows, 30 inches apart; the plants were thinned to two inches as soon as they had grown their fourth leaf. The object was to obtain beets with tender and sweet flesh, not woody, of regular shape and smooth. The varieties shown in the following table are recommended:—

BEETS—RESULTS OF VARIETY TEST

Variety	Date of first pulling	Yield	
		Plot, 1929	Average yield per acre 3 years
		lb.	bush.
Eclipse	July 20	90	870
Half Long Blood	July 20	80	749
Crosby Egyptian	July 22	100	855
New Oval Gem	July 22	95	845
Detroit Dark Red	July 23	97	754

PEAS—TEST OF VARIETIES

Fourteen varieties of peas were under test. The percentage of germination for eight varieties was only 65 per cent; this poor result may be attributed to the bad weather following immediately after the seeding. The peas were grown in 30-foot rows, one and a half feet apart; the plants were spaced one inch apart in the rows. The best results were given by the following varieties. Seeding was done May 18.

PEAS—RESULTS OF VARIETY TEST

Variety	Origin of seed	Date of first picking	Yield per acre	
			Plot, 1929	Three year average
			gal.	gal.
Pedigree	Gregory	July 13	3¾	2,175
Director	Invermere	July 21	4½	2,610
English Wonder x Gradus	C.E.F.	July 23	4⅝	2,465
Lincoln	Sharp	July 26	4¾	2,900
Gregory Surprise x English Wonder	C.E.F.	July 26	4¼	2,465

PARSNIPS—TEST OF VARIETIES

Three thirty-foot plots were sown to parsnips from different sources; Hollow Crown and Cooper Champion were the varieties used. The plants were thinned out to two inches; the plots were two and a half feet apart. The yields of the plots for this year as well as the average yield over a three-year period are given in the following table:—

PARNSIPS—RESULTS OF VARIETY TEST

Variety	Origin	Yield	
		Plot, 1929	Three year average
		lb.	bush.
Hollow Crown	Graham	60	216·25
Hollow Crown	C.E.F., Ottawa	55	206·10
Cooper Champion	Dupuy & Ferguson	45	181·35

SQUASH—TEST OF VARIETIES

In order to ascertain the most profitable varieties of squash for this locality, over twenty varieties were grown on this Station during the last seven years. The object was to find the earliest varieties and also those having the best keeping quality.

The squash are sown in hills, nine feet apart every way; there are three hills for each variety, with three plants in each hill.

SQUASH—RESULTS OF VARIETY TEST

Variety	Season	Yield per acre, 3-year average
		lb.
English Vegetable Marrow	Early	20,655
Cocozelle, Bush	Early	15,795
Table Queen or Des Moines	Fall	17,100
Kitchenette	Winter	14,580
Delicious	Winter	14,384

PUMPKINS—TEST OF VARIETIES

As a result of the experiments conducted on this Station with different varieties of pumpkins, we are able to recommend for use in this district the four varieties named in the following table.

Seeding is done as soon as the soil has warmed up, in hills made of earth mixed with well rotted manure; these hills are nine feet apart. The three strongest plants are kept in each hill; there are three hills for each variety.

PUMPKINS—RESULTS OF VARIETY TEST

Variety	Quality	Yield	
		Plot, 1929	Three year average
		lb.	lb.
Japanese Pie	Flesh very firm	152	29,889
Large Cheese	Yellow flesh, sweet	100	24,786
Small Sugar	One of the best for table use	105	23,571
Winter Luxury	Good winter variety	80	22,356

RADISH—TEST OF VARIETIES

Among the eleven varieties of radishes tested during the last five years, the Saxa was the earliest and is also a good producer. The same qualities may be found in Scarlet Globe, Oval and Twenty Days.

Seeding was done May 18. The results given by a 30-foot row for some varieties which can be recommended are shown in the following table. The yield is given in bunches of twenty radishes.

RADISH—RESULTS OF VARIETY TEST

Variety	Quality	Yield	
		Plot, 1929	Three year average
		bunches	bunches
Saxa	Slow to run to seed	9	8
Vick Scarlet Globe	Very good for forcing	9	8½
Olive White	Very mild	8	7½
Long White Icicle	Tender, crisp, pungent	7	7
Twenty Days	The earliest variety	8	6½
Scarlet Turnip	Tender and mild	6	6
French Breakfast	Rapid growth	5	

TURNIPS—TEST OF VARIETIES

Four varieties of table turnips were under test this year. The seed was sown on May 18 in 30-foot rows and the plants were thinned to 4 inches. The yield is given in bunches of five turnips each.

TURNIPS—RESULTS OF VARIETY TEST

Variety	Ready for use	Yield	
		Plot, 1929	Five year average
		bunches	bunches
Milan Purple Top	July 11	10	11·8
Red Top	July 14	9	10·8
Snowball	July 12	8	10·2
Golden Ball	July 14	8	9

SALSIFY—TEST OF VARIETIES

Long White and Mammoth Sandwich Island were the two varieties under test. The roots of the latter are larger than those of Long White which however, are, superior in quality, being tender and delicious. Average yield over five years of a thirty-foot row: Mammoth Sandwich Island, 41 pounds; Long White, 35 pounds.

SWISS CHARD—TEST OF VARIETIES

Two varieties of swiss chard have been under test on this Station for over five years. This type of beets is grown for the leaves and leaf stalks; when the leaves reach from six to eight inches in length, they can be used like spinach, and the stalks, when sufficiently developed, may be consumed like asparagus. The stalks of the Lucullus variety are white, those of the Fordhook, creamy white; they are large, meaty and sweet in both varieties.

The swiss chard was grown in rows thirty feet long, thirty inches apart; the plants were thinned ten inches apart.

SPINACH—TEST OF VARIETIES

The seven varieties under test are all equally recommended; they vary very little in earliness but it is best to sow those varieties which are slowest to run to seed. Each variety is grown in 15-foot rows, 18 inches between rows; the plants are thinned to 6 inches.

The percentage of plants which had run to seed on August 5 is given in the following table; seed was sown on May 18.

SPINACH—RESULTS OF VARIETY TEST

Variety	Run to seed		Date of first picking	Yield 1929
		%		bunches
Bloomsdale	July 5	75	July 19	8
Big Crop	July 5	50	July 21	10
Noble Gaudry	July 5	30	July 10	12
Broad Flanders	July 5	20	July 21	12
Princess Juliana	July 5	15	July 21	13
King of Danemark	July 5	10	July 21	16
New Zealand	July 5	—	August 13	19

CUCUMBERS—TEST OF VARIETIES

Eleven varieties or strains of cucumbers were under test. The seed was sown in hills, after the soil had been thoroughly mixed with well rotted manure. The three strongest plants were kept in each hill; there were three hills of each variety placed six feet apart every way. Seeding was done on May 23.

The following desirable varieties gave the results shown in the following table:—

CUCUMBERS—RESULTS OF VARIETY TEST

Variety	Quality	Date of first picking	Yield of plot, 1929
			No.
White Arctic	Very uniform, 5-7 inches	August 5	143
Early Fortune	Flesh white and firm	" 12	130
Early White Spine	Flesh crisp and mild	" 10	129
Green Prolific	Fruit 10-12 inches, very tender	" 15	103
Perfection	Flesh white, quality good	" 13	98
Cumberland	Flesh firm and crisp	" 13	95

PEPPERS—TEST OF VARIETIES

Four varieties of peppers were under test; the seed was sown in a hotbed on March 19; the plants were pricked out on April 22 and transplanted in the open on June 5. Harris Early, New Giant and Tomato pepper gave the best yields, with 4 gallons, 3½ gallons and 2¾ gallons respectively. The Red Chili variety was destroyed by the first frost on September 20.

Each variety was sown in thirty-foot rows, the plants being eighteen inches apart in the rows.

CABBAGE—TEST OF VARIETIES

In addition to varieties already recommended in past reports, the following have also given good results during the last three years.

The seed was sown in a hotbed on April 3 and the plants were put out in the open on May 30 twenty inches apart for early cabbage and eighteen inches for late varieties.

CABBAGE—RESULTS OF VARIETY TEST

Variety	Season	Ready for use	Weight of two heads		Average weight of ten heads, three years	
			lb.	oz.	lb.	oz.
Golden Acre	Early	July 25	5	4	21	12
Early Express	Early	July 27	7	4	32	8
Charleston Wakefield	Mid-season	August 3	7	8	37	12
Early Summer Henderson	Mid-season	August 6	10	2	52	4
Autumn King	Late	October 2	12	0	58	8
Extra Amagar Danish Roundhead	Late	October 2	12	8	60	10

CAULIFLOWER—TEST OF VARIETIES

Six varieties were used in these tests. The plants were obtained by sowing the seed in a semi-hotbed on April 3 and were put out in the open on May 30. The six varieties grown belong to three different seasons and are recommended for use in this district.

Each variety was sown in two rows, thirty feet long and thirty inches apart; the plants were placed eighteen inches apart in the rows.

CAULIFLOWER—RESULTS OF VARIETY TEST

Variety	Season	Ready for use	Yield			
			Plot, 1929, 10 heads		Average weight 10 heads three years	
			lb.	oz.	lb.	oz.
Six Weeks	Early	August 3	47	8	39	8
Earliest of All	Early	" 4	43	12	38	4
Danish Dry Weather	Mid-season.	" 16	45	0	40	1
Danish Perfection	Mid-season.	" 18	52	8	48	8
Larger Algiers	Late	" 25	56	4	44	0
Veitch Autumn King	Late	" 28	52	8	43	0

CORN—TEST OF VARIETIES

Several varieties of corn were tested for the last ten years; the object of this experiment is to find the earliest and most profitable table varieties for this district.

In an attempt to lengthen the crop season of corn, a certain number of late maturing varieties are also under test with the early sorts. By using the following varieties, corn may be had from the first days in August up to the first autumn frosts. The corn was planted on May 23 in 66-foot rows.

CORN—RESULTS OF VARIETY TEST

Variety	Origin	Date of first crop	Number of cobs
Pickaninny	Central Experimental Farm	August 5	96
Banting	" "	" 12	97
Early Malcolm	" "	" 22	99
Burbank	Stark	" 25	90
Golden Giant	Rennie	September 1	98

WATERMELONS—TEST OF VARIETIES

Watermelons are grown in the same manner as muskmelons. The hills are nine feet apart every way. Cole Early is recommended on account of its earliness; the flesh is crisp and sweet.

The seed was sown in a hotbed on April 3 and the plants were put out in the open on June 2. Cole Early yielded 38 pounds for three hills.

BRUSSELS SPROUTS—TEST OF VARIETIES

Brussels sprouts seed was sown in a hotbed on April 3; plants from the hotbed were transplanted in the garden on May 30 in thirty-foot rows; the rows are thirty inches apart and the plants eighteen inches apart in the rows.

The average crop taken from a thirty-foot row during three consecutive years is as follows:—

BRUSSELS SPROUTS—RESULTS OF VARIETY TEST

Variety	Length of stalks	Average yield, three years
	in.	gal.
Long Island	25	2½
Little Gem	20	2¼
Improved Dwarf	22	1½

LETTUCE—TEST OF VARIETIES

The majority of the thirteen varieties under test gave a satisfactory yield. Although several varieties gave very good lettuce, they are not superior in quality to the Grand Rapids and Simpson Curled; the latter formed a compact mass of curled, tender leaves.

Big Boston and Iceberg are two excellent head lettuce; the heads are firm and crisp. In addition to these qualities, Wayahead heads earlier than the two first ones.

MUSKMELONS—TEST OF VARIETY

Very few muskmelons are grown in this district. The cool nights of the late spring and early summer are the main causes of failure. However, during the last five years a fair crop of melons was obtained on this station by the following methods:—

Seed is generally sown in hotbeds during the first days of April. As soon as the plants are well developed, they are transplanted in cold frames, containing well manured soil and kept covered with sashes at night during most of June.

Satisfactory results were obtained with Emerald Gem (early), ripe on September 13; Golden Champlain (second early), ready for use on September 20; Oka, ripe on September 23.

ONIONS—TEST OF VARIETIES

Over twenty-five varieties were under test during the last six years. Seeding was done in semi-hotbeds; when the plants were well developed, they were transplanted into the open and spaced two inches apart in the rows.

For the last five years, two seedings have been done, one in a semi-hotbed, the other in the open. The best results have always been obtaind from the first method of seeding. Each variety is sown in thirty-foot rows and the rows are eighteen inches apart.

ONIONS—RESULTS OF VARIETY TEST

Variety	Yield (Row)				1929	Average yield, 3 years		
	Elongated		Ripe		Total	Elongated	Ripe	Total
	lb.	oz.	lb.	oz.	lb. oz.	lb.	lb.	lb.
Ailsa Craig	6	0	79	0	85	4,940	57,514	62,454
Danvers Yellow Globe	3	8	66	8	70	3,388	58,512	61,900
Giant Prizetaker	3	0	66	0	69	2,904	57,126	60,030
Red Wethersfield	2	0	56	0	58	1,936	48,524	50,460

LEEKS—TEST OF VARIETIES

Leeks are grown in the same way as onions; a thirty-foot row of each variety was sown on May 25. The rows are eighteen inches apart. The seed was sown in a semi-hotbed. The results obtained this year and the average results for three years are as follows:—

LEEKS—RESULTS OF VARIETY TEST

Variety	Small	Yield	
		1929	3 year average per acre
	%	lb.	lb.
International	16	61	44,200
London Flag	12	59	43,330
Carentan	11	52	42,890

PARSLEY—TEST OF VARIETIES

Triple Curled and Champion Moss Curled are the two best varieties for this district; they also can be recommended for use as seasonings for different dishes. Their curled foliage is useful for garnishing dishes. The plants are vigorous, they grow strong roots which are easy to keep during the winter.

TOMATOES—TEST OF VARIETIES

The seed of fifty varieties was sown in hotbeds on March 19, plants were pricked out on April 22 and transplanted in the open on May 30.

Five plants of each variety were used in this test; all were reduced to a single stem. Three clusters or trusses of flowers were kept on each plant; the plants were set three feet apart each way.

The first ripe tomatoes were picked on August 17. A heavy frost on September 20 destroyed the remaining tomatoes.

The following results were obtained during the last three years:—

TOMATOES—RESULTS OF VARIETY TEST

Variety and source	Date of first picking	Plot yield, 1929, from Aug. 17 to Sept. 19		3 year average yield
		lb.	oz.	lb.
Herald, C.E.F., Ottawa	Aug. 17	22	0	18,050
Danish Export, Ste. Anne	" 17	19	8	17,666
Canadian, Rice	" 17	19	4	19,602
New 50 days, Burpee	" 17	17	8	17,666
Early Avon, Vaughan	" 20	16	0	21,296
Self Pruning, Burpee	" 17	15	12	19,936

MULCH PAPER EXPERIMENT

"Gator Hide" paper, grade A, was used in this experiment with the following eleven vegetables: bean, cucumber, onions, tomato, potato, corn, celery, carrot, beet, cauliflower and cabbage.

The vegetables were sown in rows, and paper was laid on each side, leaving a space of approximately one inch of bare soil for the row of seedings to grow. As regards cauliflower, cucumber and cabbage, the paper was placed over the rows and openings were made at the required distances, after which the plants were transplanted. This paper was pinned and kept in place by means of wooden strips 1 by 4 inches and 6 feet long, but stones had to be added to the strips in order to keep the paper in place. Eleven hours manual labour were necessary to lay the paper, wooden strips and stones in proper position; in addition, during the summer, six hours were taken to readjust and renew part of the paper.

BEANS

The rows were 37 inches apart and the beans were planted in groups of two seeds every four inches apart in the rows. When the young plants had become sufficiently developed, they were thinned so as to have one plant every four inches apart.

Records were made of the following: dates of germination, flowering, height of the plants three weeks after germination, and date when pods were ready for use as snap pods. The rows were thirty feet long and were divided in two equal sections, one section of each was grown for beans as snap pods; on the other, the beans were harvested at maturity.

BEANS—RESULTS OF PAPER TEST (IN PODS)—ROWS FIFTEEN FEET

Variety	Date		Yield, first picking	Number of pods	Average yield of two rows	
	Sown	Picked				
			lb.		lb.	pods
Round Pod (with paper)	May 20	Aug. 26	1·4	88	8·5	534
Round Pod (without paper)	May 20	Aug. 26	1·8	89	5·13	435
Stringless (with paper)	May 20	Aug. 26	2·7	200	10·5	691
Stringless (without paper)	May 20	Aug. 26	1·11	179	12·9	1,055

BEANS (AT MATURITY)—LENGTH OF ROWS: 15 FEET

Variety	Date		Average yield of two rows	
	Sown	Picked		
			lb.	oz.
Round Pod (with paper)	May 20	Sept. 14	1	12½
Round Pod (without paper)	May 20	Sept. 14	1	2
Stringless (with paper)	May 20	Sept. 14	2	6½
Stringless (without paper)	May 20	Sept. 14	1	5½

CUCUMBER

The cucumber rows were 73 inches apart and the plants 12 inches apart in the rows, which were 30 feet long. The date of maturity of the first cucumber and that when the first six cucumbers were ready for use were noted.

CUCUMBERS—RESULTS OF PAPER EXPERIMENT

Variety	Date		Yield		Average yield, two rows	
	Sown	Pulled	Number	Weight	Number	Weight
				lb. oz.		lb. oz.
Perfection (with paper)	May 21	Aug. 16	6	4 5	75	63 9
Perfection (without paper)	May 21	Aug. 16	6	4 3	78	63 0

ONION

Onion seed was sown in the open, in rows thirty feet long and nineteen inches apart; the plants were thinned out one inch apart. On the rows protected by paper, the plants appeared one day earlier and the yield was three pounds greater than in the others. The root maggot did not cause any injury to either plot.

ONIONS—RESULTS OF PAPER EXPERIMENT

Variety	Date sown	Unripe onions	Size		Average yield of two rows
			2 inches and over	2 inches and less	
		lb.			lb.
Yellow Globe (with paper)	May 25	15½	40½	9	65
Yellow Globe (without paper)	May 25	8	29	6	43

CARROT

The rows of carrot were thirty-seven inches apart and the plants were thinned out to two inches. These rows were thirty feet long and were divided in two equal parts; one section was grown until the carrots were one inch in diameter and the other until they had reached maturity.

CARROTS—RESULTS OF PAPER EXPERIMENT

Variety	Date sown	Date, 1st pulling	Number of carrots	Average yield of two rows
				lb.
First pulling—				
Chantenay (with paper)	May 20	July 20	6	113½
Chantenay (without paper)	May 20	July 22	4	99
At maturity—		*Last pulling*		
Chantenay (with paper)	May 20	Oct. 14	.....	33
Chantenay (without paper)	May 20	Oct. 14	.....	34½

TOMATO

The tomato rows were spaced 55 inches and the plants 36 inches in the rows. A record was kept of the date of maturity of the first tomato, of the first six tomatoes and of the number of ripe fruit picked during the first two weeks of maturity.

During seventeen days, the tomatoes grown without paper protection gave the highest yield; however, as regard the total crop, the paper-protected rows gave a slightly higher yield.

TOMATOES—RESULTS OF PAPER EXPERIMENT

Variety	Date sown	First ripe fruit picked	Yield		Ripe fruit picked, Aug. 25–Sept. 10		Average yield of two rows	
			lb.	oz.	lb.	oz.	lb.	oz.
Bonny Best (with paper)	May 31	Aug. 25	—	9	15	9	40	—
Bonny Best (without paper)	May 31	Aug. 25	1	1	17	1	39	6

POTATOES

The rows were thirty-seven inches apart and the sets were placed twelve inches apart in the rows. Fifty per cent of the Green Mountains had germinated on July 2 and the same quantity of Irish Cobblers on July 3; these rows were protected by paper mulch.

In the unprotected rows, Green Mountains were three days later and Irish Cobblers one day later.

One half of the rows was pulled August 15 and the other half when the potatoes were ripe.

POTATOES—AVERAGE OF TWO ROWS

Variety	Date planted	Yield				Average yield of two rows	
		Small		Large			
		lb.	oz.	lb.	oz.	lb.	oz.
1st crop, Aug. 15—							
Green Mountain (with paper)	May 31....	3	7	29	5	35	4
Green Mountain (without paper)	"	3	6	29	—	32	6
Irish Cobbler (with paper)	"	2	15	22	11	25	1
Irish Cobbler (without paper)	"	3	7	22	8	25	5
2nd crop—							
Green Mountain (with paper)	"	4	8	45	—	49	8
Green Mountain (without paper)	"	5	8	42	5	48	—
Irish Cobbler (with paper)	"	6	5	28	—	34	—
Irish Cobbler (without paper)	"	6	—	36	—	42	—

CORN

The corn did not germinate earlier in one plot than in the other; however, it made a more vigorous growth and a gain of seven ears was recorded for the protected row.

CORN—RESULTS OF PAPER EXPERIMENT

Variety	Date of planting	Date, ready for use	Length of stalks	Number of ears		Average yield of two rows
				Good	Bad	
			in.			
Golden Bantam (with paper)	May 20	Sept. 3	57½	30	2	32
Golden Bantam (without paper)	May 20	Sept. 3	49	23	2	25

CELERY

Celery was transplanted in the open on June 5; the rows were 37 inches apart and the plants 6 inches apart in the rows.

In both rows the celery was good; it was blanched by means of planks.

CELERY—RESULTS OF PAPER EXPERIMENT

Variety	Number of plants	Average yield of two rows
		lb. oz.
Golden Plume (with paper)	12	22 5
Golden Plume (without paper)	12	20 4

BEETS—RESULTS OF PAPER EXPERIMENT

Variety	Date sown	Date ready for use	Number	Average yield of two rows
*First crop**—				
Detroit Dark Red (with paper)	May 20	July 18	11	65
Detroit Dark Red (without paper)	" 20	" 18	7	63
At Maturity—				
Detroit Dark Red (with paper)	" 20	July 14	.....	52
Detroit Dark Red (without paper)	" 20	" 14	.....	50½

*The beets measured 1½ inches in diameter when pulled.

CAULIFLOWERS—RESULTS OF PAPER EXPERIMENT—LENGTH OF ROW: 30 FEET

Variety	Date sown
Snowball (with paper)	May 22
Snowball (without paper)	May 22

The results obtained are not conclusive, as the paper was torn and carried away several times by high winds.

CABBAGE—RESULTS OF PAPER EXPERIMENT—LENGTH OF ROWS: 30 FEET

Variety	Date sown	Date 1st crop	Number of heads pulled	Weight	Average yield of two rows
				lb.	Hds. lb. oz.
Golden Acre (with paper)	May 22	July 24	4	12	16 55 3
*Golden Acre (without paper)	.....	.....	.....	.....	.....

*Paper torn away by winds and plants destroyed.

LIST OF PROJECTS UNDERTAKEN FOR THE HORTICULTURAL DIVISION, 1929—

VEGETABLES

H. 61—Beans—Test of varieties.
H. 70—Beets—Test of varieties.
H. 153—Peas—Test of varieties.
H. 145—Parsnips—Test of varieties.
H. 201—Squash—Test of varieties.
H. 188—Pumpkins—Test of varieties.
H. 192—Radish—Test of varieties.
H. 214—Turnips—Test of varieties.
H. 197—Salsify—Test of varieties.
H. 203—Swiss Chard—Test of varieties.
H. 199—Spinach—Test of varieties.
H. 106—Cucumbers—Test of varieties.
H. 157—Peppers—Test of varieties.
H. 77—Cabbage—Test of varieties.
H. 88—Cauliflower—Test of varieties.
H. 102—Corn—Test of varieties.
H. 125—Watermelons—Test of varieties.
H. 70—Brussels sprouts—Test of varieties.
H. 116—Lettuce—Test of varieties.
H. 122—Muskmelons—Test of varieties.
H. 138—Onions—Test of varieties.
H. 112—Leeks—Test of varieties.
H. 140—Parsley—Test of varieties.
H. 211—Tomatoes—Test of varieties.
H. 685—Paper mulch as a protection for different varieties of vegetables vs. no paper.

CEREALS

THE SEASON

Although a detailed report of the temperature for the year was presented under tabulated form at the beginning of this report, it is deemed advisable, in order to ensure a better understanding of the tables which follow, to sum up the main features of the season of growth.

Spring was a little late again this year but, on the other hand, the weather was moderate and more settled than usual.

The first seedings were done on May 17 and seeding was general on May 20. The soil was easily worked, and as it contained a good supply of water the germination was very good. June, July, and August were much more favourable to the crops than in the past; rains were more frequent and fell at more regular intervals. September was a nice month; the crops were stored under excellent conditions.

The following tables show the yield per acre for 1929 as well as the five-year averages. In each class of cereals, the most popular variety of the district was adopted as a standard of comparison and its yield was represented by 100, so that all other varieties of the same crop might be compared on a percentage basis.

SPRING WHEAT

Five varieties of spring wheat were compared this year; they were sown on May 17 and harvested between August 24 and September 9.

SPRING WHEAT—COMPARISON OF VARIETIES—FIVE-YEARS' AVERAGE

Variety	Origin	Yield per acre	Days to mature	Length of straw	Strength of straw	Average yield per acre 1925-1929	Relative yield in percent of Huron O. 3 used as check	Average weight per measured bushel 1925-1929
		lb.	days	in.		lb.	%	lb.
Huron O. 3	Ste. Anne	2,292	107·8	41·3	9·9	2,300	100·0	62·3
Pringle's Champlain	Macdonald	2,196	110·8	42·5	9·1	2,332	101·4	61·7
Marquis. O. 15	Ottawa	2,016	108·8	40·1	9·8	2,276	98·9	62·2
Reward O. 928	Ottawa	2,088	100·0	37·0	9·8	2,172	94·4	63·5
Garnet O. 652	Ottawa	2,136	97·0	35·0	9·8	2,180	94·8	62·3

The above table shows that there is very little difference between the first three varieties; the other two, Reward O. 928 and Garnet O. 652, are earlier. Garnet ripens in 97 days, or 10 and 11 days earlier than Huron and Marquis respectively. Reward takes 100 days to ripen, leaving a difference of from seven to ten days in maturity between it and the first-named varieties in the preceding table. The advantage of Reward over Garnet lies in its kernel, which has a much better appearance; it is roundish, fairly large and well filled, whilst that of Garnet is angular and small. These two varieties, Reward especially on account of the good appearance of its kernel, will be useful for localities where late varieties rarely mature and also in other districts where seeding cannot be done quite so early.

OATS

Nine varieties were under test this year; they were sown on May 18 and cut from August 17 to September 6.

COMPARISON OF VARIETIES—FIVE YEAR AVERAGE

Variety	Origin	Yield per acre 1929	Days to mature	Length of straw	Strength of straw	Average yield per acre 1925-1929	Relative yield in percent of Banner O. 49 used as check	Average eight per measured bushel, 1925-29
		lb.	days	in.		lb.	%	lb.
Banner 49	Ste. Anne	2,880	108	41·7	9·5	2,794	100·0	37·2
Banner 44	M.C.	2,784	108	42	9·6	2,862	102·4	37·0
Victory	Swedish	2,976	109	41·7	9·4	2,967	106·2	37·0
Gold Rain	Ottawa	3,096	104	44·8	9·7	3,008	107·6	40·5
Alaska	Ottawa	2,712	93	39·8	9·6	2,247	80·0	39·2
*Cartier	M.C.	2,808	96	38·9	9·6	2,403	91·8*	41·1
**Lasalle	M.C.	3,200	111	39·2	9·8	.....	111·1**	37·1
**Brant	M.C.	2,472	108	40	9·7	.....	89·3**	38·9
**Legacy O. 678	Ottawa	2,808	105	36·6	10·0	.....	97·3**	37·7

*Two year's average.
**This year's results.
Figures for the first five varieties are a five year average.

Two years' results are given for the Cartier variety and this year's results for the other three varieties. As regards Cartier, the relative yield was figured by using the average yield of Banner O. 49 for 1928 and 1929, and for the last

three varieties on the list only the yield for 1929. Gold Rain leads all others with 120 pounds in 1929, averaging 41 pounds more than Victory, which takes second place, and 214 pounds more than Banner 49. It also has a heavier weight per bushel than all others and is from four to five days earlier than Victory and Banner 49. The yellow colour of its kernel is certainly an objection from a commercial point of view, but as it is a few days earlier than Banner and has always yielded a few bushels more, the writer believes that farmers growing oats only for their own needs would find it profitable to use this variety. Victory also gives a high yield, but as it is not any earlier than the Banners and as it has a weaker straw here it will not likely be grown much more than it is to-day.

The two strains of Banner are very much alike and very good; they probably will remain in popular demand for the commercial production of oats in all sections where they ripen well.

Alaska is an early oats, which will always have a place on the farm in districts where late oats do not ripen regularly, although it yields a little less per acre than the strains of Banner. It has a higher feeding value than other varieties, on account of its low percentage of hulls, which fact would seem to increase its yield and lessen the apparent difference between it and the other varieties.

Cartier, the two years' average of which is given in the above table, is also an early oats, comparing favourably with Alaska.

BARLEY

Eight six-row varieties and five two-row varieties of barley were sown and compared during the year; they were sown on May 22 and cut from August 16 to September 6.

COMPARISON OF VARIETIES—FIVE YEAR AVERAGE

SIX-ROWED BARLEY

Variety	Origin	Yield pe acre 1929	Day to mature	Length of straw	Strength of straw	Average yield per acre 1925-1929	Relative yield in percent of O.A.C. 21, used as check	Average weight per measured bushel, 1925-1929
		lb.	days	in.		lb.	%	lb.
O.A.C. 21	Guelph	1,968	89	35·1	9·1	2,574	100	48·1
Chinese, O. 60	Ottawa	2,136	89	35·9	9·4	2,558	99·4	49·1
Star	McD	2,424	91	27·8	9·8	2,705	105·2	49·4
Bearer O. 475	Ottawa	2,352	98	37·6	9	2,906	112·9	48·1
Manchurian	C.R.	2,040	92	37·4	9·1	2,421	94	49·7
Pontiac		1,536	91	36·3	8·2	1,875	* 78·8	48·3
Canadian Thorpe	Ottawa	2,760	94	26	9		** 140·2	51·0
Trebi	Ottawa	2,760	94	24	10		** 140·2	50·0

TWO ROWED BARLEY—FIVE YEAR AVERAGE

Duckbill	Mcdonald	2,184	101·3	38·1	9·5	2,449	95·1	52·1
Hannchen	Ottawa	2,544	98·8	33·2	8·7	2,606	101·2	51·9
Charlottetown 80	Charlot	2,400	98·8	33·4	9·4	2,667	103·6	51·9
Monk	Mcdonald	1,704	98·5	39	9·5	1,815	*76·3	51·9
Plumage Archer	Ottawa	2,280	107	29	10·0		**115·8	50

*Two year average.
**This year's results.

The same system was followed here as for oats; the relative yields of Monk and Pontiac were computed in percentage of the average yield of O.A.C. 21 for 1928 and 1929 and of its yield for 1929 only (1968 pounds) for those varieties grown for the first time in 1929. Of the six-rowed varieties mentioned in the table, Bearer comes first as to yield, giving 201 pounds more than Star, which takes second place, and 332 pounds more than O.A.C. 21, best known and most generally grown variety. Bearer matures in 98 days, nine days later than O.A.C. 21 and on this account is more suitable for mixing with Banner oats for feeding purposes. Star also gives a high yield of kernels but its straw is very short.

The three other varieties mentioned for a five-year period differ more in name than in characteristics; their yields and the number of days to mature are about the same.

In the two-rowed group, Charlottetown 80 and Hannchen gave practically the same yield; they also ripen in the same number of days. They are the earliest varieties of the group and correspond, as regard maturity to the latest six-rowed varieties.

PEAS

Seven varieties of peas were sown on May 21. Germination was even and good but unfortunately the ground was not uniform for all the replications of varieties. Some low-lying plots suffered through an excess of moisture, and the growth was abnormal as well as the yields. Results obtained at harvest time do not show the exact value of all the varieties tested, and it is thought best not to publish any results.

Selection of Arthur Peas

Our selection of Arthur peas, begun in 1924 and registered as Elite Stock Seed in 1928, was multiplied during the present season; it was sown on 4·4 acres of undrained land on May 22 and harvested on September 4. The total yield obtained was 155 bushels, or an average of 35·2 bushels per acre. The number of days to reach maturity was 105. As this selection takes the same number of days to ripen as Banner oats and yields a high proportion of straw, it is very suitable for mixtures grown for green fodder or as mixed grains. Furthermore, it is a very good pea for soups and in great demand.

BEANS

Four varieties of beans were sown in the spring, in plots measuring $\frac{1}{290.4}$ acre or two rows of 30 feet long and 30 inches wide. The seed was sown on June 4 and harvested from September 23 to September 28. The following table shows the results for a five year period.

BEANS—RESULTS OF VARIETY TEST

Variety	Origin	Yield per acre, 1929	Days to mature	Average yield per acre 1925-1929	Relative yield in percent. of Navy O. 711 used as check	Average weight per measured bushel 1925-29
		lb.	days	lb.	%	lb.
Navy O 711	Ottawa	1,558	110·2	1,582	100·0	64·4
Robust	Mcdonald	2,032	116·8	1,698	107·3	65·7
Imp. Yellow Eye	Ottawa	1,684	113·8	1,387	87·7	62·2
Large White	Mcdonald	1,568	116	1,425	90·1	63·3

MIXED GRAIN CROPS

Pea and oats mixture grown for grain

The object of this experiment is to find the mixture of peas and oats giving the highest yield and at the same time ascertain if this mixture would be more satisfactory than either one of these grains sown alone. The quantity of seed used was 2 bushels oats and 1 bushel peas. The composition of the different mixtures is as follows: Banner O. 49 and Mackay; Banner O. 49 and Arthur; Gold Rain and Gold Vine; Alaska and Chancellor.

The average yield for two years is 3,660 pounds, weighing 43 pounds per measured bushel; this exceeds by several hundred pounds the yields from either oats or peas sown alone.

A fact, which should encourage the growers of Alaska oats and Chancellor peas is that the mixture of these two grains gave the highest yield of all—3,360 pounds of grain per acre.

Oats and barley sown alone and in combination for grain

The quantity of seed used per acre was two bushels of oats and one bushel of barley. The following varieties were tried: Banner and Victory oats with Bearer, Charlottetown 80 and Duckbill barleys; Gold Rain and Alaska oats with O.A.C. 21 barley. The highest average yield for the two years the experiment was conducted was 3,165 pounds and the lowest 2,460 pounds.

The highest production was obtained from the mixture Victory-Charlottetown 80, the yield of which greatly exceeded those of oats and barley sown alone. For the same two years, Victory oats yielded 2,827 pounds and Charlottetown 80 barley 2,527 pounds.

Barley, oats and wheat sown alone and in combination for grain

The following mixture was used in this experiment: oats, $\frac{3}{4}$ bushel; barley, $\frac{3}{4}$ bushel; wheat, $\frac{1}{2}$ bushel.

Its average yield was 2,850 pounds, weighing 42 pounds per measured bushel. Here again the grain mixture gave better results than either grain sown separately. These experiments on mixed grains will be continued for a few years, and if the results obtained in the future confirm those of the past two years, more definite conclusions may be reached, regarding the choice of the most profitable mixture.

ROD-ROW TESTS OF CEREALS

These tests are conducted on plots consisting of three rows 16·5 feet long and 7 inches apart; each variety is replicated five times. The object is to sow in each row in so far as it is possible to do so, the same number of seeds which will germinate, for each one of the varieties. The quantity sown is based on the weight of 100 seeds and the percentage of germination of each variety.

The following tables show the results obtained over a five-year period.

WHEAT—ROD-ROW TESTS

Variety	Origin	Average yield per acre, 1929	Days to mature	Length of straw	Strength of straw	Average yield per acre, 1925-29	Relative yield in per cent of Huron O. 3 used as check	Average weight per measured bushel 1925-29	Weight of 1,000 kernels
		bush.	days	in.		bush.	%	lb.	grms.
Huron O. 3	Ottawa	36	111	41	9·9	35	100	62·9	44·6
Whitehead 123	Charlottetown	38	112	43	9·4	41	117·1	60·6	40·9
Chelsea O. 10	Ottawa	42	107	41	9·2	40	114·3	62·0	41·7
Early Russian	Ottawa	40	110	42	9·5	40	114·3	62·5	44·6
Bishop O. 8	Ottawa	45	107	40	9·7	39	111·4	62·7	42·6
Marquis O. 15	Ottawa	34	111	40	9·6	37	105·7	62·6	41·6
Aurore	Ottawa	35	108	40	9·7	37	105·7	61·9	41·4
Huron C.R. 7	Cap Rouge	38	111	41	9·8	37	105·7	62·0	44·0
White Russian O. Sel	Otatwa	40	114	42	9·0	36	102·8	60·0	42·0
Reward O. 928	Ottawa	39	101	37	9·7	36	102·8	64·0	41·8
Garnet O. 652	Ottawa	35	98	36	9·6	34	97·1	63·0	36·4
Master O. 520	Ottawa	40	97	34	9·2	34	97·1	62·4	41·5
929 B	Ottawa	38	102	35	9·7	34	97·1	63·6	35·8
Major O. 522	Ottawa	37	107	41	9·1	34	97·1	62·0	40·1
Preston	Ottawa	27	110	42	8·5	33	94·3	61·0	35·9
Red Fife O. 17	Ottawa	38	114	41	9·2	32	91·4	60·6	38·3
Ruby O. 623	Ottawa	34	102	37·3	9·5	31	88·5	62·6	36·6
White Fife O. 11	Ottawa	32	117	42	9·3	30	85·7	60·6	40·6
Crown O. 353	Ottawa	36	102	37	9·8	30	85·7	62·0	35·1
Early Red Fife O. 16	Ottawa	34	112	41	9·9	29	82·8	62·4	45·4

OATS—ROD-ROW TESTS

Variety	Origin	Yield per acre, 1929	Days to mature	Length of straw	Strength of straw	Average yield per acre 1925-29	Relative yield in per cent Banner 49, used as check	Average weight per measured bushel 1925-29	Weight of 1,000 kernels
		bush.	days	in.		bush.	%	lb.	grms.
Banner O. 49	Ottawa	93	109	42	9·5	87	100	34·6	39·6
Danish Island	"	106	108	42	9·8	100	115	32·6	40·5
Leader B	"	115	106	41	9·3	96	111	31·4	41·3
O.A.C. 144	"	100	108	45	9·0	94	108	33·8	41·1
Lincoln	"	111	109	44	9·1	93	107	34·0	44·2
Victoire Sw	"	98	110	42	9·1	91	105	37·1	41·9
Columbian	"	108	109	41	9·1	91	105	35·6	41·1
Prolific O. 77	"	111	111	43	9·1	90	104	36·6	40·7
Mansholts III	"	104	109	41	9·4	90	103	36·1	42·1
Gold Rain	"	92	106	44	9·8	88	101	38·0	36·5
O.A.C. 72	"	95	108	44	9·4	87	100	35·2	43·5
Legacy O. 678	"	89	108	42	9·1	86	98	35·6	38·4
Irish Victor	"	100	107	43	9·2	84	97	34·7	40·0
Longfellow O. 478	"	89	103	42	8·8	83	95	33·6	46·0
Alaska	"	82	95	37	9·7	77	89	36·0	39·6
Leader A	"	96	102	41	9·5	74	85	33·0	35·3
Laurel O. 477	"	57	102	39	9·5	60	69	47·0	26·5
Liberty O. 480	"	45	101	40	9·5	52	60	41·0	30·0
Banner Saks. 99	"	92	110	42	8·8	94	108	35·6	39·9
Banner Waugh	"	103	109	43	8·7	93	107	35·2	40·7
Banner Dow	"	104	110	43	9·0	91	105	34·5	40·8
Banner U.B.C.	"	102	109	43	9·1	91	105	35·2	39·3
Banner C.R.	"	104	109	44	8·8	88	101	34·2	39·4
Banner Sask. 144	"	105	110	43	9·1	88	101	35·3	39·8
Banner McColm	"	96	110	43	9·2	87	100	34·4	39·4
Banner 44	"	87	109	42	9·3	85	98	34·1	39·3
Banner Langille	"	100	107	41	9·1	82	94	35·3	40·3
Banner Dixon	"	75	109	46	9·3	79	91	35·3	40·4
Banner Griffin	"	93	108	41	7·6	68	77	35·6	43·2

BARLEY—ROD-ROW TESTS

Six-Rowed Varieties

Variety	Origin	Yield per acre, 1929	Days to mature	Length of straw	Strength of straw	Average yield per acre 1925-29	Relative yield in percent. of O.A.C. 21, used as check	Average weight per measured bushel 1925-29	Weight of 1,000 kernels
		bush.	days	in.		bush.	%	lb.	grms.
O.A.C. 21	Ottawa	74	94	29	9·4	65	100	49·9	41·5
Feeder O. 561	"	49	94	34	9·3	40	61·5	49·1	43·9
Albert O. 54	"	33	86	29	9·4	41	63·1	50·1	46·4
910 H	"	43	86	27	9·6	49	75·4	47	38·1
Hymalaya O. 59	"	72	92	25	9·4	57	87·7	62·4	43·7
Manchurian	Cap Rouge	58	99	38	9·7	59	90·8	48·4	42·1
Guymale	Ottawa	78	92	25	9·5	60	92·3	62·5	44·0
Chinese O. 60	"	59	94	34	9·5	62	95·4	49·4	42·8
Mensury	"	57	96	35	9·1	62	95·4	49·	44·6
Star	"	63	96	27	10·0	62	95·4	48·4	38·6
Bearer O. 475	"	67	106	37	8·4	62	95·4	47·6	39·9

Two-Rowed Varieties

Duckbill O. 57	Ottawa	40	105	36	9·6	49	75·4	51·5	55·1
French Chevalier	"	57	102	39	9·3	52	80	52·0	48·1
Duckbill 207	M.C.	51	105	37	9·5	56	86·1	51·6	54·6
Sw. Chevalier	Ottawa	66	109	34	7·4	58	89·2	51·8	47·3
Charlottetown No. 80	"	55	102	31	9·2	58	89·2	52·0	42·5
Early Chevalier	"	60	95	33	8·4	60	90·3	49·4	45·6
Gold	"	60	102	29	8·7	61	93·8	51·6	41·8
Hannchen	"	72	102	32	8·4	65	100	51·0	42·8

LIST OF PROJECTS UNDERTAKEN FOR THE CEREAL DIVISION

Ce. 1—Spring wheat—Test of varieties.
Ce. 5—Oats—Test of varieties.
Ce. 6—Barley—Test of varieties.
Ce. 7—Peas—Test of varieties.
Ce. 8—Beans—Test of varieties.
Ce. 9—Flax—Test of varieties for seed production.
Ce. 13—Spring wheat—Isolation of superior lines by selective breeding of old varieties.
Ce. 17—Oats—Isolation of superior lines by selective breeding of old varieties.
Ce. 19—Peas—Isolation of superior lines by selective breeding of old varieties.
Ce. 50—Production of registered seed.
Ce. 59—Peas and oats sown in mixtures for grain.
Ce. 60—Barley and peas sown in mixtures for grain.
Ce. 61—Barley, oats and wheat sown in mixtures for grain.
Ce. 76—Seed selection—Selected seed *vs.* non-selected seed.

FORAGE CROPS

Experiments on forage crops took up much of our time during the past season. These crops are of the highest importance in the entire district represented by this station, due to the fact that cattle breeding is the main feature on the majority of the farms.

A series of experiments on silage plants, corn, sunflowers and mixtures of peas and oats was undertaken; another series dealing with variety tests of roots

and the growing of roots and a third series on the growing of legumes and of annual and perennial grasses for hay production and the improvement of pasture lands, were also conducted.

CORN

Nineteen varieties of corn were under test during the present year.

The yields obtained in 1929 and the average yields for the number of years the varieties were under test, are shown in the following table. The yields in dry matter are computed each year from an analysis of a composite sample of each variety sent to Ottawa after the harvest.

The first five varieties shown in the table were left longer in the field than the others, to see if any of them would form ripe ears, and they were not cut for silage; that is the reason why no yield is mentioned. The corn was planted on June 12 and cut on September 23.

CORN—COMPARISON OF VARIETIES

Varieties	Origin	Height	Yield per acre 1929		State of maturity	Average yield per acre		Number of years under test
			Green weight	Dry matter		Green weight	Dry matter	
		in.	tons lb.	lb.		tons lb.	tons lb.	
Quebec 28	Macdonald College	50			Late milk			6
Northwest Dent	North Dakota grown (McKenzie)	52			Milk			7
Northwest Dent (Crookstown) strain	A. E. McKenzie	62			Milk			3
Northwest Dent	O'Neil	57			Milk			1
Amber Flint	Wimple	60			Ears formed			6
Long Fellow	Duke	68	9 429	2,838	Eare forming	13 224	2 380	7
Golden Glow	Duke	66	8 770	2,776	Eare forming	12 1,249	2 654	7
Leaming	Duke	71	8 1,422	2,823	Ears forming	12 501	2 37	7
Yellow Dent	Wimple	51	5 1,733	1,701	Ears formed	12 1,025	2 440	7
Bailey	Duke	73	8 1,837	2,870	Ears formed	12 1,514	2 406	7
North Dakota	Steele Briggs	71	9 1,951	2,933	Ears formed	13 1,832	2 245	6
White Dent, 90 day	Dakota Imp. Seed	70	10 152	3,164	Ears formed	14 762	2 834	6
Hybrid	Wimple	70	9 1,259	2,980	Ears formed	16 345	2 1,073	6
Burr Leaming	Cater	78	10 1,039	3,007	Eare formed	15 1,672	1 1,958	5
Pride yellow Dent	Dakota Imp. Seed	67	10 519	2,324	Ears formed	11 1,155	1 1,657	5
White Cap Yellow Dent	Steele Briggs	74	9 1,970	3,216	Ears formed	13 851	2 429	4
Wisconsin and Twitchell's Pride	E. F. Summerland	67	11 1,716	3,557	Ears forming	15 1,413	2 825	2
Iroquois	Macdonald College	74	8.....	2,296	Ears forming	9 1,659	1 1,028	1
Northwest Dent Stowell's Evergreen	Macdonald College	76	7 1,820	2,406	Ears forming			

As shown in the above table, the varieties giving the highest yield of green matter per acre do not always produce the largest quantity of dry matter; this is a very important point as it is the dry matter which counts from a nutritive point of view.

Wimple's Hybrid heads the list with 16 tons 345 pounds green matter and 5,073 pounds dry matter per acre; 90 days Dent comes second with 4,834 pounds dry matter and 14 tons 762 pounds green matter per acre. Other varieties although yielding only 12½ tons per acre still have 4,600 pounds of dry matter. These varieties have a high percentage of dry matter and although they yield a lesser quantity of green forage, their production is nevertheless creditable as regards feed.

The small margin existing between the Longfellow, Golden Glow, Leaming, Yellow Dent, Bailey and North Dakota over a seven-year period will be

noted. As shown in the above table, the highest yield (2 tons 654 pounds) was given by Golden Glow and the lowest (2 tons 37 pounds) by Leaming; the average yield of these six varieties is 2 tons 360 pounds.

Corn growing for silage is not generally recommended to the farmers of this district. However, those owning large herds of cattle and who wish to produce milk throughout the year would probably find this crop profitable, but they should select their varieties carefully and grow them in the best approved manner.

SUNFLOWERS

Seven varieties or strains of sunflowers were under test during the year. They were planted on June 12 and cut when each of the varieties was about 75 per cent in bloom.

Two varieties mentioned in the following table—Ottawa 76 and Mennonite—are very early but they are short and yield less than the other varieties; they are not recommended for silage. In this district of lower Quebec, where corn does not give large yields, the growing of sunflowers either alone or in mixture with corn is recommended.

The weather greatly influences the yield of corn but seems to have little or no effect on the yield of sunflowers. For this reason, the growing of a mixed crop of these two plants insures a profitable yield, in good or poor years.

SUNFLOWERS—COMPARISON OF VARIETIES

Variety	Origin	Date of harvesting	Height	Condition at maturity	Yield per acre, 1929		Average per acre		Number of years tested
					Green weight	Dry weight	Green weight	Dry weight	
			in.	%	tons lb.	tons lb.	tons lb.	tons lb.	
Russian Mammoth	Kenneth MacDonald	Sept. 17	75	75	14 1,561	2 665	18 374	2 703	7
Manchurian	McKenzie	Sept. 5	65	75	11 1,902	1 1,454	15 754	2 27	6
Russian Mammoth	Ewing	Sept. 17	78	75	15 901	2 431	21 75	2 573	5
Russian Mammoth Selection Ottawa 76	Disco	Sept. 16	74	75	15 1497	2 526	14 1,443	2 330	4
Mennonite	C.E.F.	Aug. 29	59	75	13 61	1 1,065	13 352	2 159	4
Manchurian	Rosthern	Aug. 21	44	75	8 296	0 1,916	13 692	2 529	4
	Steel Briggs	Sept. 17	80	75	10 485	2 1,958	.....	.....	1

The above table shows that the yields of green or dry matter, particularly the latter, vary little in the two selections of Russian Mammoth, Kenneth MacDonald and Ewing; they are far superior to the others and their use is strongly recommended.

MANGELS—VARIETY TEST FOR YIELD AND PURITY

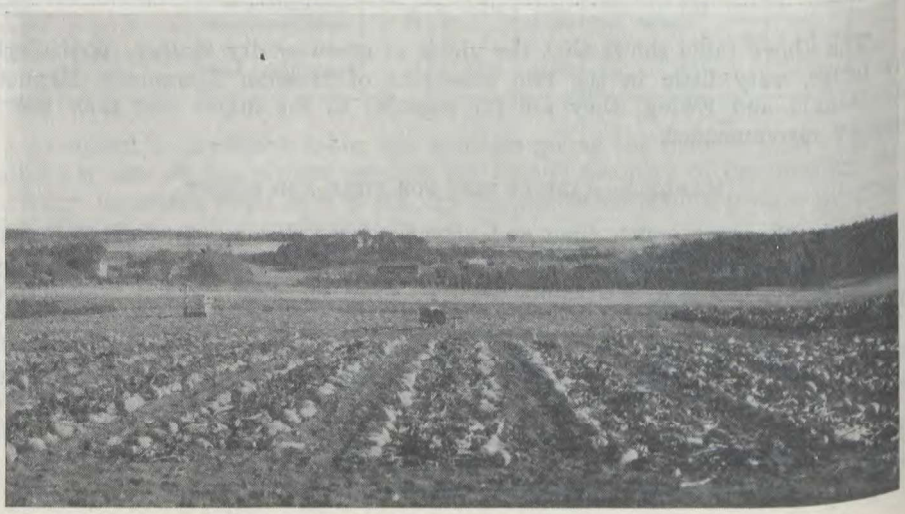
As in the past, much time and attention was devoted to the growing of mangels this year. Thirty-three varieties representing different types—long, half-long, intermediate and tankard—were sown on May 23 and pulled from October 12 to October 16.

The following table shows, first of all, the yields obtained in 1929 and the average yields per acre for the number of years each variety has been under test.

MANGELS—TEST OF VARIETIES

Varieties	Origin	Yield per acre, 1929		Average yield per acre		Number of years under test	Type
		Green weight	Dry matter	Green weight	Dry matter		
		tons lb.	tons lb.	tons. lb.	tons lb.		
Yellow Intermediate	Ottawa	25 1,087	3 263	20 972	2 1,319	8	Yellow Intermediate.
Danish Sludstrup	D. & F.	33 821	3 1,130	21 1,211	2 1,475	8	Yellow Intermediate.
Danish Rose Half Sugar	Ste.Anne	20 972	2 835	19 928	2 375	7	Rose Intermediate.
Perfection Long Red Mammoth	Rennie	23 1,770	3 607	18 820	2 1,296	7	Red Long.
Barres	Hartman	27 17	1 1,269	20 179	2 629	6	Yellow Intermediate.
Stryno Fjerritslev Barres	Hartman	28 1,063	2 1,706	21 636	2 1,344	6	Yellow Intermediate.
Sludstrup Barres	Hartman	26 969	2 1,848	23 298	2 1,918	6	Yellow Intermediate.
Red Top Half Sugar White	Hartman	26 1,318	2 1,790	19 1,865	2 536	6	Half Long.
Green Top Half Sugar White	Hartman	25 621	2 1,806	20 774	2 894	6	Half Long.
Svalof Alpha Red	G. Swedish	22 1,651	2 1,200	20 405	2 783	6	Half Long.
Echendorffer Yellow	Hartman	31 988	2 1,688	23 1,855	2 431	6	Yellow Tankard.
Echendorffer Red	Hartman	33 1,185	3 194	23 344	2 462	6	Yellow Tankard.
Echendorffer Yellow	G. Swedish	34 315	2 1,730	23 761	2 328	6	Yellow Tankard.
Echendorffer Red	G. Swedish	30 51	2 1,771	22 1,596	2 432	6	Red Tankard.
Imp. Cream Tankard	Rennie	33 37	3 247	22 1,142	2 474	6	Cream Tankard.
Ideal	Rennie	29 1,195	3 1,009	22 1,960	2 1,066	6	Yellow Tankard.
Golden Tankard	Rennnie	22 1,651	2 711	17 1,883	1 1,655	6	Yellow Tankard.
Golden Tankard	D. & F.	22 961	2 217	19 7	2 140	6	Yellow Tankard.
Mammoth Elevatham	Hartman	24 3	3 706	20 1,253	2 761	6	Long Red.
Mammoth Red Long	D. & F.	25 443	2 1,851	20 1,403	2 742	6	Long Red.
Mammoth Red Long	Sutton	28 372	3 421	22 1,720	2 1,118	6	Long Red.
Yellow Long	D. & F.	22 653	2 1,287	16 620	2 324	6	Long Yellow.
Barres Half Long	G. Swedish	29 806	3 328	22 1,976	2 1,099	6	Yellow Intermediate.
Yellow Globe	D. & F.	21 1,560	2 434	22 308	2 27	6	Yellow Globe.
Yellow Globe	Rennie	28 1,832	2 1,164	22 1,761	2 3	6	Yellow Globe.
Yellow Globe	Sutton	23 1,480	2 150	25 294	2 254	6	Yellow Globe.
Giant Sugar	Rennie	18 1,564	2 117	18 1,339	2 318	6	Yellow Globe.
Barres Oval	G. Swedish	27 414	2 1,583	22 779	2 1,021	6	Yellow Tankard.
Taaroge Barres	Hartman	28 367	3 99	23 229	2 1,152	6	Yellow Intermediate.
Giant Sugar White	R. Moore	32 966	3 497	24 376	2 1,498	5	White Half Long.
Sludstrup	Penticton	25 1,139	2 1,431	21 22	2 1,111	4	Yellow Intermediate.
Eclipse	McKenzie	29 1,588	2 1,595	22 125	2 978	4	Yellow Intermediate.
Half Sugar White	D. & F.	26 359	2 1,901	20 45	2 735	2	White Half Long.

By referring to the above table, it may be seen that although the yields for 1929 were very good, there is quite a difference in the capacity of production of the different varieties. The difference in dry matter, which is the most important consideration as regards nutritive value, is still more significant. Cattle breeders who intend to sow mangels will do well to select varieties yielding the highest amount of dry matter rather than the heaviest tonnage.



Variety test of roots.

Varieties of the tankard and globe types are more suitable on heavy and shallow soils; on soils of average depth, the intermediate and half-long types and on deep soils, the long type.

In the above table, Hartman's Sludstrup, belonging to the yellow intermediate type, gave the highest yield of dry matter per acre, followed by Rennie's Golden Tankard, of the tankard type, with 2 tons 1,655 pounds of dry matter.

Although good yields were obtained from all types, the varieties belonging to the intermediate group generally gave the best results. In fact, if the varieties under test for six years listed in the table are grouped by types, the following average yields are shown:—

MANGELS—AVERAGE YIELDS OF DIFFERENT TYPES

Type	Green yield		Dry yield	
	tons	lb.	tons	lb.
Intermediate	22	264	2	1,228
Half long	20	348	2	739
Long	20	249	2	737
Tankard	22	36	2	445
Globe	22	425	2	151

As shown by these figures the varieties of the intermediate type gave 489 pounds dry matter more per acre than the varieties of the half-long type and long type, occupying second place, 783 pounds more than the tankard varieties and 1,077 pounds more than the globe varieties.

Moreover, it is much easier to pull the intermediate and tankard varieties, which is a great advantage in their favour when grown on heavy soils.

SUGAR BEETS

Only three varieties were under test this season. The object of this experiment is to ascertain the productivity, the purity and the value for refining of each variety. Twelve typical roots of each variety were forwarded to the Chemistry Laboratory, Department of Agriculture, at Ottawa, for analysis. The results obtained up to date are given in the following tables:—

SUGAR BEETS—TEST OF VARIETIES

Variety	Origin	Yield per acre	
		tons	lb.
Horning	Dominion Sugar Co.	12	8
Rabbethge & Gieseke	" "	11	360
Fredericksen	" "	11	1,304

SUGAR BEETS—CHEMICAL ANALYSIS

Variety	Sugar in liquid matter	Coefficient of purity	Average weight per root	
	%	%	lb.	oz.
Horning	22·00	86·06	1	7
Rabbethge & Gieseke	22·43	85·05	1	10
Fredericksen	21·63	85·31	1	10

SUGAR BEETS—AVERAGE YIELD, 1922-29

Year	Number of varieties	Average yield	Average weight per root	Average yield of sugar in liquid matter	Coefficient of purity
		tons lb.	lb. oz.	%	%
1929	3	11 1,224	1 9	22·02	85·47
1928	6	8 924	1 —	21·04	85·40
1927	8	21 566	1 6	20·16	90·32
1926	8	11 179	1 7	17·74	83·37
1925	7	13 94	1 14	18·52	82·82
1924	8	9 748	1 7	19·92	84·79
1922	6	8 427	1 1	17·69	87·38
7 year average 1923 to 1929	.....	11 1,737	1 6	19·58	85·65

SWEDES

Twenty-eight varieties of swedes and three of turnips were under test this year. The results obtained during the season as well as the average yield for the number of years tested are shown in the following table:—

SWEDES—COMPARISON OF VARIETIES

Variety	Origin	Yield per acre 1929		Average yield per acre		Number of years under test
		Green weight	Dry matter	Green weight	Dry matter	
		tons lb.	tons lb.	tons lb.	tons lb.	
Ditmars	McNutt	29 1,040	2 983	24 294	2 696	7
Bangholm	Dupuy & Ferguson	25 1,483	2 798	21 946	2 432	7
Kangaroo	"	23 1,930	2 764	21 1,758	2 1,011	7
Sutton's Red Top Champion	"	22 379	2 274	20 483	2 639	7
Elephant	"	28 246	2 1,276	21 1,725	2 709	7
Good Luck	Ste. Anne	25 878	1 1,963	22 654	2 1,019	6
Perfection	Dupuy & Ferguson	30 1,992	2 1,065	22 1,584	2 489	6
Ne Plus Ultra	"	28 1,834	2 656	23 1,750	2 804	6
Jumbo Improved	Rennie	22 453	2 481	21 161	2 651	6
Canadian Gem	"	38 431	3 1,506	24 1,630	2 1,378	6
Magnum Bonum	"	25 1,784	2 402	23 1,771	2 787	6
Prize Purple Top	"	24 1,290	2 446	22 1,516	2 706	6
Invicta	"	26 391	2 443	25 160	2 763	6
Best of all	"	26 1,222	2 822	21 943	2 300	6
Bangholm	E. F. Nappan	24 1,367	2 1,667	19 967	2 855	6
Bangholm	General Swedish	23 1,891	3 135	20 713	2 1,215	6
Shepherd Yellow Globe	Hartman	29 212	2 1,321	23 535	2 809	6
Shirwings	Kenneth MacDonald	26 218	2 1,070	18 1,082	2 132	6
Yellow Improved	General Swedish	24 523	2 813	22 1,914	2 1,416	5
Bangholm 8312	MacDonald College	25 846	2 1,125	22 1,094	2 744	5
Lord Derby Imp	Sutton	26 1,071	2 739	24 1,411	2 573	5
Good Luck	Steele Briggs	26 5	2 124	21 131	2 257	5
Hall's Westbury	Ewing	27 361	2 409	22 1,207	2 514	4
Bangholm	Kentville	19 427	2 231	18 1,192	2 612	2
Bangholm	Hartman	28 1,339	3 38	22 632	2 1,221	2
Bangholm Klonk	Trifolium	22 1,360	2 776	19 1,722	2 495	5
Yellow Tankard	Dupuy & Ferguson	21 185	1 155	21 1,892	2 152	5
Fynch Bartfelder	"	29 1,573	2 224	22 245	1 1,805	4
Dales' Hybrid	"	20 1,817	1 1,383	19 150	1 1527	1
White Butler	Hartman	18 519	2 61	.....	.....	1
Mustala	Hartman	18 1,748	1 1,394	.....	.....	

The value of a variety of swedes or beets should not be judged by the yield in tons but rather by the yield in dry matter. As shown in the above table, some varieties are heavy yielders but as their percentage of dry matter is not so high as in other varieties, the total yield in dry matter is lower.

The following five varieties gave the highest yield of dry matter per acre over six years: Improved Yellow (General Swedish) 5,416 pounds, Canadian Gem (Rennie) 5,378 pounds, Bangholm (General Swedish) 5,215 pounds, Good Luck (Ste. Anne selection) 5,019 pounds and Kangaroo (Dupuy and Ferguson) 5,011 pounds.

Attention is drawn to the large number of varieties or lines of different origin, which have approximately the same value as to yield. A detailed analysis of the preceding table, when the varieties grown during the same number of years, are grouped together would give the following results:—six varieties tested during seven years gave an average yield of 2 tons 417 pounds. For the same group, the highest individual yield was 2 tons 1,019 pounds and the lowest 2 tons 432 pounds.

Thirteen varieties grown during six years had an average yield of 2 tons 793 pounds. With the exception of three varieties which gave from 420 to 623 pounds more, and two from 493 to 661 pounds less, the other eight gave about the same yields.

CARROTS

Nine varieties were sown in this experiment. The results obtained are as follows:—

CARROTS—COMPARISON OF VARIETIES

Variety	Origin	Yield per acre, 1929 green weight	Average yield per acre, green weight	Years under test
		tons lb.	tons lb.	
White Belgian	Dupuy & Ferguson	15 855	14 1,497	7
Danish Champion	"	14 1,693	13 173	7
Large White Vosges	"	12 1,918	12 862	6
Mammoth Short White	Rennie	17 195	16 962	6
Large White Belgian	"	9 295	13 1,297	6
White Belgian	Hartman	15 1,363	14 848	6
Champion	"	13 1,515	12 655	6
Champion	General Swedish	13 1,007	14 332	5
James	Dupuy & Ferguson	11 796	12 500	2

LIST OF EXPERIMENTS UNDERTAKEN FOR THE FORAGE PLANTS DIVISION

Ag. 16—Beets—Test of varieties for yield and purity.
Ag. 17—Beets—Production for pure lines.
Ag. 19—Beets—Large vs. small seed.
Ag. 20—Beets—Early seeding vs. late seeding for fodder.
Ag. 23—Beets—Seed production as a commercial venture.
Ag. 24—Beets—Small roots (stecklings) vs. large roots for seed production.
Ag. 25—Beets—Best method of planting roots for seed production.
Ag. 66—Sugar beets—Test of varieties for yield and purity.
Ag. 46—Turnips—Test of varieties for yield and purity.
Ag. 51—Swedes—Test of varieties for yield and purity.
Ag. 52—Swedes—Production of pure lines.
Ag. 53—Swedes—Early vs. late seeding.
Ag. 58—Swedes—Best method of planting roots for seed production.
Ag. 60—Swedes—Thinning out to different distances.
Ag. 36—Carrots—Test of varieties for yield and purity.
Ag. 1—Corn—Test of varieties for silage purposes.
Ag. 76—Sunflowers—Test of varieties for yield and purity.

LEGUMES AND GRASSES

The experiments on legumes and grasses were continued this year on a somewhat larger scale than in the past. A field measuring 2·75 acres divided into one-hundredth-acre plots was sown to twenty-eight different hay and grass mixtures, five varieties of alfalfa, and sixteen of red clover, with oats as cover crop. As there was sufficient rain, germination was good, and with few exceptions the plots had a well-developed growth in the fall, sufficient to withstand the winter.

In addition to these plots, another series of twenty plots, including ten perennial grasses and ten varieties of white clover, was established on clay loam, in order to ascertain the value of these plants as pasture crops on soil of poor quality.

A great deal of the land in this district is in permanent pasture, and any scheme which has for object the improvement of such pastures deserves the best consideration.

MIXTURES FOR HAY AND PASTURE

The crops used in the preparation of these various mixtures are as follows: alfalfa, timothy, red clover, alsike clover, white clover, orchard grass, fescue, blue grass, and tall oat grass.

The composition of each mixture, as well as the quantity of seed used for each crop, are given in the following table. Yields are given as green weights and dry matter per acre. The determination of the dry matter content is worked out at Ottawa, according to the analysis of a sample forwarded to the Chemistry laboratory at harvest time.

MIXTURES OF GRASSES AND CLOVER

Mixtures	Quantity per acre	Mixtures sown in 1927		1928–29	
		Yield per acre, 1929		Average yield per acre	
		Green weight	Dry matter	Green weight	Dry matter
	lb.	tons lb.	lb.	tons lb.	lb.
Alfalfa	3				
Timothy	6				
Red clover	10	7 700	3,161	9 1,975	4,545
Alsike clover	2				
White Dutch clover	1				
Alfalfa	3				
Timothy	6				
Red clover	5	7 1,600	3,354	9 1,275	4,316
White Dutch clover	1				
Timothy	8				
Red clover	8	7 1,700	3,627	10 525	4,623
Alsike clover	2				
White Dutch clover	2				
Timothy	6				
Meadow fescue	4				
Red clover	10	7 1,300	4,483	11 475	5,687
White Dutch clover	1				
Timothy	6				
Meadow fescue	4				
Red clover	8	7 1,000	4,665	9 1,850	3,556
Alsike clover	2				
White Dutch clover	1				

MIXTURES OF GRASSES AND CLOVER—*Concluded*

Mixtures	Quantity per acre	Mixtures sown in 1927		1928-29	
		Yield per acre, 1929		Average yield per acre	
		Green weight	Dry matter	Green weight	Dry matter
	lb.	tons lb.	lb.	tons lb.	lb.
Timothy	6				
Meadow fescue	4				
Red clover	8				
Alsike clover	2	7 1,800	5,024	10 650	3,725
White Dutch clover	1				
Kentucky blue grass	2				
Red top	2				
Timothy	6				
Orchard grass	4				
Red clover	10	7 0	4,400	9 675	3,432
White Dutch clover	1				
Timothy	6				
Orchard grass	4				
Red clover	8	7 100	4,089	10 550	3,160
Alsike clover	2				
White Dutch clover	1				
Timothy	6				
Orchard grass	2				
Meadow fescue	2	7 500	4,263	9 1,625	3,347
Red clover	10				
White Dutch clover	1				
Timothy	6				
Orchard grass	2				
Meadow fescue	2				
Red clover	8	6 1,600	4,053	9 825	3,227
Alsike Clover	2				
White Dutch clover	1				
Timothy	6				
Orchard grass	2				
Meadow fescue	2				
Red clover	8	7 900	4,187	10 425	6,268
Alsike clover	2				
Kentucky blue grass	2				
White Dutch clover	1				
Red top	2				

MIXTURES OF GRASSES AND CLOVERS

Mixtures	Quantity of seed per acre	Mixture sown in 1928	
		Yield per acre in 1929	
		Green weight	Dry matter
	lb.	tons lb.	lb.
Timothy	8		
Red clover	10	12 1,300	4,453
White Dutch clover	1		
Timothy	8		
Red clover	10		
Kentucky blue grass	2	12 1,800	4,567
Red top	2		
White Dutch clover	1		
Timothy	8		
Red clover	8		
Alsike clover	2		
Kentucky blue grass	2	13 1,300	4,382
Red top	2		
White Dutch clover	1		

MIXTURES OF GRASSES AND CLOVERS—*Concluded*

Mixtures	Quantity of seed per acre	Mixture sown in 1928; Yield per acre in 1929	
		Green weight	Dry matter
		tons lb.	lb.
Timothy	8		
Alsike clover	4	13 0	4,602
White Dutch clover	1		
Timothy	8		
Alsike clover	4		
Kentucky blue grass	2	13 100	4,176
Red top	2		
White Dutch clover	1		
Timothy	6		
Meadow fescue	4		
Red clover	10		
Kentucky blue grass	2	11 1,500	4,442
Red top	2		
White Dutch clover	1		
Timothy	6		
Orchard grass	4		
Red clover	10		
Kentucky blue grass	2	12 1,600	4,403
Red top	2		
White Dutch clover	1		
Timothy	6		
Orchard grass	4		
Red clover	8		
Alsike clover	2	13 1,500	4,680
Kentucky blue grass	2		
Red top	2		
White Dutch clover	1		
Timothy	6		
Meadow fescue	2		
Orchard grass	2		
Red clover	10	12 1,000	4,474
Kentucky blue grass	2		
Red top	2		
White Dutch clover	1		
Timothy	8		
White clover	10	7 1,000	4,256
White Dutch clover	1		
Timothy	6		
Orchard grass	4		
White clover	10	7 700	3,308
White Dutch clover	1		
Timothy	6		
Meadow fescue	4		
White clover	10	7 1,900	4,654
White Dutch clover	1		
Timothy	6		
Meadow fescue	2		
Orchard grass	2	7 400	3,370
White clover	2		
White Dutch clover	1		
Timothy	8		
White clover	10	8 200	4,099
White Dutch clover	1		
Timothy	6		
Orchard grass	4		
Yellow clover	10	7 1,300	3,672
White Dutch clover	1		
Timothy	6		
Meadow fescue	4		
Yellow clover	10	8 1,100	4,275
White Dutch clover	1		
Timothy	6		
Meadow fescue	2		
Orchard grass	2	8 100	3,864
Yellow clover	10		
White Dutch clover	1		

The first eleven mixtures were sown in 1927 and the remainder in 1928 only; as the latter were grown only one year, no average yield is given.

As shown by the yields obtained, the addition of other legumes or grasses to those generally used—i.e. timothy, red clover, and alsike clover—was profitable, but as the results only cover two years' operations, it is as yet too early to draw any definite conclusions in favour of one or the other of these mixtures. This work will be continued.

ANNUAL HAY PLANTS—VARIETIES OF GRAIN GROWN FOR HAY AND GREEN FODDER

For many years to come, hays and pastures will be the main reliance of cattle breeders, but these crops alone will not supply sufficient feed, and they should be supplemented by an annual hay crop.

In order to determine the most profitable mixtures, twenty plots in duplicate measuring each 1/100th acre, were sown to twenty different mixtures in 1928 and again this year; these mixtures are made up of the following: oats, Banner and Victory; peas, Mackay and Arthur; vetches.

Each plot contained one or the other of these crops in various proportions.

The yields obtained this year as well as the average for two years are given in the following table:—

HAY MIXTURES—OATS, PEAS AND VETCHES

Mixture No.	Composition	Yield per acre, 1929				Average yield per acre, 2 years			
		Green weight		Dry matter		Green weight		Dry matter	
		tons	lb.	tons	lb.	tons	lb.	tons	lb.
1	Banner oats Mackay peas Vetches	12	650	3	345	12	225	2	1,421
2	Banner oats Mackay peas Vetches	13	50	3	492	13	110	2	1,705
3	Banner oats Mackay peas Vetches	12	1,100	3	117	12	625	2	1,534
4	Banner oats Mackay peas Vetches	12	300	3	388	12	225	2	1,624
5	Banner oats Mackay peas Vetches	12	850	3	309	12	600	2	1,770
6	Banner oats Mackay peas Vetches	14	350	3	112	14	550	2	1,365
7	Banner oats Mackay peas Vetches	13	1,700	3	407	13	1,450	2	1,548
8	Banner oats Mackay peas Vetches	13	1,500	2	1,879	13	275	2	1,258
9	Banner oats Mackay peas Vetches	13	1,200	3	109	13	325	2	1,714
10	Banner oats Mackay peas Vetches	14	450	3	723	13	1,125	2	1,800

HAY MIXTURES—OATS, PEAS AND VETCHES—*Concluded*

Mixture No.	Composition	Yield per acre, 1929		Average yield per acre, 2 years	
		Green weight	Dry matter	Green weight	Dry matter
		tons lb.	tons lb.	tons lb.	tons lb.
11	Banner oats Mackay peas Vetches	14 1,000	3 299	13 1,225	2 1,771
12	Banner oats Mackay peas Vetches	12 1,050	3 835	13 975	2 1,934
13	Banner oats Arthur peas Vetches	12 1,400	3 350	12 1,525	2 1,899
14	Victory oats Arthur peas Vetches	13 1,950	3 462	13 975	2 1,954
15	Banner oats Mackay peas	14 1,350	3 730	14 475	3 316
16	Victory oats Mackay peas	15 0	3 351	13 1,825	2 1,831
17	Banner oats Arthur peas	12 1,000	3 135	12 600	2 1,609
18	Victory oats Arthur peas	12 1,800	3 367	12 800	2 1,762
19	Banner oats Mackay peas	12 1,900	3 143	12 1,000	2 1,478
20	Banner oats Mackay peas	13 250	3 644	12 25	2 1,717

Other experiments along these lines were also conducted, among which may be mentioned the testing of various perennial grasses sown alone as pasture plants and to which much attention was given.

No comparison could be made of the results obtained to date as they are not sufficiently representative, but they show that certain grasses are more profitable than others. Orchard grass, meadow fescue, tall oat grass, brome grass, and Sudan grass germinated well and gave a fairly abundant yield, while blue grass and western rye grass were almost a complete failure. A few plots of soy beans and horse beans, sown both alone and in mixture with oats and peas, were under test this year; the object was to ascertain their respective value for green fodder. This work will be continued for some time in order to gain an idea of their real value for this district.

LIST OF EXPERIMENTS UNDER WAY ON LEGUMES AND GRASSES

Ag. 126—Test of varieties for hardiness, yield and suitability.
Ag. 146—Red clover—Test of varieties for yield and general suitability.
Ag. 161—Sweet clover—Test of varieties.
Ag. 178—Alsike clover—Test of varieties.
Ag. 201—Timothy—Test of varieties.
Ag. 231—White Dutch clover—Test of varieties for suitability and yield.
Ag. 255—Test of various grasses.

Ag. 264—Grasses and clovers sown alone and in mixtures for hay and pasture.
Ag. 246—Test of varieties of grain for hay and green fodder.
Ag. 248—Test of annual grasses for hay—Test of varieties for yield and suitability.
Ag. 249—Hay mixtures.
Ag. 251—Millet—Test of varieties.

Seven-acre field of clover and alfalfa which yielded 4 tons 1,200 pounds per acre for two cuts.

POULTRY

Only Barred Rocks are kept on this Station. On December 31, 1929, the flock included 90 hens, 120 pullets, 16 cockerels, and 4 cocks. Over 200 hens were entered in the laying contest.

Incubation was begun on March 15 and the first chicks were hatched on April 18; 2,762 hatching eggs were used, giving 1,467 chicks, 604 of which were sold as day-old chicks and the remainder were kept in the Station.

IMPROVEMENT OF POULTRY IN THE DISTRICT

In order to improve the quality of poultry in the district, a certain number of hatching eggs, chicks, cockerels and pullets are sold every year; this year, 98 dozen hatching eggs, 604 day-old chicks, and 150 cockerels and pullets issued from heavy-laying strains were sold.

Several experiments on poultry-keeping are under way, to find out the best methods of breeding and feeding in order to reduce to a minimum the cost of production of a cockerel, of a pullet, and of a dozen eggs.

INCREASING PRODUCTION BY MEANS OF PEDIGREE BREEDING

All the hens kept on this Station are trap-nested; for breeding purposes, the best layers are mated with males issued from two generations of females with a good laying record.

The annual production and the yearly average for the fifteen best layers since 1923 are given in the following table:—

PRODUCTION OF THE FIFTEEN BEST LAYERS

Year	Number of birds	Total number of eggs laid	Average production per bird
1923	15	1,854	123·6
1924	15	2,297	153·1
1925	15	3,036	202·4
1926	15	3,374	224·9
1927	15	3,333	222·2
1928	15	3,693	246·2
1929	15	3,878	258·5

This table shows clearly the possibility of improving egg production by using males of good parentage for mating purposes, by practising a strict selection of the hens kept for breeding and, last but not least, by practising good management and good feeding methods.

FEED COST OF EGGS

The object of this experiment is to ascertain the cost of egg production for the different months of the year; records are kept of the number of eggs laid and the cost of feed for a given number of birds.

Twenty Barred Rock pullets were used for this experiment; they were fed a standard mixture of grain and a dry mash made up of one part bran, one part middlings, one part cornmeal, 15 per cent tankage, 5 per cent bone meal, and 1 per cent table salt. They also received gravel, oyster shell, charcoal, and cod liver oil in the mash, two or three times a week, and greens during the winter months (mangels or sprouted oats).

FEED COST OF EGGS

Month	Number of birds	Eggs produced	Cost of feed	Cost per dozen	Value	Profit over the cost of feed
			$	cts.	$	$
November	20	228	4 00	21·0	11 40	7 40
December	20	370	3 88	12·4	16 96	13 08
January	20	350	4 42	15·1	11 66	7 24
February	20	234	4 18	21·4	7 80	3 62
March	20	470	4 38	11·1	12 36	7 98
April	20	418	4 14	11·8	9 40	5 26
May	20	378	3 17	9·9	10 39	7 22
June	20	378	3 50	11·0	10 39	6 89
July	20	312	3 56	13·6	8 33	4 77
August	20	366	3 72	12·0	12 20	8 48
September	20	342	3 52	12·4	12 82	9 30
October	20	320	3 26	12·6	12 00	8 74
Total for the year	20	4,166	45 73	13·2	135 71	89 98

As shown in the above table, the eggs left a very handsome profit of $89.98 over the cost of feed. This was due to high production, maintained throughout every month of the year, and especially to a very heavy production during October, November, December, and January, when the price of eggs reaches its peak.

It should also be noted that the average production per bird for the year was 208·3 eggs, at an average cost of production of 13·2 cents per dozen, leaving a profit of $4.50 per bird, not taking into account labour, lodging, capital invested, etc. In other words, the profit that can be made is closely related to a high winter and total production.

NUMBER OF EGGS REQUIRED TO COVER THE COST OF FEED

Taking as a basis the figures given in the above table, it will be seen that the average feed cost per bird and per year was $2.29; assuming that the average sale price of eggs during the year is 40 cents per dozen, it would be necessary for a hen to lay 69 eggs in order to cover the cost of feed consumed; the average number of eggs required to pay the cost of feed over a five-year period is 70.

BEST MAKE OF INCUBATOR

Two kinds of incubators are used on the Station: Miller Ideal and Buckeye. Both makes are placed under the same conditions and a record is kept of the percentage of eggs hatched for each incubator.

As may be seen in the following table, the results obtained with both machines are nearly identical.

RESULTS WITH DIFFERENT INCUBATORS

Incubator	Total eggs set	Fertile eggs	Number of chicks obtained	Hatching percentage of fertile eggs	Fertile eggs required for one chick
Miller Ideal	1,878	1,646	1,032	62·6	1·5
Buckeye	884	698	435	62·3	1·6

BEST INCUBATION DATE

In order to determine the best month for incubation, eggs are set in March, April, and May and a record is taken of their fertility, the number of eggs hatched, and the number of chicks dying up to the age of three weeks.

BEST INCUBATION DATE

Month	Eggs incubated	Fertile eggs	Percentage fertile	Number of chicks obtained	Percentage of fertile eggs hatched	Number fertile eggs required for one chick	Percentage of live chicks at age of three weeks
March	399	340	85·2	189	55·6	1·7·	92·0
April	1,339	1,147	85·6	733	63·9	1·5	90·7
May	1,024	857	83·6	545	63·5	1·5	90·9

It will be noted, in the above table, that the percentages of fertile eggs for March, April and May were respectively 85·2, 85·6 and 83·6. But, on the other hand, the percentage of eggs hatched was 8·3 lower for March than for April and May. As regards the percentage of live chicks at three weeks of age, March comes first. This experiment shows that the principal factor to be considered in the breeding of chicks is the vigour of the males and of the hens producing the eggs used for hatching, rather than the date or month the eggs are set, provided the chicks are well cared for.

FATTENING AND FINISHING ROASTERS

In order to ascertain the most satisfactory methods for fattening and finishing roasters, thirty-six Barred Rock cockerels were divided into six groups of six each; the first five lots were put in fattening crates and the other lot was left free, in a fattening pen.

Skim-milk was used in the preparation of the mash for each lot, at the rate of 1½ pound per pound mixed grain, except for lot 3, where it was replaced by beef scrap.

In addition to the feed mentioned, charcoal and oyster shell were fed to all the birds.

Lot No. 1.—2 parts barley meal, 2 parts oat meal, 1 part mixed bran and milk at the rate of 1½ pounds milk for 1 pound of mixture.

Lot No. 2.—1 part barley meal, 1 part corn meal, 2 parts oat meal, 1 part mixed bran and milk.

Lot No. 3.—2 parts corn meal, 2 parts oat meal, 1 part bran, 2 parts beef scrap.

Lot No. 4.—2 parts corn meal, 2 parts oat meal, 1 part mixed bran and milk.

Lot No. 5.—2 parts corn meal, 2 parts oat meal, 1 part bran, 1 part cooked potatoes, with milk.

Lot No. 6.—2 parts corn meal, 2 parts oat meal, 1 part mixed bran and milk.

The last lot was left free in a fattening pen; the others were kept in crates, so as to determine the effect of confinement.

FATTENING AND FINISHING ROASTERS

Group No.	Weight per group at beginning	Weight at the end	Gain in weight	Mash	Milk	Cost of feed	Initial value of group	Final value of group	Profit per group	Profit per bird	
										1929	Average for 5 years
	lb.	lb.	lb.	lb.	lb.	$	$	$	$	cts.	cts.
1	40	48	8	44	66	1 25	10 00	15 36	4 11	68	49
2	37	47	10	48	72	1 39	9 25	15 04	4 40	73	53
3	35	41	6	40	.....	0 95	8 75	13 12	3 42	57	41
4	38	47	9	47	70	1 40	9 56	15 04	4 08	68	55
5	34	44	10	39	58	1 13	8 50	14 08	4 45	74	60
6	38	47	9	45	67	1 33	9 50	15 04	4 21	70	53

In studying the details for each lot, it will be noted that all lots made gains varying from six to ten pounds per lot; the profit over the cost of feed ranged from $3.42 to $4.45 per lot. It should be stated here that all the chickens used in these feeding experiments were valued at a uniform price per pound at the beginning and at the end of each experiment, although there was quite a difference in quality between lot No. 3 and lots No. 2 and No. 5.

This concludes an experiment which has run five years and it may be concluded that the feeds given to lots No. 2, No. 3 and No. 4 are the best.

UNFATTENED CHICKENS

Another similar experiment was to compare a lot of six chickens which had been fattened with another lot comprising the same number of birds unfattened, in order to determine the net profit which is realized through fattening. The fattened lot yielded $4.60 more than the other one.

BEST HATCHING DATE FOR EGG PRODUCTION

The object of this experiment was to ascertain if early hatched pullets will give more eggs than late-hatched ones. The egg production of two equal lots of well-matched pullets was compared in order to obtain this information; one lot had been hatched in April and the other in May.

The latter gave an average production of 225 eggs per bird while the former yielded only 205 eggs as an average.

PULLETS *vs.* HENS FOR EGG PRODUCTION

The object of this experiment was to determine and compare the relative value of pullets and hens for egg production. The annual production of the ten or twelve best layers of each kind was compared; the results obtained during a three-year period are given in the following table:—

PULLETS VS HENS FOR EGG PRODUCTION

Lot	Year	Number of birds	Total eggs laid	Eggs laid per bird
Hens	1924	10	1,108	111
	1926	12	1,818	152
	1929	12	1,926	161
	Total...	34	4,852	
Average per bird				142
Pullets	1924	10	1,371	137
	1926	12	2,558	213
	1929	12	2,959	247
	Total.....	34	6,888	
Average per bird				203

The above experiment is repeated periodically to demonstrate that it is not profitable to keep two year old hens and still less older hens as layers.

It will be noted that there is a margin of 61 eggs in favour of the pullets on the average over a three-year period. As it has already been shown in another experiment that an average production of 70 eggs per year is required to pay for the feed consumed by a hen, this surplus of production would practically defray the entire feeding cost of a bird. On the other hand, it is advisable to select and keep a certain number of the best two-year old birds or even older birds for breeding purposes.

SOURCES OF ANIMAL PROTEIN

The object of this experiment is to find the best means of supplying animal protein to poultry. Three equal lots of pullets were housed and fed in the same manner, except that one lot received skim-milk as source of animal protein, a second lot received beef scrap in a hopper and a third lot received raw meat (horse meat).

This experiment has been under way for six years and the test lasted six months per year; the following results have been obtained:—

SOURCES OF ANIMAL PROTEIN

6 year average		Lot receiving skim milk	Lot receiving horse meat	Lot receiving beef scrap
Birds in lot	No.	12	12	12
Eggs laid	No.	869	841	808
Cost of feed	$	14 63	13 86	13 75
Value of eggs	$	33 17	31 14	30 32
Cost per dozen	c.	20·1	19·6	20·4
Profit over cost of feed	$	18 54	17 28	16 57

ROOTS *vs.* CLOVER *vs.* SPROUTED OATS *vs.* EPSOM SALTS

This experiment was conducted in order to compare three kinds of greens and to ascertain, at the same time, if Epsom salts can be used as a substitute for greens.

Four equal groups of pullets were housed and fed in the same manner, except than one lot received two pounds of roots per day; another received as much clover as the birds would consume; a third lot was fed sprouted oats once daily and the fourth lot received Epsom salts, 1 ounce daily, mixed in the drinking water or in the mash.

This experiment is carried on six months yearly and has been under way for five years; the following results were obtained:—

COMPARISON OF GREEN FEED (5 YEAR AVERAGE)

5 year average		Lot receiving roots (beets)	Lot receiving clover	Lot receiving Epsom salts	Lot receiving sprouted oats
Birds in group	No.	12	12	12	12
Eggs laid	No.	923	952	918	888
Cost of vegetable feed	$	0 86	0 31	0 62	1 41
Total cost of feed	$	13 56	13 17	13 53	13 93
Value of eggs	$	34 53	34 67	33 48	32 31
Cost per dozen	cts.	17·6	16·6	17·7	18·8
Profit over feed cost	$	20 97	21 50	19 95	18 38

QUEBEC-EAST EGG-LAYING CONTEST

The seventh egg-laying contest conducted at this station started on November 1, 1928 and was completed on October 23, 1929; it eclipsed all previous contests. Twenty pens were entered, including 5 of White Leghorns, 12 of Barred Plymouth Rocks, 1 of White Plymouth Rocks, 1 of Rhode Island Reds and 1 of White Wyandottes.

The total number of eggs laid by the 200 pullets entered during the 51 weeks was 37,599, an average production of 187·9 eggs per bird. Sixty-nine birds were registered; this is an increase of 34 over the preceding year.

The best layer in the contest was the property of Mr. Alphée Poirier, Bonaventure Est; it laid 244 eggs from November 1 to October 23 and obtained a rating of 311·1 points. The best pen belonged to Mr. Raoul Corriveau, Montmagny; the birds produced 2,119 eggs and obtained 2,264·5 points, an average of 211·9 eggs and 226·4 points per bird.

The average production per breed is as follows:—

White Leghorns	52·4 per cent
Barred Plymouth Rocks	53·1 "
White Plymouth Rocks	52·7 "
Rhode Island Reds	56·7 "
White Wyandottes	44·4 "

The following table contains the egg production since the inception of the contest:—

EGGS LAID SINCE THE BEGINNING OF THE CONTEST

Year	Number of birds	Eggs laid	Average production per bird
1922–23	120	13,506	112·0
1923–24	170	23,473	138·0
1924–25	200	30,927	154·6
1925–26	200	28,998	144·9
1926–27	190	27,130	142·7
1927–28	200	34,337	171·7
1928–29	200	37,599	187·9

LIST OF PROJECTS UNDER WAY—POULTRY KEEPING

1—Best make of incubator.
3—Best incubation date.
15—Cost of incubation.
22—Brooding costs.
28—Rate of growth in rearing.
29—Separation of sexes in rearing.
42—Cost and increase in weight in fattening roasters.
47—Milk substitutes for fattening purposes.
48—Best date to sell surplus stock.
58—Best hatching date for egg production.
60—Pullets vs. hens for egg production.
62—Cost of producing eggs.
64—Quebec East egg-laying contest.
74—Temperature of hen-houses of different sizes.
56—Pedigree breeding for egg production.
78—Corn vs. barley.
83—Skim-milk vs. beef scrap vs. meat scrap.
88—Influence of different animal feeds on fertility of eggs.
93—Roots vs. clover.
94—Roots vs. clover vs. sprouted oats.
95—Roots vs. clover vs, sprouted oats vs. Epsom salts.
106—Snow vs. water as drinking supply.
111 and 111a—Breeding for fertility of eggs and strong chicks.
113—Relation between winter laying and fertility of eggs.
114—Breeding for size of eggs.
134—Intestinal parasites of fowls.
150—Egg preservatives.
154—Time required for trap-nesting.
157—Improvement of poultry in the district.
159—Influence of various greens on the fertility of eggs.
163—Relation between the annual production and the date first egg is laid.

BEEKEEPING

THE SEASON

The year 1929 was favourable to honey production in this district. The winter of 1928-29 was equally favourable to the wintering of our 97 colonies; only three colonies were lost during the winter. Spring was prolonged and cold. The crop of pollen was poor on the willows, a fact which delayed the development of the colonies. The dandelions, the first nectar-bearing flowers, made their first appearance on May 27; the fruit trees bloomed on May 29.

The number of hours of sunshine and the rain recorded during the season are as follows:—

—	Hours of sunshine	Inches of rainfall
May	154·75	3·29
June	154·25	3·19
July	238·10	5·08
August	193·40	3·11
September	161·25	2·45

Towards the end of May, after the weak or queenless colonies had been united and two colonies sold and four packages of bees bought, there were 82 colonies, 79 of which were on the Station and 3 at the outside apiary.

There was an abundance of clover, which is our only honey-producing crop. The temperature was very nice during the first part of the bloom—that is up to July 27; after this date, the weather was rather cool until the end of August. The last two weeks of the honey flow were affected by this, although there was plenty of clover. Swarming lasted from June 15 to August 20.

The Station's apiary produced 6,985 pounds of honey, or an average of 88·6 pounds per hive. The highest producing colony gave 219 pounds. The honey crop from the outside apiary amounted to 110 pounds, or an average of 36·0 pounds per hive. During August and September, the bees gathered sufficient honey to feed themselves.

All the two-year-old queens were replaced during the summer; 25 out of 31 queens were accepted by the various colonies.

The autumn was specially favourable to the bees; feeding was accomplished under very good conditions. One hundred and two colonies were wintened, ninety-eight on the Station and three at the outside apiary; seventy-nine hives were put in the cellar and twenty-three in wintering cases.

Several neighbouring apiaries were visited during the summer; a Beekeepers' Day was held at the Station on July 26 and over a hundred apiarists were present.

Several hundred circulars dealing with beekeeping were distributed by this office.

CONTROL OF SWARMING BY DEQUEENING AND REQUEENING

At the first appearance of larvae in the royal cells, the queen was taken from the hive and all the royal cells were destroyed. Nine days later the royal cells were again destroyed. Of the ten colonies thus treated, nine received a young fertilized queen; in the other, a queen cell was left when the second inspection was made.

One of these ten colonies swarmed after having been treated. These ten colonies averaged 90·12 pounds of honey. A new colony was formed in this group by using one of the queens and two frames of brood.

CONTROL OF SWARMING BY SEPARATING THE QUEEN FROM THE BROOD

At the first appearance of larvae in the royal cells, all the cells were destroyed. All the frames containing brood were placed in a super, the queen was left in the lower part and the hive was filled with drawn combs. Then a bee-excluder was placed over the brood chamber over which the supers containing honey and the super containing the brood were placed. Nine days later, the latter super was again inspected and all the royal cells were destroyed.

The five colonies thus treated gave an average of 120·3 pounds of honey per colony; of the five, three made ready to swarm after they were treated.

CONTROL OF SWARMING BY ARTIFICIAL SWARMING FOR THE PRODUCTION OF COMB HONEY

At the beginning of the main clover honey flow, two very strong colonies were chosen for this experiment; each colony received the following treatment:—

The hive was removed from its support; another hive containing in the centre two frames of drawn combs and on each side frames of complete foundation, was put in its place. The queen was put in a cage during handling to prevent its becoming lost or injured. Then all the bees from the brood chamber were shaken in front of the new hive. After the majority of the bees had entered, the queen was liberated by placing it on the top, between the two centre frames; a bee-excluder was placed on the hive and a super containing sections was placed above. During the honey flow, new supers were added when necessary. A young fertile queen was introduced into the original hive, which contained practically only brood. This hive was placed next to the swarm, the entrance being at right angles to the new colony and left in this position for three days; the fourth day, the hive was placed in the same position as that occupied by the swarm, the two entrances being side to side. Five days later, on a nice morning, when all the bees were out gathering nectar, the hive was removed to another place in the apiary.

The two new swarms gave 66 sections No. 1, 24 sections No. 2 and 62 sections No. 3, and in addition 88·8 pounds of extracted honey. The two parent hives yielded 70·8 pounds of extracted honey. If all the crop is computed on the basis of extracted honey and if one section No. 1 is taken as being equivalent to 1½ pounds of extracted honey, the total yield is 257·8 pounds, or an average of 128·12 pounds per colony.

Of the four colonies, three made ready to swarm, two 51 days and the other 49 days after treatment. This tendency towards swarming was eliminated by destroying the royal cells and the swarms were returned to the parent colony.

METHOD FOR DISCOVERING SWARMING PREPARATIONS

Ten hives containing 10 frames each were chosen in the spring for this experiment; a half-super was given as an addition to the brood chamber. During the swarming period these hives were examined every nine days by raising the rear of the half-super to detect the presence of royal cells. If no royal cells were found, the super was put back into place and the brood chamber was not inspected. On the other hand, if royal cells were found to be present, the brood chamber was inspected and swarm control practised.

All ten colonies made ready to swarm; eight contained royal cells in the super and in the brood chamber and two in the super only.

It is very easy to detect swarming preparations by the use of this method, which also allows the apiarist to inspect a larger number of hives in less time.

This method has been used for the last five years, and it has been noticed that all the colonies getting ready to swarm had royal cells in the half-super

and with few exceptions also in the brood chamber. The point to note here is that in all cases swarm preparations were detected by merely tipping the upper part of the brood chamber.

WINTERING IN CELLAR

In the fall of 1928, 73 colonies were placed in the cellar on Nov. 6 and taken out on April 24 of the following year.

Winter was mild with frequent changes in temperature, causing a heavy consumption of food. The average quantity of food consumed per hive for the 73 hives was 18·2 pounds of honey; the proportion of dead bees was higher than usual. On certain days, the bees were rather restless; this condition was also brought about by the changes in temperature.

Two hives died during the winter and six suffered from dysentery towards the end of March. Two colonies were placed on scales and a thermometer was installed in the centre of the cellar. The weight of the hives as well as the temperature was recorded each week. The average temperature recorded during the winter was 49 degrees, the maximum was 54 degrees and the minimum 44 degrees; the degree of dampness varied from 35 to 45 degrees, an average of 39·7 degrees. However, wintering in the cellar gave satisfactory results.

WINTERING IN FOUR-COLONY CASES

Two wintering cases each containing four colonies were used in this experiment. The hives were weighed and placed in the cases on October 18 and feeding was completed afterwards by means of sugar syrup. Four of these hives were wintered with a half-super in addition to the brood chamber and the other four in the hive body only. In each wintering case, two hives had their entrances facing the northeast and the other two facing the southeast; they were put side by side. Mill shavings were used for isolation purposes, four inches thick in the bottom and all around the hives, ten inches on top; two openings one inch in diameter, one on each side and opposite each other, were made in order to insure proper ventilation over the shavings. An entrance 1 inch by ½ inch was left. The hives were taken out on June 12.

Of the eight colonies wintered, one died of dysentery in April; three weak colonies had to be united and the four others gave an average production of 98 pounds of honey.

It was also noticed that the hives wintered with a half-super were weaker than the others in the spring.

WINTERING IN THREE-COLONY CASES

Three wintering cases containing three colonies each were used in this experiment. The hives were placed side by side, with entrances facing south; mill shavings were used for insulating as follows: five inches on the bottom, 3½ inches around the sides and 8 inches on the top.

Six colonies were wintered on the station, of which four were 10-frame Langstroth and two 10-frame Jumbo; all six wintered well and yielded an average of 61·2 pounds of honey per hive.

The three others, consisting of 10-frame Jumbo hives, were wintered in the outside apiary; they also passed the winter satisfactorily and gave an average of 36·10 pounds per colony. In the fall, the apiary included eight colonies only, which explains the low production.

WINTERING IN TWO-COLONY CASES

Four colonies were put in two two-colony cases on October 6; a half-super was added to the brood chamber of two of these colonies. Mill shavings were used for insulating, 6 inches on the bottom and around the sides of the hives and 10 inches on top. All hive entrances faced south.

The two colonies to which a half-super was added were weak in the spring and had to be united; the other two were in good condition and gave an average production of 114·8 pounds of honey.

WINTERING IN SINGLE COLONY CASES

Two colonies were placed in single colony wintering cases on October 8, with entrances facing south. Mill shavings were used in one and dry maple leaves in the other as insulating substances; 6 inches thick on the bottom and around the sides and 10 inches on top. One of these hives had two brood chambers. Both colonies wintered well; one yielded 35 pounds of honey and a swarm while the other gave 120 pounds of honey.

The average production of colonies wintered in this manner during the last four years was 81·4 pounds of honey.

TWO-QUEEN SYSTEM

A hive with a brood chamber divided into two equal sections was used for wintering purposes; a partition placed in the centre of the chamber completely isolated the two groups of bees. Each group had a young queen. One of the groups died during the winter; the other developed well and gave a production of 65 pounds of honey.

COMPARISON OF HIVES OF DIFFERENT SIZES

Five types of hives of different size were used in order to ascertain the value of each type as to swarming, wintering and honey production.

The following results were obtained:—

RESULTS WITH HIVES OF DIFFERENT SIZES

Number of hives	Size	1929				5-year average					
		Average production per hive		Average quantity of honey consumed in winter		Total number of hives 5 years	Percentage of swarming	Average quantity of honey consumed in winter		Average production per hive	
		lb.	oz.	lb.	oz.		%	lb.	oz.	lb.	oz.
2	Langstroth 8 frames	54	8	12	12	10	93·7	11	15	46	9
1	Langstroth 9 frames	40	0	21	8	8	75·0	18	0	55	9
2	Langstroth 10 frames	128	8	19	8	10	81·0	17	1	112	
2	Langstroth 12 frames	111	10	26	8	10	20·0	21	0	100	3
2	Jumbo 10 frames	124	8	26	0	10	87·5	21	8	89	5

The results obtained over a five-year period would seem to indicate that the 10-frame Langstroth is the most satisfactory hive for the district for wintering purposes and for honey production. With this type of hive, it is easy to control swarming; moreover the Langstroth is easily handled. It should also be noted that the 12-frame hives wintered as a rule very badly, although their swarming percentage was very low; during the first three years, when taken out in the spring, these hives were very weak and had to be strengthened.

PACKAGES OF BEES

Four packages of bees weighing three pounds each and accompanied by a young queen were ordered this year to determine the advantage, if any, of such packages in the formation of colonies. These packages were received in good condition, two on May 26 and two on May 30. On the night of their arrival

each package was placed in a hive, in the following manner: a hive was placed on the stand that the new colony was to occupy and two combs of honey were put in the hive and three drawn combs on one side of the hive; the supply of food and the cage containing the queen were then removed from the package; the latter was placed between two frames on which a few bees from the package were shaken; the cage containing the bees was placed in the free space of the hive, the opening of the feeder turned downwards; a wooden block, 1 inch square, was put between the cage and the floor of the hive, so as to raise one of the ends of the cage to allow for the escape of the bees, then the hive was again closed and its entrance reduced to one inch. The following day, the cage was removed and the vacant space filled with drawn combs and the hive was not inspected for nine days. The introduction of these packages was a complete success. All this handling was done without the use of smoke.

The two packages received on May 24 swarmed and gave an average production of 37·8 pounds of honey; the other two packages, received on May 30, produced an average of 48·8 pounds of honey.

Two of these packages were due here around May 6 but were lost en route and were replaced by the two received on May 30. It is altogether probable that if these packages had been received earlier, the honey crop would have been heavier.

VALUE OF STIMULATIVE FEEDING FOR HONEY PRODUCTION

Of the ten colonies used in this experiment, five received 65 per cent sugar syrup during the entire month of May, up to the dandelion flow. The bees in these hives always had a supply of syrup available. The other five colonies had a sufficient quantity of honey for their daily needs. The average production of the group fed was 135·9 pounds of honey, and that of the other group, 111·9 pounds. Each group produced a swarm.

The following results were obtained during the last five years:—

RESULTS OF STIMULATIVE FEEDING

Year	Average production of colonies receiving stimulative feeding in the spring	Average production of check colonies
	lb.	lb.
1925	76·0	54·0
1926	48·3	41·7
1927	60·0	48·6
1928	106·2	85·12
1929	135·9	111·9
Average for 5 years	85·3	68·3

STUDY OF THE HONEY FLOW

The two colonies placed on scales were used in this experiment, which lasted from July 11 to July 27. Their weight was carefully noted every hour from 7 a.m. until 7 p.m. The temperature was also recorded by means of a thermometer fixed to one of the scales and placed in the shade, as well as the direction of the wind and the weather. The following are the three days during which the honey flow was the heaviest: July 17, 18 pounds; July 23, 17·8 pounds; July 25, 17 pounds. The wind was from the west and the weather very bright.

The observations which were made show, in a general manner, that there is a loss in weight up to 10 a.m., followed by a slight increase till noon; the weight remains stationary from noon to 1 p.m. and the heaviest increase takes place between 2 and 7 p.m.

WINTERING IN CELLAR AND IN WINTERING CASES

The twenty colonies wintered outside were compared with an equal number of colonies wintered in the cellar. On June 1, after the weak or queenless colonies had been united, there remained fourteen colonies of the wintering-case group and sixteen of the cellar group. One of the former died in the spring and five weak colonies were united; four weak colonies in the latter group were also united. On June 1, the average number of bee and brood frames for each group was as follows:—

	Cellar	Cases
Number of frames of bees	8·11	10·2
Number of frames of brood	6·3	6·13

The average production per colony was 84·13 and 81·6 pounds of honey for the group wintered in the cellar, and the group wintered in cases, respectively.

The small margin between the two groups can be attributed to the poor weather conditions; there was a very light crop of nectar in May.

HOW TO PREVENT SWARMING BY GIVING MORE SPACE

Seven colonies were treated in the following manner in this experiment: three colonies were given another hive body as an additional brood chamber, thus placing twenty frames at the disposal of the queen; two of these three colonies made ready to swarm. The three colonies gave an average production of 138·1 pounds of honey. A half-super was added to the brood chamber of the four other colonies; on July 12, when both chambers had been filled to their capacity, three frames of capped brood were removed from the lower part of the brood chamber of each colony and replaced by drawn combs, which were placed in the centre of the brood chamber, in order to give the queen sufficient space for laying. The three brood frames were placed in the last super. None of the four colonies thus treated made any preparations to swarm, and an average yield of 144 pounds of honey was obtained.

SPRING PROTECTION OF BROOD CHAMBER

Ten colonies were divided into two equal groups. The first group was protected until June 1 by means of an outside case when taken out of the cellar; no protection whatsoever was given the other group.

The average number of bee and brood frames at spring inspection and on the day the protective cases were withdrawn, was as folows:—

	Unprotected group (check)		Protected group	
	May 6	June 1	May 6	June 1
Number of frames of bees	6·3	8·4	7·1	10·1
Number of frames of brood	2·2	3·4	2·2	7·3

It will be noted that the brood developed much better in May in the protected group. As our apiary is well sheltered from the wind, we believe the difference would still be greater in hives lacking this natural protection.

The unprotected group gave an average production of 135·8 pounds per hive and the protected group 127·8 pounds; each group produced a swarm.

QUEEN REARING

During the season, eighteen queens were reared from our best producers. Natural grafting of queen cells was practiced in mating nuclei. Usually, these queens were placed in the station's apiary, which caused fairly heavy losses, as a large number of young queens lost their way when returning from their mating flight. This year, the nuclei were placed in a young orchard, about three acres distant from the apiary. In this way, not a single queen was lost; all were successfully mated and were distributed throughout the apiary during the summer.

PRODUCTION OF COMB AND EXTRACTED HONEY

Two colonies of equal strength were chosen for this experiment. One was swarmed artificially on July 1 to produce section honey and at the same time was given section supers; it produced 32 sections No. 1, 10 sections No. 2 and 46 sections No. 3, as well as 54 pounds extracted honey. If the production of this hive is figured on the basis of extracted honey, the total crop is 122 pounds. The second colony swarmed on June 26 and was given supers containing drawn combs; it produced 203 pounds extracted honey. In both cases, the swarm supplanted the original stock.

RELATION BETWEEN THE STRENGTH OF COLONY IN BEES AND IN BROOD AND THE HONEY CROP

Ten colonies were used in this experiment; five were wintered in the cellar and five in wintering cases. The number of bees and brood frames was noted at the first spring inspection, and once again at the beginning of the honey flow. As might have been expected, the colonies strong in bees and in brood during May and June gave the highest production.

DIVIDED *vs.* UNDIVIDED COLONIES AND THE HONEY CROP

In order to ascertain if it is profitable to divide the colonies to increase the production of honey, a certain number of colonies were divided and compared with another group of undivided colonies.

As may be seen by the following table, the undivided colonies gave a larger crop of honey than the divided ones.

DIVIDED VS. UNDIVIDED COLONIES AND THE HONEY CROP—1929

Divided colonies		Undivided colonies	
Number of colonies	Yield	Number of colonies	Yield
	lb. oz.		lb.
1	135 8	6	152
30	122 0	40	161
42	97 0	44	160
59	203 0	72	142
75	113 0	76	167
56	137 4	94	219
Average yield	pounds 134·10	Average yield	pounds 166·13
Value of honey	$121 17	Value of honey	$150 27
Value of increase	42 00		
Total	$163 17		
Average value per colony	$ 27 19	Average value per colony	$ 25 04

The division of colonies may be profitable if an increase in the number of hives is sought, but if the only object is honey production, the necessary steps to prevent swarming should be taken.

The results obtained during the last five years were as follows:—

DIVIDED VS. UNDIVIDED COLONIES AND THE HONEY CROP

Years	Divided Colonies						Undivided colonies			
	Number of colonies	Average production per colony	Value of honey crop	Value of increase	Total value honey and increase	Average value per colony	Number of hives	Average production per colony	Value of honey crop	Average value per colony
		lb. oz.	$	$	$	$		lb. oz.	$	$
1925	4	65 6	39 23	28 00	67 23	16 80	4	150 4	90 15	22 53
1926	6	55 8	53 28	42 00	95 28	15 88	6	88 8	84 96	14 16
1927	8	51 7	65 83	56 00	121 84	15 23	8	93 0	119 76	14 97
1928	7	132 14	148 80	35 00	183 80	26 26	7	142 12	159 86	22 84
1929	6	134 10	121 17	42 00	163 17	27 19	6	166 13	150 27	22 04
Totals	31	439 13	428 82	203 00	631 32	101 36	31	641 5	605 00	96 54
Average for 5 years		87 15	85 66	40 06	126 66	20 27		128 4	121 00	19 30

NOTE.—The difference in production between the two groups gives an average of 41·9 lbs. per colony in favour of the undivided group.

WINTERING BEES IN DOUBLE HIVES

Nineteen colonies were wintered; four had a full-depth super in addition to the brood chamber. One of these hives was wintered in a single colony wintering case; the remaining three were wintered in the cellar and had an average consumption of 26·5 pounds; all four were in good condition in the spring.

The other fifteen colonies had a half-super added to the brood chamber. Six were wintered in wintering cases and only one of those was in good condition in the spring; the other five were weak and had to be united. Nine other colonies were wintered in the cellar and consumed an average of 22·7 pounds per colony; five of the nine were weak in the spring and were united. One of these colonies was put on scales during the winter and consumed one and a half pounds more per month than an ordinary hive, also placed on scales.

Since this experiment was started, it has been noted that hives treated in the above manner consumed much more than ordinary hives and were much weaker in the spring.

OUTSIDE APIARY

This apiary is located approximately four miles from the station; it includes three colonies housed in Jumbo hives and which were wintered in a three-colony wintering case. In the spring, all three were in good condition; one was divided and the other two swarmed. The number of hives in the apiary is now eight. The average production per colony was 36·17 pounds.

All eight colonies were in good shape prior to wintering; three were wintered in wintering cases on the spot and the other five were removed to the apiary of the station, to winter in the cellar.

LIST OF PROJECTS UNDERTAKEN FOR THE BEE DIVISION

Ap. 1—Control of swarming by removing and replacing the queen.
Ap. 2—Control of swarming by separating the queen from the brood.
Ap. 4—Control of swarming by artificial swarming for comb honey production.
Ap. 5—Method of detecting swarming preparations.
Ap. 7—Wintering in cellar.
Ap. 8—Wintering in four-colony cases.
Ap. 8A—Wintering in three-colony cases.
Ap. 9—Wintering in two-colony cases.
Ap. 10—Wintering in single colony cases.
Ap. 21—Comparison of hives of different size.

LIST OF PROJECTS UNDERTAKEN FOR THE BEE DIVISION—*Concluded*

Ap. 12—Two-queen method.
Ap. 22—Packages of bees.
Ap. 25—Value of feeding for honey production.
Ap. 28—The honey flow.
Ap. 30—Wintering in cellar *vs.* wintering in cases.
Ap. 31—How to prevent swarming by allowing more space for the bees.
Ap. 32—Spring protection of the brood chamber.
Ap. 33—Comparison of races of bees.
Ap. 34—Queen rearing.
Ap. 35—Production of comb and of extracted honey.
Ap. 36—Relation between the strength of the hive in bees and in brood and the honey crop.
Ap. 67—Divided *vs.* undivided colonies and the honey crop.
Ap. 49—Wintering in double hives.
Ap. 55—Outside apiaries.

FLAX FOR FIBRE

Weather conditions were very favourable this year to the production of flax for fibre. Seeding was done fairly early; the growth was uniform and strong throughout the year and the yields obtained were far superior to those of the previous years.

During the winter 1928-29, 38,700 pounds of flax were broken and scutched at the station for the farmers of the locality giving a yield of 4,645 pounds of fibre or 12 per cent. The flax brought here this year was retted better than usual; it was, as a rule, of more uniform size and better prepared; however quite a percentage was too short. The main causes of this short flax are the use of seed of poor quality and the poor preparation of the land.

To further encourage the growers desiring to improve their crop, 1,568 pounds of good seed as well as printed instructions on the growing of flax were distributed. In the fall, several lectures and demonstrations on the date of pulling, the proper way to dry and spread flax for retting, etc. were given under the auspices of Women's Clubs.

FLAX—COMPARISON OF VARIETIES

The experiments undertaken in 1924 have been continued every year since on duplicate plots measuring $\frac{1}{120}$ acre; the average yields over a four-year period as well as the yields of flax and tow for 1929 are given in the following table:—

FLAX—TEST OF VARIETIES

—	Three-year average					Yield per acre in 1929	
	Number of days maturing	Yield of retted straw per acre	Yield of seed per acre	Yield of fibre per acre	Yield of tow per acre	Fibre	Tow
	days	lb.	lb.	lb.	lb.	lb.	lb.
Riga Blue	90	2,504	724	368	320	375	500
Saginaw	99	2,637	794	397	312	425	520
Longstem	99	2,490	910	407	297	392	460
Dutch blue blossom	93	2,430	856	280	311	360	440
829 C	93	2,448	841	289	301	315	320
J. W. Stewart	94	2,949	650	405	286	443	440
Pure Line No. 6	92	2,543	788	371	320	387	500

As shown in the above table, seven varieties were under test during four years; according to the results obtained, no variety has shown any marked superiority over the others.

The variety J. W. Stewart, imported from Ireland, gave the highest yield of retted straw and the second highest for the production of the variety fibre. Long Stem heads the list for fibre and seed production. Saginaw and Pure Line No. 6, gave slightly heavier yields than the other three varieties.

These tests will be continued for some time in order to secure conclusive proof as to the advantages of one or several of the above varieties.

METHODS OF SEEDING FLAX

Duplicate plots were used in this experiment; one series was sown broadcast and the seed covered by means of a rake; drill-seeding was done on the other series with a Planet Junior.

RESULTS FROM DIFFERENT METHODS OF SEEDING FLAX

—	Four-year average					Yield per acre in 1929	
	Number of days maturing	Yield of retted straw per acre	Yield of seed per acre	Yield of fibre per acre	Yield of tow per acre	Fibre	Tow
	days	lb.	lb.	lb.	lb.	lb.	lb.
Riga Blue in rows	89	2,118	722	304	279	250	580
Riga Blue broadcast	88	2,289	766	426	264	362	340

The above table shows that there is a marked advantage in sowing flax broadcast instead of in drills. In drill seeding, the flax is nearly always finer and the straw offers less resistance to lodging. If the weather is more or less favourable to growth during the growing season and no heavy rains fall when the flax is in bloom or shortly afterwards, the yields will not be greatly reduced. On the other hand, if the growth is rapid, due to favourable temperature but heavy rains fall at blooming—as was the case this year—then the lodging of the crop will be the rule in drilled plots and the yield of fibre resulting will be poor, although there will be an abundance of tow.

FLAX—SEEDING AT DIFFERENT DATES

The object of this experiment, started here in 1924 and continued every year since, is to determine the influence on the yield of fibre of seeding as early as possible in the spring and of seedings done at weekly intervals thereafter.

The yields obtained from each seeding, over a four-year period, are given in the following table:—

FLAX—SEEDING AT DIFFERENT DATES

—	Four-year average					Yield per acre in 1929	
	Number of days maturing	Yield of retted straw per acre	Yield of seed per acre	Yield of fibre per acre	Yield of tow per acre	Fibre	Tow
	days	lb.	lb.	lb.	lb.	lb.	lb.
Riga Blue, 1st seeding, May 14	88	2,346	796	336	295	400	440
Riga Blue, 2nd seeding, May 21	91	2,196	729	342	241	465	440
Riga blue, 3rd seeding, May 28	94	2,322	770	353	256	478	440
Riga Blue, 4th seeding, June 4	95	2,347	731	342	276	400	400

The above table shows that the third seeding gave the highest yield, the second one came in second place and the first and fourth seedings gave the same yield.

Although the results tabulated above do not show any advantage in favour of early or late seeding, there is an objection to late seeding that should be mentioned here; it is seldom possible to ret the crop the same year. Moreover, if rain does not fall soon after seeding, it is almost a certainty that the results will be poor, because, if the soil has already dried up to some extent at the time, germination will not be as good as with early seeding, the growth will be slower and there will be a smaller crop in the fall.

FLAX—RATES OF SEEDING

The rate of seeding is generally 84 pounds per acre. To determine if better yields can be obtained by sowing a larger quantity of seed, three series of duplicate plots were sown, the first at the rate of 84 pounds per acre, the second 98 pounds and the third 112 pounds per acre.

Results obtained to date are given in the following table but no conclusions could be drawn in favour of one or the other rate of seeding. However, the plots sown at the rate of 112 pounds per acre gave a slightly higher yield.

FLAX—RATES OF SEEDING

—	Four-year average					Yield per acre in 1929	
	Number of days maturing	Yield of retted straw per acre	Yield of seed per acre	Yield of fibre per acre	Yield of tow per acre	Fibre	Tow
	days	lb.	lb.	lb.	lb.	lb.	lb.
Riga Blue, 84 pounds per acre.	88	2,445	817	364	272	428	360
Riga Blue, 98 pounds per acre.	88	2,367	765	350	311	392	470
Riga Blue, 112 pounds per acre	88·7	2,318	761	377	278	420	420

FLAX—CHEMICAL FERTILIZER TEST

An experiment was undertaken in 1925 to determine if the application of chemical fertilizers to flax would give a sufficient increase in yield to justify the additional expenses incurred.

The following fertilizers were used:—

1. A series of three plots receiving 100 pounds nitrate of soda per acre.
2. A series of three plots receiving 200 pounds nitrate of soda per acre.
3. A series of three plots receiving 300 pounds nitrate of soda per acre.
4. A series of three plots receiving 400 pounds nitrate of soda per acre.
5. A series of three plots receiving 500 pounds phosphoric acid per acre.
6. A series of three plots receiving 100 pounds muriate of potash per acre.
7. A series of three plots receiving 200 pounds nitrate of soda and 500 pounds phosphoric acid per acre.
8. A series of three plots receiving 200 pounds nitrate of soda, 500 pounds phosphoric acid and 100 pounds muriate of potash per acre.
9. Five check plots (no fertilizer applied).

These tests were conducted on heavy clay land, already well fertilized. Up to date, there does not seem to have been any increase in yield which might be attributed to the use of nitrate of soda and of phosphoric acid; plots treated by means of potash showed a slight increase in yield.

LIST OF PROJECTS FOR THE FLAX DIVISION

E. 3—Test of varieties.
E. 5—Methods of seeding.
E. 7—Different dates of seeding.
E. 9—Different rates of seeding.
E. 13—Chemical fertilizers applied to the flax crop.

EXPERIMENTS WITH CHEMICAL FERTILIZERS, LIME, GROUND LIMESTONE, AND MANURE

This experiment was started on the station in 1924 and continued every year since. Its object is to determine the influence on the yields of the crops of various chemical fertilizers applied in mixtures or alone; the following rotation was used: swedes, barley, clover and timothy.

The different treatments followed, the fertilizers applied per acre as well as the yields for 1929, for each of the crops and the average yields to date are as follows:—

EXPERIMENTS WITH CHEMICAL FERTILIZERS, LIME, GROUND LIME STONE AND MANURE

No. of plot	Fertilizer applied per acre	Yield per acre									
		Swedes		Barley		Clover hay		Timothy hay			
		1929	Six year average	1929	Five year average	1929	Four year average	1929	Three year average		
		tons lb.	tons lb.	Bush. lb.	Bush. lb.	tons lb.	tons lb.	tons lb.	tons lb.		
1	Ground limestone—4,000 lbs.	24 1,020	17 1,790	46 32	49 0	2 960	2 572	1 1,960	2 907		
2	Quicklime—2,240 lbs.	20 1,934	16 1,812	37 44	39 13	2 1,220	2 445	1 1,240	2 360		
3	Basic Slag (16% PO) — 750 lbs.	20 1,469	17 775	37 4	40 18	2 1,240	2 1,070	1 1,680	2 550		
4	Check	21 1,269	18 797	43 36	43 41	2 1,000	2 717	2 120	2 333		
5	Superphosphate—750 lbs.	23 116	20 1,018	45 40	44 9	2 1,100	2 783	2 160	2 1,093		
6	Manure—20 tons	29 545	23 367	52 24	46 16	2 1,280	2 922	2 1,140	2 1567		
7	Manure—20 tons Ground limestone—4,000 tons.	32 585	24 563	55 40	46 28	2 1,160	2 1,072	2 240	2 1,380		
8	Manure—10 tons Nitrate of Soda—100 lbs. Sulphate of Ammonia-75 lbs Superphosphate—400 lbs. Muriate of Potash—100 lbs.	31 738	22 1,026	47 4	38 6	2 1,240	2 890	2 580	2 813		
9	Nitrate of Soda—100 lbs. Sulphate of Ammonia-75 lbs Superphosphtae—400 lbs. Muriate of Poateh, 100 lbs.	30 519	21 1,552	40 40	38 40	2 1,100	2 900	2 320	2 890		
10	Nitrate of Soda,—100 lbs. Sulphate of Ammonia-75 lbs. Superphosphate.—400 lbs.	26 120	19 1,050	39 8	36 46	2 840	2 582	2 296	1 1,455		
11	Check	18 1,404	15 683	39 28	38 19	2 1,080	2 242	2 300	1 1,840		
12	Nitrate of Soda—100 lbs. Sulphate of Ammonia-75 lbs Muriate of potash—100 lbs.	25 1,285	17 1,899	42 44	41 38	2 1,040	2 428	2 520	2 833		
13	Superphosphate—400 lbs. Miurate of potash—100 lbs.	24 323	19 1,378	43 16	42 21	2 940	1 1,970	2 1,020	2 1,080		

The above table shows that manure is superior to commercial fertilizers for all crops on clay lands, and that the use of lime results in an increase in the yields of swedes and of barley.

As regards chemical fertilizers, heavy applications of all kinds of fertilizer have benefited the swede crop, which showed a marked increase in yield.

ILLUSTRATION STATIONS

The illustration stations which provide practical object lessons for the farmers are fast becoming increasingly popular. The establishment of four new stations during the year necessitated a readjustment of the whole system of stations under our supervision. All stations west of the counties of Lotbinière and Dorchester were transferred to the Central Experimental Farm, Ottawa. As these stations included some of the best organized and most progressive in our group, this move will affect noticeably the results given in the Illustration Station report for this particular group, a fact which should be borne in mind.

Endeavours are being made on all these stations to determine and demonstrate the best methods to follow in order to intensify agricultural production in all its forms, while increasing the margin of profit.

Three tables are extracted from the above report and reproduced here, to show the kind of work undertaken and the educational possibilities of these stations.

CROPS—AVERAGE YIELD AND COST OF PRODUCTION, 1929

Crop	Number of stations	Yield per acre	Cost per ton or bushel
			$
Swedes	16	20·6 tons	3 06
Potatoes	11	259·4 bushels	0 24½
O.P.V. hay	13	2·9 tons	9 49
Oats	17	41·6 bushels	0 58
Clover hay	14	2·1 tons	7 90
Timothy hay	8	1·9 tons	6 79

Visitors at the Ste. Anne Station.

MILK AND BUTTER-FAT PRODUCTION ON ILLUSTRATION STATIONS IN EASTERN QUEBEC

Stations	Number of cows	Breed	Average number of days in milk	Average production		Lowest production		Highest production	
				Milk	Fat	Milk	Fat	Milk	Fat
			days	lb.	lb.	lb.	lb.	lb.	lb.
Causapscal	11	Ayr.	228	5,146	203	4,326	167	6,325	259
St. Alexandre	12	Gr.	233	5,545	223	3,823	172	6,141	289
Nouvelle	5	Gr.	248	3,427	126	2,670	93	4,495	182
St. Apollinaire	6	Ayr.	247	4,365	162	3,765	146	5,241	184
St. Fabien	15	Gr.	230	3,112	119	2,875	107	4,256	169
St. Pierre I.O.	16	Gr.	210	3,291	129	2,287	72	4,044	186
St. Alphonse	7	Gr.	208	4,590	191	3,276	155	5,517	223
St. Arsène	7	Gr.	274	4,596	176	3,975	142	5,304	173
Rivière Bleue	11	Ayr.	240	3,777	.....	2,290	.....	6,455	.....
New Richmond	8	Gr.	175	3,583	.....	3,300	.....	4,500	.....
Valley Jonction	19	Gr.	276	6,620	.....	3,795	.....	8,795	.....
St. Eleuthère	16	Gr.	263	4,094	.....	3,076	.....	4,754	.....
Matane	9	Gr.	269	5,856	.....	2,847	.....	7,900	.....
St. Valier	11	Gr.	.....	4,562	.....	2,147	.....	6,987	.....

Note:—Gr. means Graded and Ayr. for Ayrshires.

CLOVER HAY, YIELD PER ACRE AND COST PER TON

Stations	Number of years grown	Yield per acre		Cost per ton	
		1929	Average	1929	Average
		tons	tons	$	$
St. Alexandre (1)	2	3·7	2·9	5 18	5 34
St. Alexandre (2)	2	3·0	2·7	6 25	7 59
Rivière Bleue	1	2·8	2·8	5 58	5 58
Montmagny	7	2·5	2·5	6 29	7 66
New Richmond	9	2·2	1·8	8 10	9 07
Causapscal	2	2·0	1·9	7 31	6 02
St. Eleuthère	2	2·0	1·8	7 82	8 25
St. Fabien	8	1·9	1·6	7 81	10 61
St. Apollinaire	4	1·6	1·7	8 61	8 99
St. Pierre I. O.	1	1·5	1·5	7·15	7 15
Matane	7	1·5	1·5	13 61	12 65
Scott Jonction	5	1·4	1·3	10 68	13 74
Grande Rivière	1	1·3	1·3	7 00	7 00
St. Alphonse	1	1·1	1·1	9 20	9 20
Average for 14 stations	3·7	2·1	1·8	7 90	9 59

(1) Clay. (2) Sand.

The yield and average cost of various crops on a certain number of farms shown in the first table are worthy of note; the margin that exists between the average production of various dairy herds, given in the last two tables, should also be noted as well as the average yield of clover hay, which is considered as an indication of success or failure in so far as dairying is concerned.

More detailed information on this subject is given in the Illustration Stations Report.

GENERAL NOTES

As in previous years, an exhibit was presented at several fairs of the district; a group of Percheron horses was exhibited at the Quebec and Ste. Anne de la Pocatière Fairs and met with great success.

During the year, ten agricultural societies and women's clubs from the territory situated between Dorchester county and the city of Edmunston, N.B. and numbering over 1,080 visited the station. The number of private visitors is also increasing yearly.

The station was inspected during the summer by the district representatives of the counties of the Lower St. Lawrence. The annual meeting of the Director of the Milk Producers Association was also held here.

The director and his assistants gave as much assistance as possible to further agricultural development and progress in the district; they acted as judges at exhibitions and at short courses, gave lectures and wrote numerous press articles for publication in agricultural periodicals.

Correspondence has greatly increased over previous years; 6,713 letters were received and 6,558 forwarded from January 1, 1929 to December 31, 1929. In addition, 2,202 circular letters and 4,949 weekly reports of the laying contest were mailed.

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