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 1930

Published by authority of the Hon. Robert Weir, Minister of Agriculture,
Ottawa, 1931

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DOMINION EXPERIMENTAL STATION, STE. ANNE DE LA POCATIÈRE

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

THE SEASON

After a severe winter, conditions were favourable for sowing on May 12, which is the average date for the district.

As shown in the following table, the precipitation was below the average during the months of April and May, which was greatly to the advantage of the farmers whose land was well drained and ready to be sown. There was a great deal of rain in June, July, August, and September, and the land seeded late, or poorly drained, suffered a great deal from this excess of moisture.

The harvesting of hay and grain crops, which were heavy, was done under difficult conditions on most farms, and the quality of these crops was below the average. On the other hand, the temperature was favourable for sandy lands, pastures and roots. Potatoes suffered more than usual from blight, and apples from scab; but on the whole, the year was above the average as regards production.

METEOROLOGICAL RECORDS, 1930

Months	Temperature (F.)							Precipitation				Sunshine	
	Mean	Maximum 1930			Minimum 1930			Rain	Snow	Total precipitation			
	1930	Highest	Date	Mean maximum	Lowest	Date	Mean minimum	1930	1930	1930	Average 18 years	1930	Average 12 years
	°	°	°	°	°	°	°	in.	in.	in.	in.	hrs.	hrs.
January	12·0	44·0	7	21·4	−12	5	2·5	0·28	23·5	2·63	2·64	67·40	87·33
February	12·5	46·0	23	23·0	−18	6	2·3	0	5·5	0·55	2·37	127·35	116·42
March	22·1	42·0	6/12	30·1	−1	3	14·1	.....	32·0	3·20	2·34	151·15	137·19
April	34·1	65·0	30	44·6	13	16	23·4	1·14	0·5	1·19	2·61	150·35	152·30
May	50·7	85·0	22/23	61·8	30	13	39·7	2·94	.....	2·94	3·36	196·15	198·20
June	65·5	88·0	15	76·8	38	1	54·2	3·68	.....	3·68	2·98	134·15	200·45
July	64·8	85·0	28	75·1	38	3	54·5	5·78	.....	5·78	3·17	257·30	246·55
August	62·4	83·0	28	71·5	44	19	53·3	4·88	.....	4·88	2·42	194·50	219·64
September	55·3	82·0	2	64·6	36	12	46·1	4·32	.....	4·32	3·13	87·30	154·81
October	45·2	76·0	12	53·8	29	7	36·6	1·01	.....	1·01	3·14	123·30	108·87
November	25·3	54·0	2/16	42·8	11	29/30	27·8	3·45	.....	3·45	2·46	89·15	67·63
December	18·2	35·0	7/9	26·2	−16	16	11·6	.....	1·4	0·14	1·81	60·10	66·49
	39·0	88·0	.....	49·3	−18	.....	30·5	27·48	62·9	33·77	.....	1,638·20	.....

ANIMAL HUSBANDRY

DAIRY CATTLE

At the end of the year 1930 our herd numbered sixty head, all registered Ayrshires, seven more than last year, including two herd sires, twenty-four cows, eight two-year-old heifers, eight yearling heifers, and eighteen calves.

This herd was established in June, 1913, with a small number of pure-bred and grade cows. In 1921 the grade herd, having served its purpose, was disposed of. From that date, the herd was tested for tuberculosis; it was accredited in May, 1925, and has remained accredited ever since. It has been

tested for contagious abortion during the last three years, always with negative results. In 1922, one cow only had qualified for the Record of Performance; to-day, all those that have completed a lactation period have qualified in the Record of Performance or in the Honour Roll. In 1924, a record of 17,406 pounds of milk and 746 pounds of butter fat was made by a three-year-old cow, " Primrose " —78274—. In 1925, a mature world's record was made by " Briery Lass " —85707— with 22,035 pounds of milk and 979 pounds of butter-fat. Another cow, " Beaver Meadow Beauty 6 " —74584—, made a record in the four-year class with 16,051 pounds of milk and 702 pounds of butter-fat.

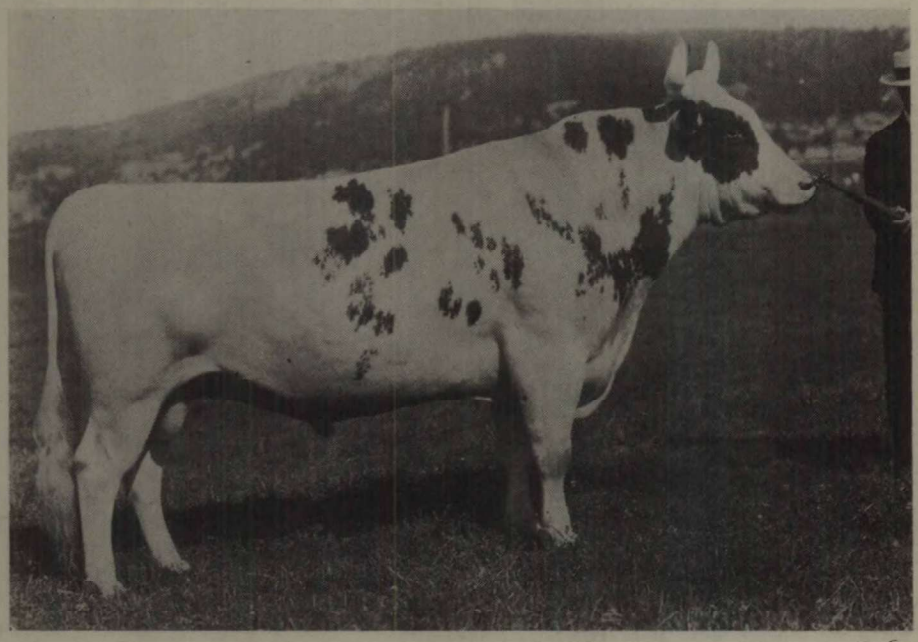
Such records show that this part of the province is quite as suitable for the breeding and feeding of cattle and the production of milk as any other district. These records have also encouraged a great many farmers of the district to improve their breeding. Since 1925, the station has sold seventy bulls, six of which are registered in Advanced registration Class AA and fourteen in Class A.

A record of the cost of production of milk and butter-fat is kept in order to keep only the best milch cows. Several very interesting experiments on the feeding of dairy cattle are being carried on.

BREEDING OF AYRSHIRE COWS

Our herd is headed by two good type bulls of splendid ancestry: " Ottawa Supreme 10th " —91809— Class AA, out of " Auchinbay Mina 5th " —70080— (62785), champion at the Royal Winter Fair, Toronto, in 1923, and " Ste. Anne Supreme 19th " —119900— Class AA, out of the world's champion cow " Briery Lass " —85707—. Their pedigrees are given further on.

The twenty-four cows included in the present herd have been under official test this year, and all those that have completed a lactation period have qualified. The average of all official records made during the year is 9,519 pounds of milk and 413 pounds of butter-fat, averaging 4·34 per cent butter-fat.



Ottawa Supreme 10-91809. Herd sire at the Ste. Anne de la Pocatière Experimental Station.

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

OFFICIAL RECORDS:—CANADIAN RECORD OF PERFORMANCE, 1930

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
305 Day Class:—	years	days	lb.	lb.	%
Lady Jane—63284	7	305	10,835	460	4·16
Ste. Anne Frivole 2—86194	5	305	10,132	395	3·90
Ste. Anne Finette —83980	6	299	10,017	383	3·82
Ste. Anne Lady Jane—105302	3	297	9,876	446	4·52
Ste. Anne Flavia de Supreme—113476	2	305	8,590	358	4·17
Ste. Anne Fadette de Supreme—113478	2	305	8,340	372	4·46
Ste. Anne Fadette 2—87702	5	297	8,650	361	4·17
Vermine—113431	2	305	8,081	373	4·62
Ste. Anne Flossie—113481	2	299	8,075	376	4·66
Ste. Anne Beauté 2—109326	2	305	7,388	413	5·59
Ste. Anne Milkmaid—113482	2	305	7,426	341	4·59
Ste. Beauté 3—109327	2	305	6,123	291	4·75
Ste. Anne Ravenette de Supreme	2	305	7,019	349	4·97
Total	42	3,937	110,552	4,918	.....
Average	3·2	303	8,504	378	4·44
365 Day Class:—					
Ste. Anne Primerose 3—105381	2	365	10,457	465	4·45
Ste. Anne Frivole 2—86194	5	335	10,323	404	3·91
Queenie of Lawndale—82120	7	300	11,055	460	4·16
Lawndale Daisy—83184	7	323	11,536	462	4·00
Lady Jane—63284	11	335	11,217	447	3·99
Ste. Anne Flavia de Supreme—113476	2	356	9,510	400	4·21
Floss of Elmbrook—72578	9	365	12,086	487	4·03
Vermine—113431	2	327	8,184	379	4·63
Ste. Anne Fadette de Supreme—113478	2	327	8,561	382	4·46
Ste. Anne Milkmaid—113482	2	321	7,712	355	4·6
Ste. Anne Doreen de Supreme—113480	2	365	10,214	416	4·07
Ravensdale Queen Bess—67093	10	365	15,727	699	4·44
Ste. Anne Doreen 4e—105303	3	324	10,364	473	4·56
Total	64	4,408	136,946	5,829	.....
Average	3·9	339	10,534	448	4·25

A summary of the official records made during the last five years is given in the following table. Attention is called to the fact that the average of fifty-one records in the 305 day class is 9,279 pounds of milk, averaging 4·22 per cent butter-fat, and the average of thirty-three records in the 365 day class is 10,833 pounds of milk, averaging 4·31 per cent butter-fat.

OFFICIAL RECORDS:—CANADIAN RECORD OF PERFORMANCE, 1930

Averages of Five Years

Years	Number of cows	Number of days milking	Pounds of milk produced	Pounds of fat produced	Average per cent of fat
305 Day Class:—		days	lb.	lb.	%
1926	7	299	10,554	470	4·45
1927	12	296	9,111	370	4·07
1928	12	299	8,997	361	4·01
1929	7	300	9,231	382	4·14
1930	13	303	8,504	378	4·44
Total	51	1,497	46,397	1,961	.....
Average	10	299	9,279	392	4·22
365 Day Class:—					
1926	4	353	13,982	633	4·53
1927	5	340	9,576	398	4·16
1928	6	334	9,589	400	4·17
1929	5	358	10,482	457	4·35
1930	13	339	10,534	448	4·25
Total	33	1,724	54,163	2,336	.....
Average	7	345	10,833	467	4·31

DETAILED PEDIGREE

of

AYRSHIRE BULL

STE. ANNE SUPREME 19TH

—119900—

Born

May 5, 1928

Class AA—A.R. 146

SIRE: OTTAWA SUPREME 2nd—89288—

Class A, Advanced registry.
Qualified in R.O.P. with 5 daughters.
Sire of 10 sons, Class A.

SHEWALTON MAINS SUPREME (Imp.) 83930.

Class AA in Advanced registry.
Qualified in R.O.P. No. 279 with 14 daughters and 2 sons.
Sire of 5 sons, Class AA.
Sire of 14 sons, Class A.

SHEWALTON MAINS PERFECTION—18664—

Sired by Hobsland Lucky Boy (16483) who has nine daughters qualified in R.O.P. with an average production at the time of first calving of 13,989 pounds milk averaging 4·05 per cent fat.

SHEWALTON MAINS VIOLET 3RD (58380)

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

AUCHLOCHAN EMERALD—70080—

Has one son qualified.
Records:
At 10 years, 10,010 pounds milk, 427 pounds fat.
At 11 years, 10,723 pounds milk, 410 pounds fat.

LESSNESSOCK GOLDEN PIPPIN—6781—

Has two R.O.P. daughters.

AUCHLOCHAN EFFIE—(25281)

DAM: BRIERY LASS—85707—

Qualified in R.O.P.
Has one son, Class AA.
Has three sons, Class A.
Records:
At 7 years, 16,047 pounds milk, 3·7 per cent fat.
At 8 years, 22,035 pounds milk, 4·44 per cent fat.
At 10 years, 16,009 pounds milk, 3·82 per cent fat.
At 11 years, 10,443 pounds milk, 3·78 per cent fat.

IMPERIAL BEAUTY OF SPRINGBANK—41071—

R.O.P. with 4 daughters.

NETHERTON KING THEODORE (IMP.)—(35757—

R.O.P. with 21 daughters and 9 sons, Class "A", and 2 sons Class AA.
R.O.P. 51.

BRIERY 2ND OF SPRINGBANK—32137—

Two-year old record, 14,131 pounds milk and 520 pounds fat.

MAPLEHURST LASS—23261—

This cow was never tested but was a heavy producer. She died when 24 years old.

SIR GEORGE OF MAPLE GROVE—16391—

Sired by Rossland of Ste. Anne.

DAISY OF NEWINGTON—13978—

DETAILED PEDIGREE

of

AYRSHIRE BULL

OTTAWA SUPREME 10TH

—91809—

Born on

November 13, 1924

Class AA (A.R. 21)

Qualified in R.O.P. No. 389 with 4 R.O.P. daughters.

SHEWALTON MAINS SUPREME (Imp.) 83930.

Champion, National Exposition.

Advanced Registration, A.A.
R.O.P. with 14 daughters and 2 sons.
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 per cent fat.
At 4 years, 16,243 pounds milk, 4·17 per cent fat.
At 6 years, 13,117 pounds milk, 3·65 per cent fat.
At 7 years, 11,174 pounds milk, 4·13 per cent fat.
At 8 years, 10,499 pounds milk, 3·94 per cent 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 per cent fat.
1921 (3 years) 12,830 pounds milk, 3·77 per cent fat.
1922 (4 years) 10,850 pounds milk, 4·17 per cent fat.
1923 (5 years) 12,780 pounds milk, 4·00 per cent fat.

AUCHINBAY NORTHERN STAR (15163)

AUCHINBAY MINA 2ND (41312)

Records:
1917—11,090 pounds milk, 4·38 per cent fat.
1918—11,150 pounds milk, 4·33 per cent 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 per cent 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 per cent fat.
At 3 years, 8,080 pounds milk, 3·74 per cent fat.
At 4 years, 9,280 pounds milk, 3·86 per cent fat.
At 5 years, 9,530 pounds milk, 3·93 per cent 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)

COST OF MILK PRODUCTION

The following table shows the yields and cost of production of milk for all cows that have completed a lactation period during 1930.

All feeds, with the exception of beet pulp and meal, were charged at the average cost of production for a period of six years on this station; the value of butter is the average of the market prices for 1930.

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

Bran	300 pounds at $1.50 per cwt.
Barley	300 pounds at $1.80 per cwt.
Oats	100 pounds at $2.25 per cwt.
Gluten feed	100 pounds at $1.70 per cwt.
Distillers' grains	100 pounds at $2.00 per cwt.
Linseed meal	50 pounds at $2.50 per cwt.
Average cost of mixture	$1.80 per cwt.

This mixture contains 14·1 per cent of digestible protein.

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 30 cts. per pound	Value of skim-milk at 20 cents per 100 pounds	Total value of products	Amount of meal at $1.80 per 100 pounds	Amount of beet pulp at $38.00 per ton	Amount of roots at $3.10 per ton	Amount of silage at $4.00 per ton	Amount of hay at $7.00 per ton	Amount of green feed at $2.40 per ton	Amount of oat hay at $10.50 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.	cts.	$
Ravensdale Queen Bess—67093	15-9-29	10	365	15,727	4·50	832·6	249 78	26 73	276 51	3,900	164	4,776	5,890	4,297	950	180	5½	121 58	77·3	14·6	154 93
Floss of Elmbrook—72578	11-6-29	9	386	12,227	4·27	614·2	184 26	20 79	205 05	2,949	75	6,375	4,375	2,630	2,250	450	5½	100 58	82·3	16·4	104 47
Lawndale Daisy—83184	21-2-29	7	322	11,536	4·11	557·8	167 34	19 61	186 95	2,672	190	4,570	5,910	2,190	2,300	970	4	94 78	82·2	17·0	92 17
Lady Jane—63284	25-3-30	12	335	11,217	4·48	591·2	177 36	19 07	196 43	2,665	.....	6,940	4,570	2,220	2,200	960	4	88 99	79·3	15·1	107 44
Queenie of Lawndale—82120	30-4-29	7	300	11,055	4·35	565·8	169 74	18 79	188 53	2,499	.....	4,747	3,850	2,361	2,250	1,180	4	85 91	77·7	15·2	102 62
Ste. A. Primerose 3rd—105381	5-12-28	2	365	10,457	4·35	535·2	160 56	17 78	178 34	2,251	.....	5,457	3,800	4,591	250	550	4	85 21	81·5	15·9	93 13
Ste. Anne Doreen 4th—105303	26-12-29	3	324	10,364	4·44	541·4	162 42	17 62	180 04	2,720	164	5,083	5,420	2,961	.....	500	4	92 68	89·4	17·1	87 36
Ste. A. Frivole 2nd—86194	9-2-29	6	335	10,323	4·25	516·2	154 86	17 55	172 41	2,342	185	5,199	3,410	2,617	1,800	1,150	4	86 70	84·0	16·8	85 71
Ste. A. Doreen de Supreme—113480	6-11-29	2	365	10,214	4·11	493·9	148 17	17 36	165 53	2,780	164	7,740	6,170	2,723	.....	550	4	98 74	96·7	20·0	66 79
Ste. A. Finette—83980	12-10-29	6	300	10,017	3·89	458·4	137 52	17 03	154 55	2,457	145	4,053	5,070	3,824	.....	225	3⅔	86 45	86·3	18·9	68 10
Ste. A. Lady Jane—105302	7-12-29	3	298	9,876	4·45	517·0	155 10	16 79	171 89	2,693	164	5,054	5,070	3,019	.....	520	4	91 75	92·9	17·7	80 14
Ste. A. Flavia de Supreme—113476	10-9-29	2	356	9,510	4·26	476·6	142 98	16 17	159 15	2,065	100	3,302	4,950	3,208	1,370	225	4⅓	77 77	81·8	16·3	81 38
Ste. Anne Fadette 2nd—87702	3-3-29	5	297	8,650	4·25	432·5	129 75	14 70	144 45	2,035	.....	5,030	4,420	1,658	1,700	920	4	74 44	86·1	17·2	70 01
Ste. Anne Fadette de Supreme—113478	16-11-29	2	327	8,561	4·57	460·3	138 09	14 55	152 64	2,566	131	7,285	5,890	2,458	.....	560	4	92 03	$ 1 08	20·0	60 61
Vermine—113431	28-10-29	2	328	8,184	4·42	425·6	127 68	13 91	141 59	2,111	93	3,370	5,520	3,545	.....	165	4⅔	80 04	cts. 97·8	18·8	61 55
Ste. A. Flossie—113481	12-11-29	2	309	8,075	4·57	434·1	130 23	13 73	143 86	2,210	140	5,735	5,750	2,453	.....	145	4⅔	82 25	$ 1 09	19·0	61 71
Ste-Anne Primerose 2nd—92071	16-4-29	4	319	7,715	4·35	394·8	118 44	13 12	131 56	2,050	205	5,295	4,350	1,180	1,800	1,610	4	80 80	1 05	20·5	50 76
Ste. A. Milkmaid—113482	23-10-29	2	332	7,712	4·57	414·6	124 38	13 11	137 49	1,820	150	3,280	4,890	3,280	.....	290	4⅔	73 79	cts. 95·7	17·8	63 70
Ste. Anne Beauté 2nd—109326	28-12-29	2	335	7,671	5·06	456·7	137 01	13 04	150 05	2,221	123	6,620	5,300	2,683	.....	500	4	84 01	$ 1 10	18·4	66 04
Ste. Anne Ravenette de Sup.—113468	25-10-29	2	326	7,101	4·62	385·9	115 77	12 07	127 84	1,832	135	3,518	4,720	3,440	.....	225	4⅔	74 02	1 04	19·2	53 82
Ste. Anne Flavia 3rd—86103	21-6-29	5	311	6,754	4·11	326·6	97 98	11 48	109 46	1,731	.....	5,430	3,750	1,260	2,050	1,370	4	69 52	1 03	21·3	39 94
Ste. Anne Beauté 3rd—109327	25-12-29	2	327	6,310	4·63	343·7	103 11	10 73	113 84	2,036	105	7,015	5,500	2,583	.....	500	4	80 97	1 28	23·5	32 87
Ste. Anne Mignonne de Sup.—113469	28-9-29	2	299	5,880	4·6	318·2	95 46	10 00	105 46	1,193	125	4,568	3,830	3,071	250	100	3	57 09	cts. 97·1	17·9	48 37
Total	.....	.....	7,561	215,136	.....	11,093·3	3,327 99	365 73	3,693 62	53,798	2,558	120,439	112,765	64,252	19,170	13,845	.....	1,960 10	.....	.....	1,733 54
Average for the herd	.....	4	329	9,354	4·4	482·3	144 70	15 90	160 60	2,339	111	5,237	4,903	2,784	834	602	4·2	85 20	93·7	18·0	75 38
Average of the 5 best cows	.....	8	350	12,137	4·4	627·8	188 34	20 63	208 97	2,853	120	5,659	4,569	3,220	1,580	664	4·6	96 45	79·6	15·4	112 52

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	422·96
1929	14	9,061	446·40
1930	23	9,354	482·30

As the average age of the twenty-three cows in the herd this year is only four years, and as eleven of these were two-year-old heifers, it may be said that the average production of 9,354 pounds of milk and 482 pounds of fat is a record. The milk production of the ten best cows is 11,318 pounds.

The profits over the cost of feed per cow vary from $32 to $154, with an average of $75. The profits are in direct relation to the production of butter-fat and the total cost of feeding. In other words, the cow that gives the most milk is not always the one that leaves the greatest profit. The farmer should take advantage of the opportunities that are offered to have his cows tested for the percentage of fat. By ascertaining the quantity of butter-fat that each cow can produce, he will know the cows that deserve to be kept, and those which should be sold to the butcher.

R.O.P. Ayrshire cows on pasture.

Attention is also called to the fact that in order to obtain a heavy production of milk or fat and good profits, the feed should be plentiful and varied. The basal ration should be good clover or alfalfa hay, ensilage or roots completed

with a well-balanced meal mixture. The system of feeding dairy cows on this farm is as follows:—

1½ pound clover or alfalfa hay per 100 pounds of the animal's weight.

3 pounds of ensilage or 4 pounds of roots per 100 pounds of the animal's weight.

1 pound of meal containing 14 or 15 per cent of protein per 4 pounds of milk.

In other words, a cow weighing 1,000 pounds and giving 40 pounds of milk, receives 15 pounds of hay, 30 pounds of ensilage, or 40 pounds of roots, and 10 pounds of meal per day.

COST OF REARING DAIRY HEIFERS

A record is kept each year of the feed consumed by all growing heifers, in order to find out the cost of rearing heifers until the age of one year and up to the first calving.

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

Name of heifers and numbers	Amount of whole milk at $1.45 per cwt.	Amount of skim-milk at 20 cts. per cwt.	Amount of hay at $7.60 per ton	Amount of roots at $3.10 per ton	Amount of silage at $4.00 per ton	Amount of meal at $1.80 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	Weight at one yenr of age
	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	months	$	lb.
Ste. A. Rosaline de Sup. 130957	340	.....	1,549	3,460	1,050	771	.....	.....	.....	32 16	564
Ste. A. Primula de Kyle 130954	290	1,754	521	750	360	410	.....	185	4	36 06	.....
Ste. A. Annette de Kyle 130955	258	2,978	1,323	3,095	.....	671	.....	56	.....	34 96	.....
Ste. A. Flo de Supreme—137419	370	2,434	790	350	.....	947	.....	.....	4⅔	37 82	525
Ste. A. Julianne de Kyle—137420	420	1,985	1,002	850	.....	990	.....	.....	4⅔	40 01	465
Ste. A. Rosetta de Sup.—137417	320	2,474	812	150	.....	940	.....	.....	4⅔	36 83	600
Ste. A. Venus de Kyle—137418	320	2,664	638	150	.....	926	.....	.....	4⅔	36 29	635
Ste. A. Mignonnette de S.—137416	402	.....	1,028	.....	.....	1,187	.....	.....	4	37 10	560
Ste. A. Florence de S.—130957	460	.....	1,382	3,320	1,050	683	.....	.....	.....	31 46	552
Ste. A. Andréa de Sup.—137415	525	.....	1,037	.....	.....	1,147	.....	.....	3½	37 45	480
Average, 1930	370	1,428	1,008	1,212	246	867	.....	24	3·02	36 01	*547
Three-year average with 28 heifers	335	1,989	957	935	234	786	4·5	27	1·7	34 32	.....

* Average of 8 heifers.

FEED COST OF HEIFERS FROM BIRTH TO FIRST CALVING

Name and number of heifers	Amount of whole milk at $1.45 per cwt.	Amount of skim-milk at 20 cts. per cwt.	Amount of hay at $7.60 per ton	Amount of silage at $4.00 per ton	Amount of roots at $3.00 per ton	Amount of oat hay at $10.50 per ton	Amount of meal at $1.80 per cwt.	Amount of Blach-ford meal at $4.75 per cwt.	Months of pasture at $1.50 per month	Total cost of feed	Weight at first calving
	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	months	$	lb.
Ste. Anne Rose de Kyle—120430	250	2,382	1,399	5,750	6,655	2,567	1,047	4	10	83 03	1,190
Ste. A. Primrose de S.—120431	357	2,614	1,381	3,920	8,200	2,192	1,313	8	10	86 72	1,075
Ste. A. Fameuse de Sup.—120727	295	2,592	1,667	5,736	6,613	2,227	1,136	57	9	85 86	930
Ste. A. Ida de Supreme—120434	242	2,092	2,463	3,975	7,475	1,840	1,214	23	10	84 17	975
Average, 1930	286	2,420	1,727	4,845	7,236	2,207	1,178	23	9⅞	84 95	1,017
Four-year average with 21 heifers	347	2,433	2,584	5,709	3,623	731	1,158	26	8	77 40	.....

The above table shows that the feed cost of ten yearling heifers raised in 1930 was $36 each. The average weight of these heifers at the age of twelve months was 547 pounds. The average cost for three years of rearing twenty-eight heifers was $34.32. From birth until first calving, that is up to the age of 2½ years, the cost of feeding amounted to $77.40; this is the average of four years for twenty-one heifers. The weight of these heifers was approximately 1,000 pounds. This cost does not appear to be very high when it is considered that these heifers are pure-bred and that they have always been well fed in order to make a normal growth.

FEEDING EXPERIMENTS

CALF FEEDING

Three feeding systems were tried out 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 butter-fat which has been removed. A dry meal mixture and hay are 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 (home-mixed meal) in the skim-milk.—Same as No. 2, with the exception that a home-mixed meal is added to the skim-milk as a substitute for the butter-fat that has been removed.

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

The details are shown in the table following:—

FEED TESTS OF CALVES

—	Lot 1	Lot 2	Lot 3
	No skim-milk	No substitute in the skim-milk	With substitute of home mixed meal in the skim-milk
Number of calves..... No.	4	4	3
Duration of feeding period.....months	6	6	6
Whole milk consumed per calf during the period.....pounds	496	360	373
Skim-milk consumed per calf during period.....pounds	.....	2,064	2,130
Hay.....pounds	596	469	542
Meal (dry).....pounds	640	421	447
Meal (wet).....pounds	.....	.....	69
Average weight per calf at birth.....pounds	64	59	67
Average weight per calf at six months.....pounds	300	327	329
DEDUCTIONS			
Cost of feed per calf during the period..... $	21 60	19 13	21 83
Gain in weight per calf during the period.....pounds	236	268	262
Cost of feed per pound of gain..... cts.	9·2	7·1	8·3

COST OF FEEDS

Whole milk	$1 45 per 100 lb.
Skim-milk	0 20 per 100 lb.
Hay	7 60 per ton
Meal:—	
Lot 1	2 50 per 100 lb.
Lot 2	2 50 per 100 lb.
Lot 3: Dry meal	1 90 per 100 lb.
Wet meal	2 35 per 100 lb.

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 dried blood meal.
4 pounds of bone meal.
4 pounds of limestone *finely* ground.
4 pounds of salt.

Lot 2—
90 pounds ground oats.
60 pounds ground corn.
60 pounds bran.
30 pounds distillers' grains.
30 pounds oilcake.
30 pounds ground linseed.
1·5 pounds salt.
3 pounds charred bones.

Lot 3—
(Dry meal).
100 pounds ground oats.
200 pounds bran.
100 pounds distillers' grains.
100 pounds linseed cake.
2·5 pounds salt.
(Wet mash).
200 pounds ground corn.
200 pounds ground oats.
100 pounds ground linseed.

It is seen by the above table that the calves which did not receive any skim-milk gained 236 pounds from birth until the age of six months, as against 268 pounds for those which did not receive meal in the milk, and 262 pounds for those which received meal in the milk, in addition to the dry meal. The feed cost per pound gain was 9·2 cents for lot 1, 7·1 cents for lot 2, and 8·3 cents for lot 3.

These results show that it is easy to rear good calves without feeding skim-milk, by substituting a special meal mixture. This system is useful by breeders and farmers who 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.

The results obtained with lot 2 show that calves may be successfully reared without adding meal to the skim-milk; that is by feeding the dry meal only. This system saves much labour and gives good results.

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 3 pounds per 100 pounds live weight, by replacing each pound of meal by 9 pounds of swedes or 11 pounds of beets. The quantity of hay always remained the same, as 2 pounds per 100 pounds live weight.

The following tables show the results for 1930, as well as a three-year average:—

BEETS AS A SUBSTITUTE FOR MEAL—YEAR 1930

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
Days on test	days	14	14	14	14
Pounds milk produced	lb.	*4,146·1	3,926·7	3,839·0	3,992·5
Average per cent butterfat	%	4·3	4·2	4·2	4·3
Total pounds butterfat	lb.	*177·91	163·70	160·32	169·12
Fat corrected milk*	"	*4,327·1	4,026·2	3,940·4	4,133·8
Pounds skim-milk produced	"	3,525·0	3,337·9	3,263·1	3,394·1
Total pounds meal consumed	"	728	1,092	728	728
Total pounds beets consumed	"	4,004	.....	4,004	4,004
Total pounds hay consumed	"	2,436	2,436	2,436	2,436
Pounds meal consumed per 100 pounds fat corrected milk	"	16·8	27·1	18·6	17·6
Pounds beets consumed per 100 pounds fat corrected milk	"	92·5	.....	101·7	97·1
Pounds hay consumed per 100 pounds fat corrected milk	"	56·3	60·5	61·8	59·0
COST OF FEED					
Cost of meal at $40 per ton	$	14 56	21 84	14 56	14 56
Cost of beets at $3.10 per ton	$	6 21	.....	6 21	6 21
Cost of hay at $7.75 per ton	$	9 44	9 44	9 44	9 44
Total cost of feed	$	30 21	31 28	30 21	30 21
VALUE OF PRODUCTS					
Value of butterfat at 44 cents per pound	$	78 28	72 02	70 54	74 41
Value of skim-milk at 20 cents per cwt	$	7 05	6 68	6 53	6 79
Total value of products	$	85 33	78 70	77 07	81 20
Profit for each period	$	55 11	47 42	46 86	50 99

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

SWEDES AS A SUBSTITUTE FOR MEAL—YEAR 1930

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.	8	8	8	8
Days on test	days	14	14	14	14
Milk produced	lb.	3,925·8	3,479·5	3,578·3	3,752·1
Average per cent butterfat	%	4·05	4·15	4·51	4·28
Total pounds butterfat	lb.	159·20	144·42	161·36	160·28
Fat corrected milk*	"	3,958·3	3,558·1	3,851·7	3,905
Total pounds skim-milk produced	"	3,337	2,957	3,041	3,189
Total pounds meal consumed	"	658	1,050	658	658
Total pounds swedes consumed	"	3,528	.....	3,528	3,528
Total pounds hay consumed	"	2,380	2,380	2,380	2,380
Pounds meal consumed per 100 pounds fat corrected milk	"	16·6	29·5	18·4	17·5
Pounds swedes consumed per 100 pounds fat corrected milk	"	89·1	.....	98·6	93·9
Pounds hay consumed per 100 pounds fat corrected milk	"	60·1	66·9	66·5	63·3
COST OF FEED					
Cost of meal at $40 per ton	$	13 16	21 00	13 16	13 16
Cost of swedes at $3.10 per ton	$	5 47	.....	5 47	5 47
Cost of hay at $7.75 per ton	$	9 22	9 22	9 22	9 22
Total cost of feed	$	27 85	30 22	27 85	27 85
VALUE OF PRODUCTS					
Value of butterfat at 44 cents per pound	$	70 05	63 54	71 00	70 53
Value of skim-milk at 20 cents per cwt	$	6 67	5 91	6 08	6 38
Total value of products	$	76 72	69 45	77 08	76 90
Profit realized during each period	$	48 87	39 22	49 23	49 05

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

The following is a formula to figure the value of roots by using the table (Swedes, 1930). This formula may be used to calculate the value of roots in the four tables relating to this feeding test:—

	Meal	Hay	Roots	Fat corrected milk
Period II	1,050 pounds	2,380 pounds	..... =	3,558 pounds
Average of periods I and III	658 "	2,380 "	3,528 pounds =	3,905 "

To even up period II and average of periods I and III, multiply the quantity of meal and hay in period II by a factor which is obtained as follows:—

$$\frac{3905}{3558 \cdot 1} = 1 \cdot 098$$ which gives the following:—

Average of Periods I and III			Period II	
Meal	Swedes	Hay	Meal	Hay
658	3528	2380	1153	2613
	3528		495	233

495 pounds meal at $40.00 per ton	$ 9 90
233 pounds hay at $7.75 per ton	0 91
Total	$ 10 81
3528 pounds of swedes	$ 10 81
2,000 pounds of swedes	$ 6 13

By means of the above calculation, it is found that with other feeds at prices charged swedes had a feeding value of $6.13 per ton in 1930, leaving a net profit of $3.03 over the production cost, while the feeding value of beets was $4.06, leaving a net profit of 96 cents. The value per ton of these two roots together is $5.10.

The low value of beets as compared with swedes is rather astonishing. This is unusual; it may have been caused in part by the poor quality of the hay that was fed during this period. In the two first experiments, which were reported in our 1929 report, the beets had approximately the same value as the swedes.

SWEDES AS SUBSTITUTE FOR MEAL—THREE-YEAR AVERAGE

Feeding experiment		Swedes	Meal
Cows in test	No.	8	8
Days on test	days	14	14
Pounds milk produced	lb.	3,288	3,080
Average per cent butterfat	%	4·22	4·11
Total pounds butterfat	lb.	138·88	130·00
Fat corrected milk	"	3,398	3,182
Pounds skim-milk produced	"	2,795	2,618
Total pounds meal consumed	"	558	981
Total pounds swedes consumed	"	3,888	.....
Total pounds hay consumed	"	2,456	2,456
Pounds meal consumed per 100 pounds fat corrected milk	"	16·4	30·8
Pounds swedes consumed per 100 pounds fat corrected milk	"	114·4	.....
Pounds hay consumed per 100 pounds fat corrected milk	"	72·2	77·2
COST OF FEED			
Cost of meal at $39.50 per ton	$	11 02	19 37
Cost of swedes at $2.95 per ton	$	5 73	.....
Cost of hay at $7.75 per ton	$	9 57	9 57
Total cost of feed	$	26 32	28 94
VALUE OF PRODUCTS			
Value of butterfat at 40 cents per pound	$	55 55	52 00
Value of skim-milk at 20 cents per cwt.	$	5 59	5 24
Total value of products	$	61 14	57 24
Profit for each period	$	34 82	28 30

BEETS AS A SUBSTITUTE FOR MEAL—THREE-YEAR AVERAGE

Feeding experiment		Beets	Meal
Cows in test	No.	8	8
Days on test	days	14	14
Pounds milk produced	lb.	3,624	3,544
Average per cent butterfat	%	4·35	4·14
Total pounds butterfat	lb.	157·92	146·72
Fat corrected milk	"	3,819	3,618
Pounds skim-milk produced	"	3,080	3,012
Total pounds meal consumed	"	644	1,048
Total pounds beets consumed	"	4,464	.....
Total pounds hay consumed	"	2,448	2,448
Pounds meal consumed per 100 pounds fat corrected milk	"	16·9	29
Pounds beets consumed per 100 pounds fat corrected milk	"	11·7	.....
Pounds hay consumed per 100 pounds fat corrected milk	"	64·1	67·7
COST OF FEED			
Cost of meal at $39.50 per ton	$	12 72	20 70
Cost of beets at $2.95 per ton	$	6 58	.....
Cost of hay at $7.75 per ton	$	9 49	9 49
Total cost of feed	$	28 79	30 19
VALUE OF PRODUCTS			
Value of butterfat at 40 cents per lb	$	63 17	58 69
Value of skim-milk at 20 cents per cwt	$	6 16	6 02
Total value of products	$	69 33	64 71
Profit for each period	$	40 54	34 52

The detailed analysis of the data given in the above tables shows that roots fed to dairy cows as substitute for meal have a high feeding value, which is $5.31 per ton for swedes, for the three-year average, and $4.33 for the beets. On the other hand, the cost of production of roots on our farm during a six-year period is only $3.10, with a yield of 19 tons per acre. It may be concluded that the growing of swedes and beets leaves a fair profit if they can be produced at a cost of $3 per ton, and that they are an economical feed, with grain at the prices charged in these experiments.

This experiment with roots is conducted especially for the farmers of the district below Quebec, where climatic conditions are against the economical production of corn silage. These results show that the problem of finding a succulent feed which may take the place of corn silage in this district is fairly well solved. There is also the mixture of sunflowers and corn, which may be compared with roots for the economical production of milk, but it will be seen elsewhere that the production of ensilage can only be recommended on rather large farms, specialized in dairying. For the average farmer of the district, where the number of cattle kept is rather limited, roots will always be more economical. The feeding of roots lengthens the lactation period, the total production may be increased during the winter without purchasing large quantities of meal, and the profit obtained from the herd is much larger.

LIST OF EXPERIMENTS UNDER WAY

A. 501—Breeding of Ayrshire cattle.
A. 56—Cost of milk production.
A. 59—Cost of raising milch cows.
A. 456—Cost of raising bulls.

A. 642—Value of roots as a substitute for a part of the meal in the ration of milch cows.
A. 219—Feeding of minerals to calves and heifers.
A. 497—Value of skim-milk for growing calves.
A. 498—Comparison of mixtures of special meals for growing calves.
A. 219A—Potassium iodide for pregnant cows and heifers.
A. 268—Feeding of minerals to milch cows.
A. 556—Three vs. two milkings per day for milk production.
A. 660—Serum test for contagious abortion.

SWINE

BREEDING AND REARING YORKSHIRE PIGS

At the beginning of 1930 the herd of Yorkshire pigs kept on this station numbered 52 head, including 13 brood sows, 2 boars, and 37 young pigs three to four months old. The brood sows in the herd to-day are all of the same maternal line, being descended from "Blanche de Cap Rouge" —40921—. "Ste Anne Brillante 5th" —94214— of the third generation, is the dam of four of the present sows, and the grand-dam of six other sows, as shown in the following table:—

PROGENY OF STE. ANNE BRILLANTE 5th —94214— BRED TO C.E.F. ROSEBERY 4th —76270—

1st generation	2nd generation	3rd generation
Ste. Anne Blanche 3 —103256	Ste. Anne Blanche 45 —131710	Ste. Anne Blanche 52 —140078
Ste. Anne Blanche 5 —108060	Ste. Anne Blanche 50 —133434	
Ste. Anne Blanche 6 —108061	Ste. Anne Blanche 48 —134432	
	Ste. Anne Blanche 74 —146897	
Ste. Anne Blanche 18 —119913	Ste. Anne Blanche 51 —136058	Ste. Anne Blanche 75 —146808
	Ste. Anne Blanche 73 —146896	
Ste. Anne Blanche 19 —119914		

PIGS FARROWED AND REARED DURING THE YEAR

Number of sows	10
Number of litters	16
Number of pigs farrowed	200
Number of pigs per litter	12·5
Number of uniform and vigorous young pigs	171
Number of small and weak pigs	15
Number of stillborn	14
Number of pigs raised	124
Number of pigs raised per sow	12·4

Of the 124 pigs reared, 42 were sold for breeding purposes, 40 were finished and sold, and 42 are still in feeding tests.

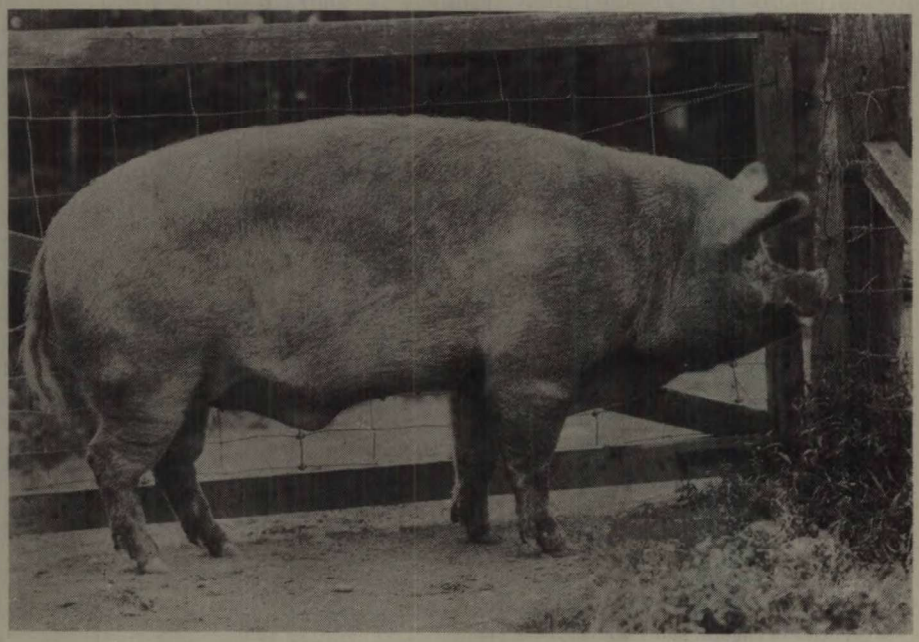
The demand for boars and sows for breeding purposes is much larger than the supply, and is increasing every year. Many requests could not be satisfied, much to our regret. Another fact that should be mentioned is that most of the breeding animals were sold at approximately four months of age, whereas in the past they were sold at the age of eight to ten weeks.

FEED COST FOR MAINTENANCE OF BROOD SOWS

Number of sows, 10.	
Feed consumed:—	
20,910 pounds meal at $0·017	$ 356 47
10,320 pounds skim-milk at 20 cents	20 64
4,165 pounds clover hay at $7.60	15 83
11,345 pounds swedes at $3.10	17 58
1,000 pounds green fodder at $2.40	1 20
1,630 pounds of cull potatoes at 15 cents	2 44
Total cost of feed	$ 414 16
Cost per head for the year	41 42
Average cost over six-year period	41 45

The above table shows that the feed cost of maintenance of brood sows during the year was $41.42, and the average cost over a six-year period was $41.45.

Farmers who have no good pastures available for their brood sows for the summer months, and who cannot produce the grain required for feeding on their farms, must purchase commercial concentrates and cannot expect the feed cost of their brood sows to be much lower. These figures may appear to be a little high, but it should be borne in mind that the breeding of hogs, as well as



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of other animals, cannot be successful unless the animals are kept in good condition. A sow which is poor at farrowing time will seldom give a large litter of uniform and thrifty pigs, and if the sow is not in good condition at the time, the pigs will not grow in a uniform manner and the profit will not be as high as if the sow had been well fed.

Another factor which contributes to keeping the cost of maintenance at that level is that our sows produce two litters a year. It will be admitted, of course, that it costs more to maintain a sow that rears fifteen to sixteen pigs than one which only rears seven or eight.

FEED COSTS OF PIGS UNTIL WEANING AGE

Number of sows	10
Number of litters	16
Number of pigs born	200
Number of pigs per litter	12·5
Number of pigs born uniform and vigorous	171
Number of pigs born small and weak	15
Number of pigs still-born	14
Number of pigs weaned	124
Number of pigs weaned per sow	12·4
Feed cost of 10 sows	$ 414 16
Cost of pigs per head at weaning age	3 34
Average cost over an eight-year period	3 80

The number of litters as well as the number of pigs reared per litter or per sow are the two factors that influence the cost of pigs at weaning age. Not only must the brood sows be well fed in order to give large litters, but they must be well taken care of at farrowing time, if the largest possible number of pigs are to be reared.

COST OF PORK PRODUCTION

Following are the results of thirty-five pigs entered in the Advanced Registry Policy for Swine:—

Days on test	days	118
Number of pigs fed	No.	35
Gross initial weight	lb.	1,001
Average initial weight	"	28·6
Gross final weight	"	7,322
Average final weight	"	209·2
Gross gain	"	6,321
Average gain per head	"	180·6
Average daily gain	"	1·53
Feed consumed—		
14,367 pounds meal at 2 cents per pound		$ 287 34
20,671 skim-milk at 20 cents per cwt		41 34
1,245 pounds green fodder at $2.40 per ton		1 49
870 pounds hay at $7.60 per ton		3 30
120 pounds turnips at $3.10 per ton		19
Total cost of feed		$ 333 66
Cost of feed per head		9 53
Cost of feed per pound gain		0 053
Meal consumed per pound gain		2 27
Skim-milk consumed per pound gain		3 27

By adding the average cost of young pigs at weaning age, i.e. $3.34, to the cost of feed consumed, we find that the total cost of the thirty-five pigs at slaughter time was $450.56. Therefore, the cost of a pound of pork amounted to 6·1 cents.

Summary of data given in the above table:—

Average cost of pigs at weaning age	$ 3 34
Cost of feed per head	12 87
Feed cost of one pound of pork	0 061

FEEDING TESTS

A number of experiements were undertaken in 1928 and continued each year since, in order to find out the benefits derived from the use of different meal mixtures, tankage, and swedes for growing pigs.

The procedure followed in these experiments as well as the results of the first year's tests were given in the annual report of this Station for 1929. These experiments were continued this year, but as it would be premature to draw final conclusions, the results will be published in table form in a further report.

ADVANCED REGISTRATION FOR SWINE

As in the past year, this Station co-operated with the Live Stock Branch, Ottawa, and entered seven sows in the Advanced Registry Policy for Swine. Five pigs from each litter are selected at weaning time and fed in individual lots until slaughtering. The quantity of feed consumed by the sow from farrowing to weaning time, as well as that consumed by the young pigs from weaning until the end of the fattening period, are recorded separately and as accurately as possible, in order to ascertain the cost of each pig.

The following marks must be secured by the pigs to qualify the sow under the policy:—

Production	40 marks
Maturity index	100 "
Quality of carcass at slaughtering time	75 "

Productiveness is measured by the number of pigs weaned in a litter; maturity, by the age of pigs at marketing time, or the number of days from birth to slaughtering; quality at slaughtering by the inspection of sides and grading and classification of carcass.

Group of sows on a rough pasture.

The results obtained with each lot are given in the following table:—

Identity of sows	M.B.	M.C.	M.F.	M.G.	M.O.	M.S.	M.F. 2
Number of pigs per lot	5	5	5	5	4	5	5
Average number of days from birth to end of test	171	169	171	182	186	174	177
Average daily gain lb.	1·55	1·58	1·54	1·48	1·45	1·51	1·65
Meal consumed per pound gain lb.	2·15	1·90	1·89	1·96	2·99	2·25	2·75
Cost of 100 pounds gain $	5 16	4 58	4 55	4 85	6 31	5 58	5 88
Total returns $	114 74	115 27	114 41	118 90	*95 13	118 89	111 76
Net returns from birth to slaughtering $	56 79	67 21	56 79	68 45	57 91	60 55	53 96

* For 4 pigs.

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. 638—Commercial concentrates vs. home-made meal mixtures.
A. 639—Value of swedes in hog feeding.
A. 382—Value of tankage in hog feeding.
A. 679—Advanced registry policy for swine.
A. 165—Value of cull potatoes in hog feeding.

SHEEP

LEICESTERS—BREEDING AND REARING

Our flock of Leicester sheep numbered thirty-six head at the beginning of the year, including twenty-five ewes, eight ewe lambs and three rams, including one imported ram.

During the spring the twenty-five ewes gave birth to thirty-six lambs, twenty-nine of which were reared. In the fall nine ewe lambs, of good conformation, were added to the herd to replace old ewes and ewes which did not meet the standard of the true Leicester type. Four lambs and one three-year-old ram bred on this Station were sold for breeding purposes, as well as six ewes and two ewe lambs. Our old imported ram "Morning Glory" —19248—, which is now eight years old and was still in good condition last fall, was mated with the thirteen ewes of the herd not related to him. The others were mated with "Deserter 28" —24504—, bred by A. W. Whitelaw, Guelph, Ont., this sire being now owned by this Station.

The wool clip from the thirty-six head included in the herd amounted to 320 pounds; that is an average of 8·8 pounds per fleece. As in the past year, this wool was graded and sold through the Canadian Co-operative Wool Growers' Association of Lennoxville. All fleeces were graded medium combing and obtained a price of 16 cents per pound.

FEED COST FOR MAINTENANCE OF FLOCK

Number of sheep		36
Feed consumed—		
20,780 pounds clover hay at $7.60 per ton	$	78 96
10,175 pounds turnips at $3.10 per ton		15 78
3,024 pounds oats at 70 cents per bushel		62 30
3,126 pounds bran at $1.50 per cwt.		55 82
5 months' pasture at 20 cents per head per month		36 00
Total cost of feed		248 86
Cost per head		6 91
Average cost per head over nine-year period		6 41

It will be noted that the feed cost is rather high on this station; this is due to the poor condition of the available pastures, which compelled us to keep the sheep in the barn until late in the spring and to bring them in early in the fall. The quantity of feed should vary in proportion to the condition and size of the stock.

If the size of most of the animals is normal and they are in good flesh, it is not necessary to increase the feed. On the other hand, as was the case with our flock at the beginning, if the animals are in poor flesh and poorly developed, they must be fed liberally so that they may reach full development as quickly as possible.

COST OF MAINTENANCE OF LAMBS AND EWE LAMBS

These experiments were undertaken in 1925 and continued each year in order to ascertain the feed cost of young lambs for breeding purposes and for the market. As most of the lambs reared on this station are sold for breeding purposes, and as we have no dual-purpose flock, we naturally have but few market lambs. However, all feed consumed is carefully noted as well as the weight of each animal. The figures given in the following table are used for the three experiments.

It will be noted that the feed consumed until the 1st of November has been recorded, as most of the sales are made at the beginning of that month in our district.

—		1930	Five-year average
Number of ewes	No.	21	80 (total)
Number of lambs reared	No.	29	119 (total)
Average weight at birth	lb.	8	8·1
Average weight on 1st of November	"	87	90·3
Feed cost of ewes less value of wool	$	98 91	373 99
Pasture, three months at 20 cents monthly per head	$	17 40	71 40
Total cost	$	116 31	445 39
Cost per head	$	4 01	3 74

BREEDING OF EWES AT THE AGE OF SIX TO EIGHT MONTHS OR AS YEARLINGS

This experiment has been under way for several years on this station; its object is to determine the possibility of maintaining the size and the quality of a flock by using ewe lambs six to eight months old for breeding purposes. The number of lambs from ewes bred at this age is not sufficient as yet to permit of comparisons or to warrant deductions. Up to date, the few ewes that were bred gave birth to only one female lamb. The males were sold for the market during the winter months, as their lack of size at the time lambs were sold for breeding purposes did not find favour with the buyers. The lack of size will always be a drawback of this system of early breeding.

EARLY VS. LATE LAMBING IN THE SPRING

As most of the lambs were born in March this year, it would be impossible to make a good comparison between the first and last ones born. A summary of the data obtained in 1928 and 1929 is given for the information of those interested.

On September 15, 1928, early lambs weighed 27·3 pounds more than late ones, and on the same date in 1929 early lambs still had an advantage in weight, but of 2·1 pounds only. While no results can be reported this year to confirm those obtained in previous years, the fact may be mentioned that purchasers of pure-bred lambs always insist on well-developed animals, and it is easier for us to comply with their desire, and thereby secure better prices, by having early lambs.

HORSES

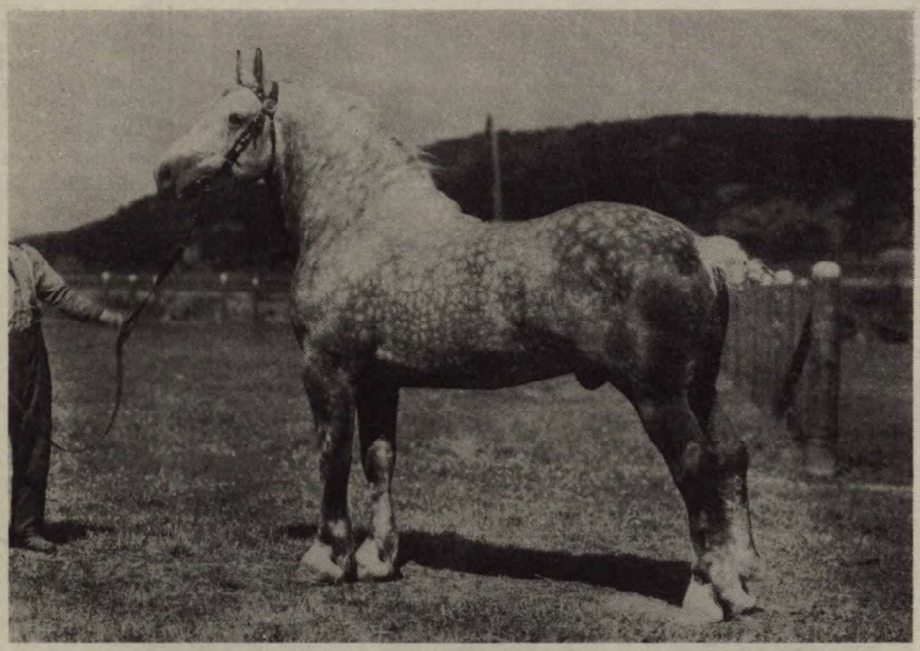
At the close of the year 1930 the number of pure-bred Percherons on this station was as follows: nine mares three years old or over, five of which were in foal; three two-year-old fillies, two yearling fillies, three colts, two geldings, and one imported stallion.

During the year four colts were reared, sired by our imported stallion " Chacal " —12951—. Two mares, one two-year-old stallion, and one colt were transferred to the Experimental Station at La Ferme, Abitibi, to start the breeding of Percheron horses.

AVERAGE FEED COST OF COLTS FROM WEANING UNTIL TWO AND A HALF YEARS OF AGE

Name	Weight	Hay	Oats	Bran	Bush pasture at $2 per month	Total cost
	lb.	lb.	lb.	lb.	months	$
Ste. Anne Brillante	1,500	3,626	3,000	664	9	107 69
Ste. Anne Jennie	1,500	4,076	3,310	724	9	117 35
Ste. Anne Meda	1,575	4,411	4,040	804	7	131 28
Ste. Anne Joffre	1,518	4,881	4,360	884	9	145 42
Ste. Anne Joliet	1,500	4,551	4,060	824	9	136 41
Total	.....	21,545	18,770	3,900	43	638 15
Average	1,518	4,309	3,754	780	8·6	127 63
6-year average for 18 colts	1,520	4,819	3,680	838	8·0	118 24

As shown in the above table, accurate records are kept of the feed consumed by colts reared on this station until they were broken in, at the average age of two and a half years. No charge is made for service, or for feed consumed by the mare during pregnancy and nursing periods. These costs are practically compensated for by the work done by the mare during nursing.



Chacal—12951. Imported stallion.

The table shows also that over a six-year period eighteen colts were reared, and that the feed consumed from weaning until breaking in at 2½ years old, amounting to 4,819 pounds hay, 3,680 pounds oats, 838 pounds bran, and eight months of pasture. These feeds were charged at the prevailing market prices for the period. The average cost of feed consumed by these eighteen colts, with an average weight of 1,520 pounds at the age of 2½ years, amounted to $118.24.

FEED CONSUMED BY DRAUGHT HORSES AND COST OF HORSE LABOUR

Name	Age	Weight	Feed consumed			Total cost of feed	Hours of labour	Cost of labour per hour
			Hay at $2 per ton	Oats at 70 cents per bush.	Bran at $30 per ton			
	yrs.	lb.	lb.	lb.	lb.	$	hours	$
Mela 4	7	1,725	5,800	4,420	720	132 62	2,400	0·055
Julia 3	7	1,625	5,300	4,160	720	124 66	2,250	0·055
Minette 2	7	1,675	5,500	3,960	720	121 46	2,171	0·056
Ste. A. Cormier	6	1,775	5,600	4,180	720	126 58	2,280	0·055
Mathilda 2	6	1,675	5,500	3,960	720	121 46	2,136	0·057
Ste. A. Juliette	4	1,500	5,000	3,750	720	114 55	1,876	0·061
Mathilda 3	4	1,550	5,200	3,760	720	115 76	1,868	0·062
Ste. A. Madeira	3	1,575	5,300	3,950	720	120 25	2,172	0·055
Ste. A. Bonnie	3	1,675	5,400	3,500	720	111 30	1,380	0·081
Average	.....	1,642	5,400	3,960	720	120 96	2,059	0·059

AVERAGE NUMBER OF HOURS OF LABOUR AND COST PER HOUR OVER A NINE-YEAR PERIOD

Year	Average number of hours of labour	Average cost of one hour of labour
		$
1930	2,059	0·059
1929	2,043	0·063
1928	1,773	0·07
1927	1,798	0·07
1926	1,891·3	0·060
1925	1,551	0·080
1924	1,953·8	0·067
1923	1,852·8	0·055
1922	2,034	0·065
Average	1,884	0·065

Group of home-raised mares.

This year, as in previous years, accurate records were kept of the feed cost of horses used for farm operations and of the number of hours of work of each horse, in order to determine the cost of horse labour.

If the hay and grain consumed by horses, and shown in the above table, are valued at market prices for 1930, we find that the average feed cost amounted to $120.96 per horse, and the cost of one hour of horse labour to 5·9 cents for the year and to 6·5 cents as nine-year average, when these horses worked 1,884 hours during the year. It should be noted also that this average cost of 5·9 cents per hour is for horses weighing an average of 1,640 pounds and, therefore, capable of doing a good day's work.

LIST OF PROJECTS UNDERTAKEN FOR THE ANIMAL HUSBANDRY DIVISION—HORSES

A. 293—Cost of horse labour.

A. 294—Cost of rearing of foals.

A. 331—Maintenance cost of work horses.

A. 409—Wintering horses in the barn vs. in the open.

A. 531—Breeding of Percherons.

A. 547—Cost of rearing fall vs. spring foals.

FIELD HUSBANDRY*

The weather conditions during the growing season of 1930 were very favourable to field crops, with the exception of cereals and potatoes. The development of late-sown grains was delayed by excessive rainfall in July, and early-sown grains were damaged by lodging in August. Notwithstanding a number of sprayings, potatoes, which were very promising, were badly attacked by late blight between August 10 and 13, following several showers accompanied by high temperatures. Not only was the yield greatly cut down by the disease but a great deal of rot was also caused. Other farm crops, such as pastures, hay, roots, sunflowers, and corn, gave very good yields, as compared with past years.

Field husbandry is the chief line of work on this farm, and most of the experiments under way are in connection with rotations. At the present time, there are in operation one three-year rotation, two four-year rotations, and two five-year rotations, with different crops, in order to determine the combination of crops and the length of rotation which give the most economical yields while maintaining soil fertility. In addition to rotation experiments, work was done on soil drainage, renovation of old pastures and the use of chemical fertilizers. These three things have a great deal of importance in this district, where poor drainage appears to be the chief limiting factor as regards the yields of crops, where there is not sufficient manure produced, on account of the scarcity of cattle, to maintain soil fertility, and where old exhausted pastures cover a rather large area of the land.

The land on this farm is composed of two distinct types: one is a heavy clay which is fertile, the other is sandy or gravelly and very poor. The experiments under way bear upon the requirements and the nature of each type. As the sandy part of the farm is more responsive to applications of chemical fertilizers than the clay part, it is used for experiments in connection with the Division of Chemistry; that is, the application of chemical fertilizers for oats, hay, pastures, potatoes, and swedes.

* This Division is under the direction of Hector Gerard, B.S., B.S.A., Assistant.

It should be noted that the field husbandry work is undertaken for demonstrative as well as for experimental purposes. During the last few years, a number of picnics were held on the farm, and the farmers attending were enabled to see for themselves the results of the various experiments under way.

METEOROLOGICAL RECORDS

Month	Average temperature			Date of last spring frost and of first autumn frost	Rainfall		
	1930	1929	17-year average		1930	1929	18-year average
					in.	in.	in.
April	34·1	34·3	37·1	.....	1·14	1·12	2·61
May	50·7	48·3	48·5	18	2·94	3·29	3·36
June	65·5	55·9	58·6	.....	3·68	3·19	2·98
July	64·8	63·6	64·3	.....	5·78	5·08	3·17
August	62·4	60·8	62·0	.....	4·88	3·11	2·42
September	55·3	52·9	53·3	.....	4·32	2·45	3·13
October	45·2	41·8	43·6	3	1·01	3·61	3·14

It may be seen by the above table that the spring of 1930 opened rather early, compared with previous years. May, with a high temperature and low rainfall, was favourable for seeding. The first sowing of grain was done on May 7, and from that date on seeding was continued without much delay. In the latter part of June showers were frequent and the rest of the summer was wet, greatly handicapping the harvesting of hay and grain crops. The cereal crops on several fields were lodged by rain when still in the green stage. The fall was open and the weather fine until late in November, enabling us to perform a great deal of the ploughing in preparation for next spring.

COST OF PRODUCING CROPS

APPLICATION OF MANURE TO ROTATIONS

Rotation	Year	Manure per acre	Percentage of value of manure charged against 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 year...		10
	5th year...		5

PERCENTAGE OF THE VALUE OF CHEMICAL FERTILIZERS CHARGED AGAINST 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 crops and 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 per ton (including hauling, machinery, gas, man labour).
Threshing: Oats, 4 cents per bushel; barley, wheat, and peas, 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 50 per bushel.
Barley	$1 50 per bushel.
Peas	$3 60 per bushel.
O.P.V.	$1 70 per bushel.
Corn	$3 00 per bushel.
Sunflowers	28½ cents per pound.
Swedes	60 cents per pound.
Beets	45 cents per pound.
Red clover	21 cents per pound.
Alsike	18 cents per pound.
Alfalfa	51 cents per pound.
Timothy	12 cents per pound.

COST OF PRODUCING INTERTILLED CROPS PER ACRE

Item	Corn	Sunflowers	Sunflowers and corn	Swedes	Beets
	$	$	$	$	$
Rent and taxes	6 25	6 25	6 25	6 25	6 25
Share of cost of manure	9 30	9 40	9 60	10 89	10 98
Seed	1 60	2 52	1 86	1 20	2 03
Manual labour	9 74	9 74	9 75	40 29	42 59
Horse labour	5 10	5 20	5 40	7 06	7 38
Ensiling	19 20	22 00	18 10	.....	.....
Machinery	2 85	2 85	2 85	2 85	2 85
Twine	0 64	0 74	0 63	.....	.....
Cost per acre	54 68	58 70	54 44	68 54	72 08
	tons lb.	tons lb.	tons lb.	tons lb.	tons lb.
Yield per acre	19 400	22 0	18 200	23 0	26 200
Cost per ton	$2 85	$2 67	$3 01	$2 98	$2 76

It will be seen by the above table that all intertilled crops gave high yields at a low cost. The yields of 19 tons for corn, 22 tons for sunflowers, 18 tons for sunflower and corn mixture, 23 tons for swedes, and 26 tons for mangels are exceptionally high—the highest ever recorded on this farm since its inception.

The chief factors responsible for such high yields and low production costs, outside of the favourable weather conditions, are the following: drainage, preparation of the land by fallowing, and the date of thinning. Everyone should

strive to secure the highest possible yield; this factor has a great deal of influence on cost of production, as most fixed costs such as seed, rent of land, cost of manure and of chemical fertilizers, use of machinery, man labour and horse labour, are approximately the same, whether the yield is high or low.

Cost of Producing Grain

Item	Oats	Wheat	Barley	Peas
	$	$	$	$
Rent and taxes	6 25	6 25	6 25	6 25
Share of cost of manure	5 39	6 70	7 20	9 00
Seed	4 20	5 82	3 38	9 36
Manual labour	8 26	7 79	7 80	11 46
Horse labour	4 22	3 89	4 08	3 40
Threshing	2 40	2 44	2 96	1 90
Machinery	2 85	2 85	2 85	2 85
Twine	0 43	0 34	0 42	.....
Total cost per acre	34 00	36 08	34 94	44 22
Cost of straw per acre	4 55	3 48	3 49	.....
Cost of producing grain per acre	29 45	32 60	31 45	.....
	bush. lb.	bush. lb.	bush. lb.	bush. lb.
Yield of grain per acre	60 4	30 30	37 0	23 42
Cost per bushel	$0 49	$1 07	$0 85	$1 87

The cost of production of cereals per acre differs but little from year to year; the only factor which influences the cost per bushel is the yield secured. Compared with previous years, the yield of grain was low this year: oats yielded 60 bushels; wheat, 30 bushels; barley, 37 bushels; and peas, 24 bushels. These crops were affected by frequent rains in July and August. In some places they suffered from an excess of moisture, while elsewhere, where better growth had been made, lodging caused much damage. As regards oats, the reduced yields secured this year may also be attributed to the fact that most of the fields had been sown to Alaska oats. Generally speaking, all grains, and especially peas, require a well-drained land. Indeed, in an experiment reported further on in this report, in connection with drainage by open ditches, it may be seen that the cereal crops are those that benefited the most from this drainage.

Cost of Producing Hay

Item	Clover	Alfalfa and clover*	Timothy	Oat and pea hay
	$	$	$	$
Rent and taxes	6 25	6 25	6 25	6 25
Share of cost of manure	5 04	4 80	2 85	5 10
Seed	2 33	3 12	1 37	7 10
Manual labour	4 64	7 69	4 29	9 22
Horse labour	0 94	1 60	0 88	4 27
Machinery	2 85	2 85	2 85	2 85
Cost per acre	22 05	26 31	18 49	34 79
	tons lb.	tons lb.	tons lb.	tons lb.
Yield per acre	3 580	5 560	3 40	3 1,260
Cost per ton	$6 70	$4 98	$6 12	$9 58

On the whole, the hay yields secured this year were the highest ever recorded on this farm. They were as follows: clover, 3 tons, 580 pounds; clover and alfalfa, 5 tons, 560 pounds; timothy, 3 tons, 40 pounds; peas and oats, 3 tons, 1,260 pounds. In order to secure good hay crops, two factors are essen-

tial: a rotation not exceeding five years, and liberal quantities of seed. The ordinary practice followed on this farm is to sow 20 pounds per acre of the following mixture: 10 pounds timothy, 8 pounds red clover and 2 pounds alsike clover.

The outstanding feature in the above table is the high yield of 5 tons, 560 pounds from the two cuttings of clover and alfalfa. This field was seeded down by adding a few pounds of alfalfa to the ordinary mixture. The mixture sown per acre was as follows: 10 pounds timothy, 6 pounds red clover, 2 pounds alsike clover and 6 pounds alfalfa. Farmers whose land is well drained and contains sufficient lime should follow this practice.

On every well-organized farm, there should be each year several acres sown to peas and oats, or peas, vetches and oats. This crop offers many advantages for dairy farms; it may be cut green and fed to the cows during the summer, or it may be placed in the silo, or cut for hay or grain, according to the needs of the season.

CROPS—COST OF PRODUCTION PER ACRE—SEVEN-YEAR AVERAGE

Crops	Average yield, 7 years	Average cost per ton or bushel, 7 years
	tons lb.	$
Hoed crops		
Corn	12 1,820	4 23
Sunflowers	16 1,540	3 31
Sunflowers and corn	14 640	3 83
Swedes	19 1,400	3 08
*Mangels	25 200	2 81
Grain crops	bush. lb.	
Oats	73 16	0 40
Wheat	30 51	1 04
Barley	38 9	0 87
Peas	44 12	1 30
Hay crops	tons lb.	
Clover	3 260	7 92
Clover and alfalfa	3 1,520	6 86
Timothy	2 1,380	7 68
Oats and peas	3 640	10 25

*Two-year average.

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

Crops	Yield, 1930	Dry matter percentage	Dry matter per acre		Cost per 100 pounds of dry matter	
			1930	Average 7 years	1930	Average 7 years
Hoed crops	tons lb.	%	lb.	lb.	$	$
Corn	19 400	14·80	5,683	3,786	0 96	1 43
Sunflowers	22 —	16·80	7,392	4,894	0 79	1 18
Sunflowers and corn	18 200	14·75	5,340	3,956	1 02	1 35
Swedes	23 —	12·34	5,676	4,158	1 21	1 55
**Mangels	26 200	13·14	6,859	6,693	1 05	1 05
Grain crops	bush. lb.					
Oats	60 4	90·8	1,856	2,275	1 59	1 34
Barley	37 —	90·7	1,610	1,666	1 95	1 86
Peas	23 42	90·8	1,291	2,420	3 42	1 88
Wheat	30 30	88·9	1,627	1,654	2 00	1 95
Hay crops	tons lb.					
Green fodder hay	3 1,260	83·4	6,055	5,652	0 57	0 61
Clover	3 580	87·1	5,731	5,445	0 39	0 46
*Clover and alfalfa	5 560	90·8	9,588	6,831	0 27	0 37
Timothy	3 40	88·4	5,339	4,697	0 34	0 44

*2 cuttings. **Two-year average.

Those who are particularly interested in field husbandry should study carefully the above tables which give the yields and cost per ton or per bushel of various farm crops, as well as the cost per 100 pounds of dry matter over a seven-year period. It will be noted that the yields mentioned are much higher than those usually secured by the farmers of the district. This may be explained by the fact that all practices conducive to increased yields, such as land drainage, rotations, use of good seed and proper applications of manure, are followed. These practices can easily be applied on the average farm.

By comparing the yields and cost of production of the three classes of crops mentioned, the reader may determine those that are most suitable for his needs and thus place his operations on an economical basis.

HOED CROPS

In order to determine the most economical hoed crops to produce, the first thing to do is to ascertain the cost of production of 100 pounds of dry matter and the percentage of digestibility. Over a seven-year period, the cost of 100 pounds of dry matter has been as follows for the various crops: corn, $1.43; sunflowers, $1.18; sunflowers and corn, $1.35; swedes, $1.55, and mangels, $1.05. It should be noted, however, that the figures given for mangels are for a two-year average only. While corn and the corn and sunflower mixture cost less per 100 pounds of dry matter than swedes, the latter are more economical as their dry matter is almost entirely digestible or, at least, 25 to 30 per cent more digestible than that of either corn or sunflowers. Thus, roots are more economical to produce than silage in this section.

GRAIN CROPS

Over a seven-year period, oats produced, as an average, 73 bushels at a cost of 40 cents, wheat, 31 bushels at $1.04, barley, 39 bushels at 87 cents, and peas, 44 bushels at $1.30. The cost of production of these cereals is much lower than their market value, and they may be considered as profitable crops on many farms.

HAY CROPS

Over a seven-year period, clover gave an average yield of 3 tons, 260 pounds, at a cost of $7.92 per ton; clover and alfalfa mixture, 3 tons, 1,520 pounds at a cost of $6.86; timothy, 2 tons, 1,380 pounds at a cost of $7.68, and pea and oat hay, 3 tons, 640 pounds at a cost of $10.25. These figures show that it is possible to grow three different kinds of legumes for a dairy herd at a reasonable cost as substitutes for clover and alfalfa which are not always available in adequate quantity on most farms. The production of pea and oat hay, even at a cost of $10.25 per ton, may be considered as profitable, as this crop may be used to supplement summer pastures, it may be ensiled, cut for hay or for grain, and it permits of following a regular rotation, with a soil-improving crop.

CROP ROTATIONS

While crop rotations have been studied longer than several other agricultural problems, many farmers do not appreciate as yet the necessity of following a rotation. Therefore, it is important that the experiments on crop rotations carried on for a number of years at this station be continued in order to find out which is the most profitable sequence of crops for this district to improve soil fertility, secure high yields and lower the cost of production. With these objects in mind, three-, four-, and five-year rotations, including various crop sequences, are under test. The yields secured and the 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 1930		Cost per acre in 1930	Cost per ton or bushel in 1930	Average yield per acre, for 7 years		Average cost per ton or per bushel for 7 years
	tons	lb.	$	$	tons	lb.	$
Corn	19	1,200	54 10	2 76	13	400	4 43
Sunflowers	22	1,600	59 62	2 61	17	1,240	3 26
	bush.				bush.		
Wheat	35	30	35 21	0 93	32	25	0 99
	tons				tons		
Clover	3	200	22 92	7 39	2	1,200	8 75

FOUR-YEAR ROTATION

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 1930		Cost per acre in 1930	Cost per ton or bushel in 1930	Average yield per acre for 7 years		Average cost per ton or per bushel for 7 years
	tons	lb.	$	$	tons	lb.	$
Swedes	24	1,600	68 70	2 77	16	1,920	3 53
Corn	17	1,400	52 82	2 98	11	920	4 50
Sunflowers	22	1,600	59 48	2 61	15	800	3 25
	bush.				bush.		
Wheat	32	24	36 75	1 07	31	38	1 08
	tons				tons		
Clover	3	720	21 24	6 32	2	1,500	8 27
Timothy	3	60	18 23	6 01	2	1,000	7 20

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 1930		Cost per acre in 1930	Cost per ton or bushel in 1930	Average yield per acre, for 7 years		Average cost per ton or per bushel for 7 years
	tons	lb.	$	$	tons	lb.	$
Swedes	16	1,000	62 43	3 78	13	1,720	4 21
Corn	19	1,400	54 90	2 79	9	1,520	5 36
Sunflowers	20	600	56 88	2 80	14	1,600	3 65
	bush.				bush.		
Wheat	20	24	35 66	1 64	22	22	1 49
	tons				tons		
Clover	2	1,220	20 23	7 75	2	420	8 51
Timothy	2	1,860	18 08	6 17	2	960	7 58

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

First year—Mixture of corn and sunflowers and pea and oat hay.
Second year—Oats.
Third year—Mixture of alfalfa and clover.
Fourth year—Pasture.

YIELDS AND COST OF PRODUCTION

Crops	Yield per acre in 1930		Cost per acre in 1930	Cost per ton or bushel in 1930	Average yield per acre, for 7 years		Average cost per ton or per bushel for 7 years
	tons	lb.	$	$	tons	lb.	$
Corn and sunflowers	18	200	54 44	3 01	14	600	3 56
Mangels	24	...	68 90	2 87	.....	.....	.....
*Oat and pea hay	4	280	39 85	9 62	3	1,640	10 46
	bush.				bush.		
Oats	67	17	36 47	0 47	74	32	0 40
	tons				tons		
Alfalfa and clover hay (1)	5	560	26 31	4 98	3	1,740	6 74
Alfalfa and clover hay and pasture	2	1,000	19 15	7 66	.....	.....	.....

*Two-year average. (1) 2 cuttings.

FIVE-YEAR ROTATION—UNDRAINED LAND

First year—Swedes.
Second year—Wheat.
Third year—Clover.
Fourth year—Timothy.
Fifth year—O.P.V. hay.

YIELDS AND COST OF PRODUCTION

Crops	Yield per acre in 1930		Cost per acre in 1930	Cost per ton or bushel in 1930	Average yield per acre, for 7 years		Average cost per ton or per bushel for 7 years
	tons	lb.	$	$	tons	lb.	$
Swedes	25	600	71 55	2 83	15	160	3 93
	bush.				bush.		
Wheat	22	15	36 14	1 52	21	26	1 49
	tons				tons		
Clover	3	1,100	22 69	6 39	2	1,220	8 56
Timothy	2	840	18 06	7 46	2	1,140	8 87
Oat and pea hay	3	1,480	31 57	8 44	3	760	9 57

Very good results are obtained with a three-year rotation, including corn or sunflowers in the first year, wheat in the second and clover in the third. However, this rotation is a short one and is suitable only for districts specializing in a particular crop, or for very light soil, or again for a part of the farm which cannot be included in the regular rotation.

A four-year rotation including corn, sunflowers or turnips in the first year, wheat in the second, clover in the third, and timothy in the fourth, is practical on a dairy farm where a fairly large acreage is available for permanent pasture, as no provision is made for pasture.

A four-year rotation, including a mixture of corn and sunflowers or roots or green fodder in the first year, oats in the second, clover and alfalfa in the third, and a cutting of hay or pasture in the last year, gives very good results, and it is the rotation recommended for the average farm of the district. In this rotation the mixture of sunflowers and corn yielded 18 tons and 200 pounds per acre, mangels, 24 tons, pea and oat hay, 4 tons and 280 pounds, clover and alfalfa hay 5 tons and 560 pounds in two cuttings. The fourth year of the rotation gave a yield of 2 tons and 1,000 pounds of hay and provided pasture for one cow per acre during 3·5 months. These results were secured with ordinary means; no lime or chemical fertilizers were applied; only an application of manure at the rate of 16 tons per acre was made to the hoed crops, for the whole period of the rotation. The hay mixture used consists of 10 pounds timothy, 6 pounds red clover, 2 pounds alsike clover, 1 pound white clover and 6 pounds alfalfa per acre. Not only is this rotation ideal for a dairy farm, but it also provides an excellent opportunity for eradicating weeds.

A five-year rotation with roots in the first year, wheat in the second, clover in the third, timothy in the fourth and green fodder in the fifth year, is suitable for a clay soil on farms where the herd is not large enough to warrant the construction of a silo and where a certain acreage is available for a permanent pasture, but green fodder may be used to supplement the pasture.

CULTURAL OPERATIONS

DRAINAGE EXPERIMENT

This experiment was undertaken to ascertain the difference in yield resulting from under drainage, compared with open ditches only. With this object in view, two four-year rotations, one on drained land and the other on undrained land or land drained by means of open ditches only, both including the same sequence of crops, were started nine years ago. The average yield over a nine-year period and the cost of production over a seven-year period 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 9 years		Average cost per ton or per bushel for 7 years	Average yield per acre for 9 years		Average cost per ton or per bushel for 7 years
	tons	lb.	$	tons	lb.	$
Swedes	16	1,340	3 57	13	1,520	4 21
Corn	11	460	4 49	9	840	5 36
Sunflowers	15	400	3 25	14	1,180	3 65
	bush.			bush.		
Wheat	31	36	1 08	22	27	1 49
	tons			tons		
Clover	2	1,340	8 26	2	400	8 51
Timothy	2	940	7 20	2	500	7 57

The above table shows that under drainage was most effective in the case of swedes, corn and wheat. Thus, on drained land, swedes yielded 3 tons more than on undrained land, corn almost two tons more, and wheat 9 bushels more. As regards other crops such as sunflowers, clover and timothy, the difference in favour of drainage was not very noticeable.

This experiment shows that underdrainage is a very important factor in the growing of root and cereal crops. This does not imply, however, that it is economical on all types of soil. Generally speaking, it is advocated only for lands suffering from an excess of moisture or for parts of land that are impossible to drain by means of ditches.

COST OF DRAINAGE PER 100 FEET

In order to determine the cost of artificial drainage per 100 feet without using special equipment, a record was kept of the manual labour, horse labour and cost of tiles for the last fields drained in 1928. Where the digging and filling were done by hand, 38 hours of manual labour were required for 100 feet of drain, which, at 25 cents per hour, totals $9.50. Where the digging was done with an ordinary plough and the filling with a road machine, 26 hours of manual labour at 25 cents, and 6 hours of horse labour at 10 cents were required, totalling $7.10. In order to ascertain the total cost, the cost of tiles at $4 per 100 feet for 4-inch tiles, and $6 for 6-inch tiles, should be added to $9.50 or to $7.10.

RENOVATION OF PASTURES

In 1927, an experiment was undertaken 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 check. Each of these parts was again divided into 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 three 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 3 years		
		Check	Ploughed	Disked
		lb.	lb.	lb.
March or beginning of April	Chemical fertilizer	860	2,241	1,686
	Check	311	1,073	640
June	Chemical fertilizer	710	2,013	1,093
	Check	661	1,526	791
September	Chemical fertilizer	1,410	2,716	2,025
	Check	308	853	556
	Averages	711	1,737	1,132

CHEMICAL FERTILIZERS:
1 ton limestone and 600 pounds Thomas phosphate in 1927.
100 pounds nitrate of soda and 400 pounds Thomas phosphate in 1930.

The above table shows that the best system of renovating an old pasture consists in ploughing, applying limestone and Thomas phosphate and seeding down in September without a cover crop. Disking with the same treatment also gives good results, especially if it is done while the ground is damp, to break up the sod.

EXPERIMENTS ON PASTURES

An old permanent pasture, producing only a small quantity of wild hay and overrun with raspberry bushes was seeded to green fodder in 1928, and a small application of 6 to 8 tons of manure was made per acre. In 1929, this field was sown to oats and seeded down for pasturing purposes. In 1930, it was divided into five equal sections of 1·75 acre each, that were fertilized and pastured by two-year-old heifers as indicated on the accompanying chart. Sections 1, 3, 4 and 5 received an application of 100 pounds of sulphate of ammonia, 300 pounds of superphosphate and 75 pounds of muriate of potash per acre at the beginning of May. Sections 1 and 2 were continuously pastured while sections 3, 4 and 5 were alternately pastured, i.e. the heifers were transferred from one pasture to another every week. The object was to find out the most profitable system for the cattle and for the duration of the pasture. The plan of this experiment as well as the results obtained in 1930 are shown in the chart and table hereunder.

RESULTS, 1930

Section	Days on pasture	Total gain of heifers
		lb.
1	276	497
2	223	60
3	329	435
4	329	435
5	329	435

The above table shows that the application of fertilizers has given splendid results in this experiment; this can be seen by comparing the results secured on section No. 2, which had been kept as check, with those secured on other sections. The unfertilized section provided 223 days of pasture and a total gain of 60 pounds, as compared with 276 days and 497 pounds for section No. 1, and 329 days and 435 pounds for sections 3, 4 and 5 which had been fertilized. The section pastured continuously gave just as good results as the sections alternately pastured. It should be noted also that those five fields could hardly carry 4 or 5 sheep before fertilizers were applied, and this year they provided an excellent pasture for 12 two-year old heifers during four months. This experiment will be conducted for several years, and the reader will do well to follow the results closely.

CHEMICAL FERTILIZERS EXPERIMENT

APPLICATION OF FERTILIZERS FOR HAY

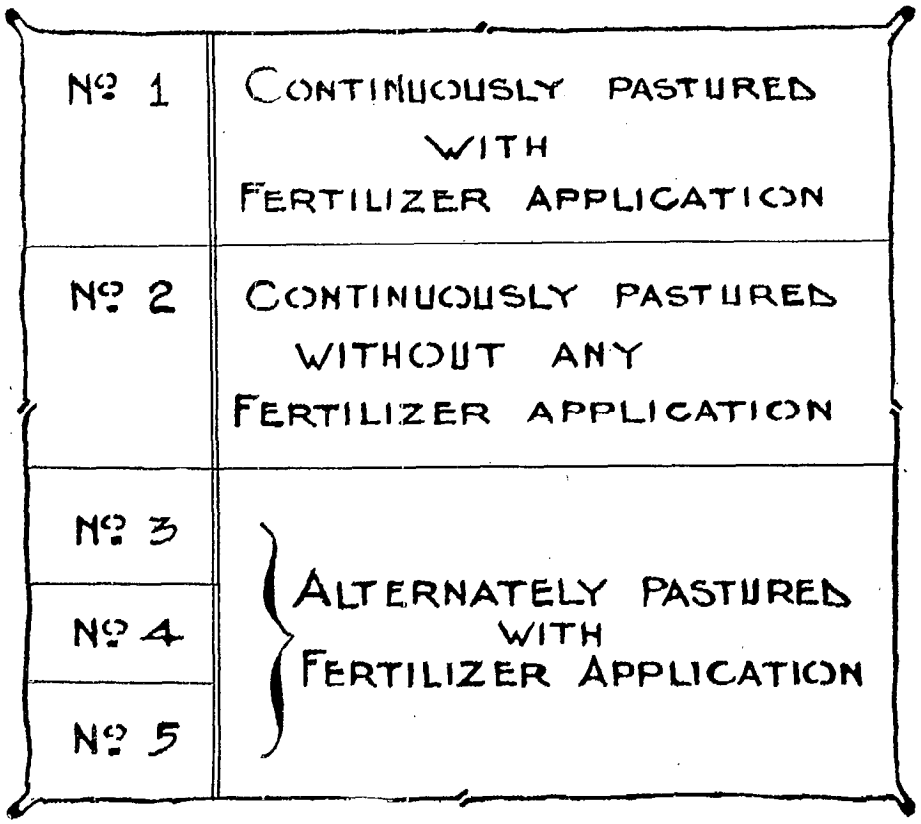
The object of this experiment is to determine the value of chemical fertilizers and barnyard manure on meadows.

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 top dressing 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.



The results obtained are shown in the following table:—

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 1,660	12 44	2 1,420	11 41	2 800	12 16
2nd	Oats (1)	bush. 59 27	0 46	bush. 60 4	0 42	bush. 55 20	0 41
3rd	Clover hay	tons 2 1,280	8 97	tons 2 1,460	7 29	tons 2 740	7 09
4th	Timothy hay	2 1,420	7 62	2 1,940	6 81	2 740	6 58
5th	Timothy hay	2 1,100	8 82	2 1,240	7 17	2 280	6 99

(1) 5-year average.

The preceding table shows that over a six-year period, the average yields of hay were slightly higher on the fertilized plots than on the check plot. However, the increase in yield is not sufficient to cover the cost of the fertilizers, or of the manure; this explains why the cost of hay is lower on the check plot. It should be noted, however, in fairness to the fertilizers that the land used for this experiment is a heavy clay, of sufficient fertility to produce good yields without any fertilizer application. It is seen by the yields that when the second cycle of the rotation was entered upon, the fertility had greatly decreased, while it had increased on the fertilized plots. Undoubtedly, this difference will increase in time. It should be noted also that chemical fertilizers gave higher yields than manure and at a lower cost.

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	3,670	48 12	4,529[1]	3,268[2]	65 08
2	Manure	3,342	34 2	3,355	2,581	41 23
3	Manure and chemical fertilizers	3,178	32 25	2,668	2,111	45 15
4	Chemical fertilizers	3,371	36 21	3,430	2,591	50 23
5	Check (without fertilizers or manure)	1,313	18 24	827	995	33 41

[1] Three-year average. [2] Two-year average.

The above results show that poor lands are very responsive to fertilizer treatments. In fact, the yields obtained on fertilized plots were practically three times as high as those obtained on check plots. It should be noted also that manure and chemical fertilizers combined gave better results than manure or chemical fertilizers alone.

CHEMICAL FERTILIZERS APPLIED TO POTATOES

An experiment has been under way for two years to determine the best formula and the most profitable quantity of fertilizers for potato growing. The various tests as well as the average yields for two years are included in the following table:—

CHEMICAL FERTILIZERS FOR POTATO GROWING

Two-year average

Treatments	Yield per acre				Per cent yield of marketable potatoes, compared with the check
	Marketable potatoes		Unmarketable potatoes		
	bush.	lb.	bush.	lb.	
Check C					
No manure or chemical fertilizers	231	33	29	15	100
Manure A					
15 tons manure	257	25	31	..	111
Manure and chemical fertilizers (3-10-6) B					
6 tons manure, 400 pounds chemical fertilizers	265	45	32	30	115
6 tons manure, 400 pounds chemical fertilizers	275	9	28	21	119
Nitrogen D					
500 pounds chemical fertilizers: 0-8-8	231	45	27	9	100
500 pounds chemical fertilizers: 3-8-8	272	45	25	45	120
500 pounds chemical fertilizers: 6-8-8	270	30	29	45	117
Potash E					
500 pounds chemical fertilizers: 4-8-0	259	3	29	45	112
500 pounds chemical fertilizers: 4-8-4	250	45	31	15	107
500 pounds chemical fertilizers: 4-8-8	256	26	29	0	111
Phosphoric acid F					
500 pounds chemical fertilizers: 4- 0-8	265	30	29	0	115
500 pounds chemical fertilizers: 4- 6-8	283	..	29	15	123
500 pounds chemical fertilizers: 4-12-8	276	45	25	15	120
Various quantities of chemical fertilizers: 3-8-8 G					
400 pounds chemical fertilizers: 3-8-8	306	39	33	30	132
800 pounds chemical fertilizers: 3-8-8	282	18	27	15	123
1,200 pounds chemical fertilizers: 3-8-8	318	15	32	15	140
1,600 pounds chemical fertilizers: 3-8-8	318	39	29	30	140
Commercial formulae D-F					
500 pounds chemical fertilizers: 3-8-8	247	45	30	15	107
250 pounds chemical fertilizers Nitrophoska: 15-30-15	245	18	31	15	106
500 pounds chemical fertilizers Nitrophoska: 15-30-15	255	15	28	..	110
Method of applying 3-8-8 H					
400 pounds in the rows and 400 pounds broadcast	307	30	32	30	132
800 pounds in the rows	330	15	32	..	143

Since this experiment has only been carried on for two years, the reader should note the kind of work carried rather than the yields obtained, as the results may have been influenced by the nature of the soil or by other factors. In an experiment of this kind, it is difficult to draw any conclusions before five years have elapsed. In 1930 the best yields were obtained on plots receiving an application of 800 pounds of 3-8-8 fertilizer in the rows.

LIST OF PROJECTS UNDERTAKEN FOR THE FIELD HUSBANDRY DIVISION

F. 305—Meteorological records.
F. 91—Cost of farm crops.
F. 88—Yields of root and silage crops and profits.
F. 86—Yields of various grain crops and profits.
F. 4—Three-year rotation—potatoes, oats, clover.

F. 5—Three-year rotation—roots, wheat, clover.
F. 7—Three-year rotation—sunflowers, corn, wheat and clover.
F. 16—Four-year rotation—corn, sunflowers and roots, wheat and timothy.
F. 24—Four-year rotation—corn and sunflowers, oats, clover and alfalfa, pasture.
F. 30—Five-year rotation—roots, wheat, clover, timothy, O.P.V.
F. 72—Drained vs. undrained land.
F. 67—Renovation of pastures.
F. 327—Pasture experiments using livestock.
F. 79—Manure vs. chemical fertilizers, vs. no manure.
F. 81—Chemical fertilizers vs. manure for hay.
F. 82—Chemical fertilizers vs. manure for potatoes.
F. 90—Cost of operating tractor.
F. 328—Degree of weed infestation on designated areas.
F. 339—Weed eradication on pastures.

HORTICULTURE

FRUIT TREES

APPLE—TEST OF VARIETIES

The following injuries to fruit trees, caused by snow and cold during the winter, were noticed at the spring examination of the orchard:—

Five apple trees were injured by snow, and eleven destroyed by cold. No injury was caused by field-mice or other rodents, as the apple trees are protected from their attacks, a number by wire screens, and others by roofing paper. The wire screens used during the last five winters are still in good condition, but the paper must be renewed every year.

The number of apple trees planted at this station is 1,076. Over 400 grafts are also grown for the propagation of Melba, Lobo, Wealthy, McIntosh, Elmer and Sandow varieties.

The bloom on apple trees was four days earlier than in 1921 and seven days earlier than in 1928.

The dates of blooming, of full bloom and of the fall of bloom for some varieties over a three-year period are given in the following table:—

OBSERVATIONS ON APPLE BLOOM

Varieties	Beginning of bloom			Full bloom			Fall of bloom		
	1928	1929	1930	1928	1929	1930	1928	1929	1930
	June	June	June	June	June	June	June	June	June
Alexander	13	8	4	15	11	7	20	15	11
Canada Baldwin	13	9	5	16	11	7	20	14	12
Crimson Beauty	7	30	1	10	2	4	15	12	9
Bruno	12	9	5	15	12	7	19	16	11
Cora	10	9	3	13	11	6	18	16	11
Duchess of Oldenburg	9	5	3	12	9	5	17	13	11
Dudley	10	8	3	13	11	5	18	14	12
Striped Fameuse	10	8	3	13	10	5	18	15	11
McIntosh Red	12	7	4	15	11	7	19	15	11
Scarlet Pippen	9	3	1	12	7	5	17	13	10
Yellow Transparent	11	6	4	13	9	6	19	15	12
Wealthy	11	8	4	13	11	6	18	15	10

The apple crop of 1930 was the heaviest ever obtained on this station, the yield amounting to 802 barrels. The average crop for the last four years was 630 barrels. The yield per tree of a number of good varieties was as follows:—

YIELDS OF DIFFERENT VARIETIES OF APPLES—SIX YEAR AVERAGE

Variety	Season	Year of		Yield	
		Planting	First crop	1930	Total for 7 years
				gal.	gal.
Langford Beauty	Late summer	1913	1920	12	120
Montreal Peach	Late summer	1915	1920	8	106
Okabena	Mid-winter	1913	1918	56	202
Dudley	Mid-winter	1913	1919	8	148
Alexander	Late fall	1913	1920	20	172
McMahan, cooking	Winter	1915	1920	86	290
Milwaukee	Winter	1915	1919	64	210
Scarlet Pippin	Winter	1915	1920	30	168

Over three hundred of the varieties under test were originated by the Division of Horticulture, Central Experimental Farm, Ottawa. The varieties given in the following table may be added to the number of good varieties given in previous reports. The average yield per tree, over a seven-year period, is given below.

Varieties	Season	Seedling	Year of		Yield	
			Planting	First crop	1930	Total for 7 years
					gal.	gal.
Beda	Sept. to mid-Nov.	Langford Beauty	1919	1925	20	50
Winton	Late Sept. to Feb.	McIntosh	1916	1920	72	204
Dulcet	Late Sept. to Dec.	Langford Beauty	1918	1922	50	108
Carno	Dec. to March	McIntosh	1913	1919	16	82
Rosalie	Late Nov. to April	Northern Spy	1913	1922	66	146
Emilia	Mid-Nov. to April	Wealthy	1918	1922	22	68

THINNING EXPERIMENT

Thinning consists in removing at the beginning of the season a part of the fruits on the tree. All poor, damaged or ill-shaped fruits are removed; only one fruit is left to each spur. Since there is more room, the fruit makes a better development and takes on a better colour. The results obtained are given in the following table:—

RESULTS WITH THINNED AND UNTHINNED TREES

Varieties	Thinned trees				Unthinned trees			
	Grade			Total	Grade			Total
	No. 1	No. 2	No. 3		No. 1	No. 2	No. 3	
	gal.	gal.	gal.	gal.	gal.	gal.	gal.	gal.
Yellow Transparent	10	12	4	26	10	16	4	30
Duchess	12	8	1	21	20	13	3	36
Dudley	18	16	2	36	10	16	4	30
Wolf River	16	8	1	25	28	18	2	58
Alexander	18	7	1	26	16	14	2	32
Fameuse	14	14	2	30	12	18	2	32
Wealthy	20	7	1	28	20	30	2	52

KEEPING QUALITY TEST

It is necessary to ascertain the average season as well as the keeping qualities of the various varieties of apple grown on this Station. The apples are placed in 1½ bushel boxes and kept under observation in the cellar; notes are taken each week. When the fruit of a variety begins to deteriorate, the season of such variety is considered to be over. The average temperature of the cellar during the winter is 38° F.

RESULTS OF KEEPING QUALITY TEST

Varieties	Date placed in cellar	Date season over	Length of season	Per cent of rot
			days	%
Baxter	Oct. 13	April 15	174	10
Bethel	" 20	Mar. 30	161	5
Bruno	" 15	May 1	196	8
Carno	" 13	Mar. 1	139	7
Garnet	" 15	Feb. 25	132	5
McMahan White	" 13	Feb. 25	134	10
Niobe	" 20	April 10	172	8
Rosalie	" 13	Feb. 20	129	5
Sandow	" 15	Mar. 1	137	4
Wealthy	" 4	April 10	188	8

PLUMS—VARIETY TEST

Twenty-three varieties of plums are under test. The total crop obtained this year was 678 gallons. Out of one hundred and thirteen plum trees grown, ninety-six bore fruit.

The three varieties Emerald, Omaha and Waneta, planted in 1927, produced their first crop in 1930. With the exception of the two first-named varieties, all others are European varieties. The trees are winter-hardy and are good fruit producers. The yields of several desirable varieties are given in the following table:—

RESULTS WITH PLUMS

Varieties	Year of		Yield	
	Planting	1st crop	1930	Seven-year average
			gal.	gal.
Smith Orlean	1914	1920	31	19·15
Latchford	1914	1920	21	18·88
John A	1914	1920	20	18·0
Green Gage	1914	1920	12·25	8·20
Reine Claude De Montmorency	1913	1916	16	8·0
Gueii	1913	1915	16	7·0
Lombard	1914	1920	16·25	6·75
Shipper Pride	1913	1915	18·50	6·25
Moore Arctic	1913	1916	18	5·30
Damas	1914	1917	12	5·0

CHERRIES—VARIETY TEST

The cherry crop given by the sixteen varieties under test was light, notwithstanding the heavy bloom. Of all the cherry varieties under test at this station, French cherry and Large Montmorency are the hardiest. The average yields per tree for some varieties are given in the accompanying table.

RESULTS WITH CHERRIES

Varieties	Year of		Yield	
	Planting	1st crop	1930	Seven-year average
			gal.	gal.
English Morello	1913	1915	10·0	7·0
Large Montmorency	1914	1916	7·75	5·25
Ostheim	1914	1916	7·25	5·0
Fouche Morello	1913	1915	7·0	4·75
French Cherry	1913	1915	4·50	4·0
Empress Eugenie	1915	1917	1·50	3·75
Early Richmond	1913	1915	1·25	2·95

PEARS—VARIETY TEST

Very few pear trees are grown in the district. Several persons are under the impression that pears do not ripen and that they are destroyed by the cold weather. However, several varieties of pears planted in 1919 on this Station are making a good growth; the trees are sound, they ripen their wood thoroughly and withstand the cold weather in the winter very well. While they are slow to come into bearing, the fruits are attractive and of good quality.

The varieties are given by order of merit in the following table:—

PEARS—RESULTS OF VARIETY TEST

Varieties	Yield per tree in 1930
	gal.
Wood Melting	20
Clapp Favourite	8½
Louise Bonne de Jersey	12
Dean Russet	16

SPRAYING AND DUSTING

One of the most important factors in the operation of an orchard is, undoubtedly, thorough spraying, done at the right time and in the proper manner. To be efficient, the tree and the leaves must be completely covered with the spray mixture. Eight applications of sulphur spray were made last season. The first one was made before the opening of the buds. The leaves, flower buds and young fruits were kept covered with the solution as much as the weather permitted. The results given by one hundred apple trees sprayed once and by one hundred trees sprayed seven times, are as follows:—

Number of applications of sulphur spray	Number of trees	Scab			Scab-free
		Light	Medium	Severe	
1	100	25	26	39	10
7	100	24	18	8	50

NOTE.—Rain and strong winds at spraying time have undoubtedly lessened the efficiency of the spray.

SMALL FRUITS

RASPBERRIES—VARIETY TEST

The raspberry is one of the most popular of the small fruits grown in the district. It is also easy to grow.

Raspberries begin to ripen at the end of the strawberry season. When suitable varieties are grown, the raspberry season lasts over four weeks.

Raspberries require a deep, cool and rich soil; they are planted in rows six feet apart and three feet apart in the row. They are pruned in the spring by removing dead canes and leaving only six to eight of the most vigorous stems. The following varieties of raspberries were planted in 1924:—

RASPBERRY—RESULTS OF VARIETY TEST

Varieties	Date of first picking	Yield	
		Of 12 bushes, 1930	Per acre
		lb.	lb.
Jumbo	July 16	17½	3,850
Viking	" 21	14½	3,198
Lloyd George	" 21	7½	1,650
Count	" 21	8¼	1,815
Herbert	" 24	10¾	2,367
Newman No. 23	" 24	10¼	3,135

STRAWBERRIES—VARIETY TEST

Four varieties of strawberries were planted in the spring of 1930, in fifteen-foot rows 3½ feet apart, with the plants 18 inches apart in the rows, following a heavy application of farm fertilizers. The varieties planted were as follows: Senator Dunlap, Parson Beauty, Premier and Wm. Belt.

CURRANTS—VARIETY TEST

In order to obtain good results, currants should be planted in a cool and rich soil. A good side dressing of well-rotted manure is made to the currants every two years. The results given by four good varieties are as follows:—

RESULTS WITH CURRANTS

—	Yield per acre for one year	Average yield per acre for 9 years
	lb.	lb.
Black currants—		
Saunders	8,349	4,815
Kerry	5,808	4,194
Magnus	5,566	4,017
Topsy	4,840	3,118
Red currants—		
Cumberland	7,320	4,520
Holland Red	7,260	4,097
Red Grape	7,623	4,013
White currants—		
Large White	7,075	4,284
White Grape	5,708	4,017
Holland White	4,840	3,586

FLOWERS

ANNUALS—TEST OF VARIETIES

Over 300 varieties or strains of annual flowers were tested on this station during the last ten years. Observations are made on each variety as to the duration of bloom, height of plants and qualities of flowers.

Any good garden soil is suitable for annual flowers. However, nasturtium and calendula prefer a soil not quite so rich.

As regards most annuals, the seed is sown in the open, at the place where they are to bloom, as soon as possible in the spring. The smaller the seed, the smaller the depth of planting.

A few good varieties that may be added to those already given are as follows:—

Amaranthus—Seven varieties; they are grown particularly for the fine effect produced by the leaves.
Asperula—Blue-flowered.
Centaurea—White, yellow or mauve flowers.
Chrysanthemum—Various varieties, all excellent as cut flowers.
Summer cypress—Fine light green leaves in the summer.
California Poppy—Various colours.
Helichrysum—Rose, red, yellow and white flowers.
Iberis—Useful for borders.
Lavatera—Suitable for clumps; rose or white flowers.
Nicotiana Affinis—White, fragrant flowers.
Petunia—In bloom until frosts.
Rudbeckia—Bloom withstands early frosts.
Antirrhinum, dahlias, stocks, Marvel of Peru, Phlox, Salpiglossis and Verbena give better results when sown in hot-beds.

Three varieties of flowers for special purposes are given in the following list:—

Border—Iberis, California Poppy and Tagetes.
Climbers—Sweet peas, Convolvulus and Nasturtium.
Fragrant flowers—Mathiola Bicornis, stocks and Nicotiana Affinis.

TULIPS—VARIETY TEST

Over two thousand tulips were planted during the last few years. They belong to the well-known groups of single early tulips, double early, Darwins, cottage and Parrot tulips.

The bulbs are usually planted at the beginning of October at an interval of six inches in the row. They are then covered with a layer of manure 4 to 5 inches thick. As the manure must not come in contact with the bulbs, it is generally applied in the year previous to blooming.

A few satisfactory varieties are as follows:—

Varieties	Colour	Season	
		Bloom	Duration
		date	days
Belle Alliance Early single	Red	May 22 to June 9	19
Cullinan Early single	White and pink	May 23 to June 8	17
Diana Early single	White	May 22 to June 8	18
Snowball Early double	White	May 24 to June 10	18
Gold Crown Early double	Yellow and orange	May 23 to June 10	18
Salvator Early double	Pink	May 25 to June 11	18
Bartigon Darwin	Red	June 4 to June 25	22
Suzon Darwin	Pink	June 4 to June 25	22
Faust Darwin	Purple	June 4 to June 25	22

CHINA ASTERS—VARIETY TEST

Seed of China asters, when sown in the open, produces plants that bloom during the summer, but it is profitable to sow it in hotbeds. Plants that have been pricked out are stronger and are more resistant to diseases. Furthermore, blooming is a few days earlier.

The varieties tested over ten years belong to two types: upright and branched. The Snow Queen and Market Queen varieties are first to bloom, but late varieties such as Vick, Comet, Ostrich Feather and Crego, which belong to the branched type, give finer bloom.

HEDGES—VARIETY TEST

Eight varieties of bushes were planted in 1924, and one variety of "Amoor Privet" in the spring of 1927. The object was to form hedges, and the bushes were planted 18 inches apart. Observations on each variety are given in the following table:—

HEDGES—RESULTS OF VARIETY TEST

Varieties	Date of planting	Height	Width	Remarks
		in.	in.	
Caragana Arborescens.....	1924	66	39	Very hardy, fine, bright green foliage, bushy.
Caragana Frutex (Frutescens)	1924	36	21	Not sufficiently hardy.
Salix Pentandra (Laurifolia).	1924	69	36	Very hardy, good foliage. Fairly good lower vegetation.
Thuya Occidentalis.....	1924	30	30	Very hardy. Makes a slow growth.
Native Spruce.....	1924	33	26	Very hardy. Makes a slow growth.
Berberis Thunbergii.....	1924	30	24	Very hardy, foliage particularly fine in fall.
Syringa Villosa.....	1924	48	33	Fairly hardy, lower vegetation too scant
Viburnum Lantana.....	1924	38	30	Hardy, lower vegetation too scant.
Ligusttum Amurense "Amoor Privet".....	1927	39	24	Fairly hardy, fine green foliage, bushy.

All the above plants were received from the Central Experimental Farm, Ottawa, with the exception of "Amoor Privet" which was received from the nursery of Village des Aulnaies.

CHEMICAL FERTILIZER EXPERIMENT

The whole orchard is under the mulch system. One part of the orchard was divided in six sections that were designated by the letters A, B, C, D, E, and F.

Plot "A" was left unfertilized.

On plot "B" nitrate of soda was applied in the spring at the rate of 5 pounds per bearing tree.

On plot "C", 4 pounds of sulphate of ammonia were applied per tree.

The results given by nine apple trees of the McIntosh variety were as follows:—

	Gallons
PLOT "A"—Average annual yield of three trees for three years	22·24
PLOT "B"—Average annual yield of three trees for three years	30·89
PLOT "C"—Average annual yield of three trees for three years	27·55

Another mulch was placed around the trees on plots D, E, and F, as well as on the check plot "A2".

On plot "D", 5 pounds of nitrate of soda were applied in early spring to each tree.

On plot "E", 5 pounds of nitrate of soda were applied at the end of August.

On plot "F", 4 pounds of sulphate of ammonia were applied on the same date.

The results given by six Wealthy apple trees were as follows:—

Plot "D"—Average annual yield of two trees for three years..... 22·66 gallons
Plot "E"—Average annual yield of two trees for three years..... 24·50 "
Plot "F"—Average annual yield of two trees for three years..... 28·75 "

LIST OF PROJECTS UNDERTAKEN FOR THE HORTICULTURAL DIVISION, 1930

FRUIT

H. 29—Apples—Keeping quality.
H. 33—Apples—Variety test.
H. 35—Cherries—Variety test.
H. 44—Pears—Variety test.
H. 48—Plums—Variety test.
H. 413—Apples—Thinning experiment.
H. 369—Spraying and dusting experiments.
H. 667—Chemical fertilizer experiment.

SMALL FRUITS

H. 2—Blackberries—Variety test.
H. 4—Currants—Variety test.
H. 6—Gooseberries—Variety test.
H. 11—Raspberries—Variety test.
H. 21—Strawberries—Variety test.

FLOWERS

H. 261—Annuals—Variety test.
H. 263—China Asters—Annuals—Variety test.
H. 278—Narcissus—Variety test.
H. 290—Tulips—Variety test.
H. 298—Hedges—Variety test.

VEGETABLES

BEANS—VARIETY TEST

Over fifty varieties of beans were grown at this Station. Since these beans were to be harvested in the green pod stage, the pods must be of good quality and stringless, and must also give a good yield. In order to facilitate cultivating and picking, they were planted in rows 30 inches apart with the plants two inches apart in the rows.

The yields of desirable varieties are given in the following table:—

BEANS—RESULTS OF VARIETY TEST

Varieties	Yield per plot, 1930	Average yield per acre for six years
	gal.	gal.
Masterpiece	6¾	5,800
Canadian Wonder	8½	4,320
Hodson Long Pod	6¼	4,234
Round Pod Kidney Wax	10½	4,147
Yellow Eye	9½	3,947
Interloper	8¼	3,770
Stringless Green Pod	7½	3,659

BEETS—VARIETY TEST

Eighteen varieties of beets were grown during the last eight years. The best results are obtained when the seed is sown in a rich, deep soil, preferably light. The plants are thinned to two inches to produce medium size beets. The test plot is thirty feet long, and the rows thirty inches apart. The seed is sown as soon as the soil warms up. The following varieties gave the best results:—

BEETS—RESULTS OF VARIETY TEST

Varieties	Yield per plot, in 1930	Average yield per acre for eight years
	lb.	bush.
Eclipse	73	836·0
Crimson Globe	52	832·0
Detroit Dark Red	57	815·6
Crosby Egyptian	55	806·8
Half Long Blood	51	773·2
Black Red Ball	71	763·2

PEAS—VARIETY TEST

The results of tests have shown that peas planted one inch apart in the row, with the rows thirty inches apart, give the most satisfactory results. Fifteen varieties were under test in 1930. The peas were sown on May 12 in thirty-foot plots.

The yields of this season's plots as well as the average yield over a nine-year period were as follows:—

PEAS—RESULTS OF VARIETY TEST

Variety	Yield per plot in 1930	Average yield per acre for nine years
	gal.	gal.
Lincoln	3	2,842
Potlach	6½	2,610
Pioneer	3¼	2,552
Laxtonian	4	2,546
Alaska	4½	2,494
Little Marvel	4	2,436
Stratagem	3¾	2,436
Blue Bantam	3¾	2,378

PARSNIPS—VARIETY TEST

Hollow Crown and Cooper Champion were the two varieties under test. As these varieties have long roots, they require a deep and well-worked soil.

The test plots were thirty feet long and they were seeded May 12. The plants were thinned to two inches apart in the row. The yield per plot as well as the average yield for nine years were as follows:—

PARSNIPS—RESULTS OF VARIETY TEST

Variety	Yield per plot in 1930	Average yield per acre for nine years
	lb.	bush.
Hollow Crown	32	445·5
Cooper Champion	37	429·2

SQUASH—VARIETY TEST

The seed is sown in hills, nine feet by nine feet apart. This crop succeeds well if plenty manure, heat and water are available. The following results were given by desirable varieties as regards earliness and keeping quality:—

SQUASH—RESULTS OF VARIETY TEST

Variety	Yield of three hills in 1930	Average yield per acre for nine years
	lb.	lb.
Vegetable Marrow	100	25,610
Green Hubbard	77	24,625
Golden Hubbard	68	24,428
Delicious	50	21,670
Long White Bush	65	18,715

PUMPKINS—VARIETY TEST

As in the case of squash, pumpkin seed is sown in hills, three hills for each variety. The hills are nine feet by nine feet apart. Only the strongest plants are kept. Pumpkins require a well manured soil. The following are desirable varieties:—

PUMPKINS—RESULTS OF VARIETY TEST

Variety	Yield per plot in 1930	Average yield per acre for nine years
	lb.	lb.
Connecticut Field	155	45,704
King of Mammoth	195	40,976
Large Cheese	370	28,565
Winter Luxury	176	23,049
Small Sugar	105	19,700

RADISHES—VARIETY TEST

Eleven varieties of radishes were sown on May 13. The plot for each variety was 30 feet long, with the rows 15 inches apart. Over twenty-five varieties or strains were tested during the last nine years. The best varieties are French Breakfast, White-tipped Scarlet Turnip and Icicle. The earliest varieties under test are Twenty-Five Days and Saxa.

TURNIPS—VARIETY TEST

Four varieties are included in the variety test with turnips. The plots are 30 feet long and 30 inches apart. The plants are four inches apart in the row. The seed was sown on May 13. The turnips were ready for use on July 7.

The following varieties have been under test during the last nine years: Milan turnip, Snow-ball, Golden Ball and Red Top. The average yields for nine years are as follows:—

Milan turnip	48 turnips
Snowball	45 "
Golden Ball	42 "
Red Top	41 "

The Milan turnip is the most desirable.

SALSIFY—VARIETY TEST

Two varieties of salsify were sown on thirty-foot plots, 30 inches apart. The seed-bed must be thoroughly and deeply worked, if long and smooth roots are desired. The plants are thinned to two inches as soon as they are sufficiently developed. The seed was sown on May 13 with the following results:—

SALSIFY—RESULTS OF VARIETY TEST

Variety	Yield per plot in 1930	Average yield per acre for nine years
	lb.	lb.
Long White	52	17,576
Mammoth Sandwich	51	17,516

SPINACH—VARIETY TEST

Seven varieties of spinach were sown on May 12, in 15-foot rows 18 inches apart. The season of this vegetable is very short, and it is advisable to sow the seed at fifteen-day intervals from May to the end of July. As regards the New Zealand variety, one sowing is sufficient, as it may be harvested until autumn frosts.

The most satisfactory varieties for the district are as follows:—

SPINACH—RESULTS OF VARIETY TEST

Variety	Duration of crop, 7-year average	First picking, 1930	Yield, 1930
	days		bunches
Princess Juliana	14·5	June 23	13
Broad Flanders	19·6	" 19	13
King of Denmark	20	" 17	11
Large Crop	13·7	" 17	9
Long Standing	18	" 17	8
Victoria	13	" 17	7

PARSLEY—VARIETY TEST

Two varieties were under test. The seed was sown on May 12, in 30-foot plots, 15 inches between rows. The plants are later thinned to three inches. The seed is sown as early as possible in the spring. The yield obtained this year as well as the five-year average yield are as follows:—

PARSLEY—RESULTS OF VARIETY TEST

Variety	Yield, 1930	Five-year average yield per acre
	lb.	lb.
Moss Curled	33	34·12
Triple Curled	37	34·2

CUCUMBERS—VARIETY TEST

Twenty varieties or strains were tested on this station in the last seven years. This year, the seed of twelve varieties was sown in hills on May 19. There were four hills of each variety, six feet apart. The three strongest plants were kept in each hill. Records are kept of the date of picking as well as of the number of cucumbers harvested.

The following varieties have given very satisfactory results:—

CUCUMBERS—RESULTS OF VARIETY TEST

Variety	Yield of plot, 1930	Yield per acre, 7-year average
	cucumbers	cucumbers
Boston Pickling	98	117
White Spine	130	111
Early Fortune	80	99
Cumberland	61	96
Long Green	85	87
Green Prolific	80	85
The Vaughan	51	62

PEPPERS—VARIETY TEST

The seed of five varieties of peppers was sown in hotbeds on March 21. The plants were transplanted in the open on June 1, in thirty-foot rows, 30 inches apart, with the plants ten inches apart in the rows.

Harris Early is the earliest variety; it is a bush plant which gives fine large fruits. The small-fruited variety, Red Cayenne, produces very few ripe peppers.

PEPPERS—RESULTS OF VARIETY TEST

Variety	Yield of plot, 1930	Three-year average yield
	gal.	gal.
Harris Early	5½	3½
Neapolitan Giant	3	2¼
Red Chili	2¾	2

WATERMELONS—VARIETY TEST

Three varieties of watermelons were grown. The seed was sown in hotbeds on April 2, and the plants were transplanted in the open on June 13. There were three hills of each variety, nine feet by nine feet apart. Two varieties, Ice Cream and Harris Early were under test for the first time. They yielded 20 pounds and 28 pounds, respectively. The third variety, Cole Early, yielded 36 pounds.

CABBAGE—VARIETY TEST

Seventeen varieties or strains of cabbage were under test. The seed was sown in semi-hotbeds on April 8, the plants being pricked out once and transplanted in the open on May 20. The late varieties are planted 24 inches apart, and the summer varieties, 18 inches apart. The plots are thirty feet long.

The following varieties are recommended for their respective season. The results represent the average weight of two heads.

CABBAGE—RESULTS OF VARIETY TEST

Variety	Season	Yield of plot, 1930		Average weight of two heads. Seven-year average	
		lb.	oz.	lb.	oz.
Golden Acre	Early	5	4	5	1
Paris Marker	"	6	8	8	11
Jersey Wakefield	"	7	0	6	9
Copenhagen	"	7	8	6	8
Kildonan	Mid-season	12	0	17	11
Enkhuizen Glory	"	10	0	18	6
Succession	"	20	0	22	13
All Seasons	"	24	0	21	4
Volga	"	8	0	17	1
Danish Roundhead	Late	15	0	15	13
Flat Swedish	"	9	0	16	3

CAULIFLOWER—VARIETY TEST

Six varieties were under test this year. They were sown in semi-hotbeds April 8. The plants were pricked out once and transplanted in the open on May 20. The plots were 30 feet long and the plants 18 inches apart in the row.

The average weight of three heads for the year and the average weight for seven years are as follows:—

CAULIFLOWER—RESULTS OF VARIETY TEST

Variety	Season	Average weight of three heads, 1930 plot		Average weight of three heads, 7-year average	
		lb.	oz.	lb.	oz.
Six Weeks	Early	7	8	6	12
Snowball	"	8	2	6	13
Erfurt	Semi-early	6	8	6	15
Danish Perfection	Late	9	12	10	0
Danish Giant	"	7	6	8	11
Veitch Autumn King	"	7	14	7	12
Late Algiers	"	9	8	9	0

CORN—VARIETY TEST

Of the forty varieties or strains of corn tested at this Station during the last ten years, a number which did not give good results were discarded. The corn plots are 60 feet long, and the hills are three feet by three feet apart. Records are kept of the yields of the ten best hills.

The following varieties have been under test for the last five years and are satisfactory:—

CORN—RESULTS OF VARIETY TEST

Variety	Yield of plot, 1930	Five-year average yield
	ears	ears
Banting	81	65
Pickaninny	78	66
Alpha	75	74
Golden Bantam	75	50
Early Malcolm	73	74
Buttercup	70	50
Howling Mob	68	53
Burbank	62	56
Adam Early	55	53
60-days	53	55

LETTUCE—VARIETY TEST

Twenty-five varieties or strains of lettuce have been tested during the last five years. The plants of cabbage lettuce varieties are thinned to 10 inches, while those of loose leaf sorts are thinned to 2 inches. The seed is sown as early as possible in the spring. The plots are 15 feet long and the rows are 15 inches apart.

The following are good varieties:—

LETTUCE—RESULTS OF VARIETY TEST

Variety		Yield of plot, 1930	Average yield for five years
		heads	heads
New York	Head	11	17·6
Brittle Ice	"	19	16
Danvers Market	"	11	15
Wayahead	"	12	14
Golden Queen	"	15	12·6
Big Boston	"	9	12
		bundles	bundles
Simpson Curled	Loose leaf	21	20
Grand Rapids	"	20	18·4
Paris White	Cos	12	12·4

BRUSSELS SPROUTS—VARIETY TEST

Four varieties of Brussels sprouts were under test. The seed was sown in semi-hotbeds on April 18. The plants were pricked out once and transplanted in the open on May 20. The plots are thirty feet long and thirty inches apart, and the plants are 18 inches apart in the rows.

The results obtained are as follows:—

BRUSSELS SPROUTS—RESULTS OF VARIETY TEST

Variety	Yield of plot, 1930		Average yield for five years	
	lb.	oz.	lb.	oz.
Paris Market	7	0	7	1
Long Island	7	10	7	0
Improved Dwarf	5	0	6	10
Little Gem	5	4	7	0

MUSKMELONS—VARIETY TEST

Ten varieties of muskmelons were sown in hotbeds on April 10. The plants were pricked out in cold frames, and grown under glass during the whole month of June in order to protect the plants during cool nights and stimulate the growth. There were three hills of each variety, nine feet by nine feet apart. The following are varieties that may be grown with fair results in the district:—

MUSKMELONS—RESULTS OF VARIETY TEST

Variety	Yield of plot, 1930	Average yield for three years
	Number	Number
Emerald Gem	15	20
Tip Top	12	19
Hearts of Gold	14	18
Honey Dew	12	16

ONIONS—VARIETY TEST

Seventeen varieties or strains of onions were under test. The seed was sown in semi-hotbeds at the beginning of April. The plants were transplanted in the garden at the end of May. The rows are thirty feet long and 18 inches apart, and the plants are two inches apart in the rows.

The following varieties may be recommended:—

ONIONS—RESULTS OF VARIETY TEST

Variety	Yield of plot, 1930	Average yield per acre, 7-year average
	lb.	lb.
Giant Prize Taker	75	70,083
Ailsa Craig	45	67,760
Red Wethersfield	56	61,586
Yellow Globe	70	60,306
Red Globe	56	53,336
White Globe	46	50,723
Silver King	60	48,884
Australian Brown	60	47,916
Ebenezer	20	38,720
White Barletta	32	24,684

LEEKS—VARIETY TEST

Four varieties of leeks were sown in semi-hotbeds on April 8. The plants were transplanted in the open on May 20. As in the case of onions, the plots are manured the previous fall. The rows are 18 inches apart, and the plants two inches apart in the rows. The London Flag and Carentan varieties have been under test during the last seven years. Their average yields per acre are as follows:—

London Flag	48,787 pounds
Carentan	48,400 "

The Champion and Large Scotch varieties, tested for the first year, gave the following yields per acre:—

Champion	54,208 pounds
Large Scotch	38,720 "

TOMATOES—VARIETY TEST

Sixty varieties or strains of tomatoes were tested in the last ten years, with the object of ascertaining the most desirable varieties for this district.

The seed is sown in hotbeds between the 15th and the 20th of March; the plants are pricked out once and transplanted in the open at the beginning of June. All plants are staked and pruned to a single stem. The plants are three feet by three feet apart.

The following varieties may be recommended for this district; the average yield for eight years as well as the number of days from sowing until the first picking are given:—

TOMATOES—RESULTS OF VARIETY TEST

Variety	Days from sowing until first picking	Yield of five plants, in 1930	Average yield per acre of five plants over 8 years
	days	lb.	lb.
Earliana	141	17	19,320
Rose	139	20	19,007
Bonny Best	140	24	18,596
Alacrity	137	15	18,354
Earliest of All	140	26	18,354
John Baer	150	21	18,111
Early Mascot	140	15	17,870
Chalk Jewel	143	19	17,630
Red Head	145	25	17,630
Scarlet Skin	139	22	17,322

MULCH PAPER EXPERIMENT

The paper used is 36 inches wide, and a one-inch space is left between paper strips, where the seed is sown. The paper is kept in place by means of wooden cleats 1 x 4 inches and six feet long, but it was necessary to place stones on each cleat.

Six hours of manual labour were required to lay the paper, cleats and stones in proper position; in addition, six hours were taken during the summer to replace part of the paper. The slight increases in yield secured with a few varieties of vegetables during 1929 and 1930 do not compensate for the surplus work and the cost of the paper used.

BEANS

The beans are planted in groups of two seeds, four inches apart in the row. When the young plants are sufficiently developed, only the strongest are kept. Records were kept of the following: dates of germination, flowering and date ready for use. The height of the stems is noted three years after germination as well as at picking time. The plots were thirty feet long and were divided in two equal parts; on one section, picking is done as soon as the pods are ready for use, while on the other the beans are harvested when ripe.

The following results were obtained:—

BEANS—RESULTS OF PAPER TEST (IN PODS)

Variety	Date of Sowing	Date of First picking	Yield	Number of pods	Yield		
			lb. oz.		lb. oz.		pods
Stringless (with paper)	May 30	July 27	1 12	100	11 1		549
Stringless (without paper)	" 30	" 27	2 10	203	16 5		834
Round Pod (with paper)	" 30	" 24	1 8	139	9 6		625
Round Pod (without paper)	" 30	" 24	1 12	150	14 3		933

BEANS—RESULTS OF PAPER TEST (AT MATURITY)

Variety	Date of Sowing	Date of Picking	Total yield	
			lb.	oz.
Stringless (with paper)	May 30	Sept. 16	2	7
Stringless (without paper)	" 30	" 16	2	9
Round Pod (with paper)	" 30	" 12	2	2
Round Pod (without paper)	" 30	" 12	2	6

With both varieties, the results are in favour of the ordinary method (without paper) as regards earliness and yield, whether the object is to secure pods or ripe beans.

CUCUMBERS

The cucumber seed was sown on May 30 in rows 73 inches apart and the plants 12 inches apart in the rows.

CUCUMBERS—RESULTS OF PAPER TEST

Variety	1st crop Date	1st crop Number	Number unmarketable	Weight	Number marketable	Weight	Total Number	Total Weight
				lb.		lb.		lb.
Perfection (with paper)	August 4	6	22	15	162	144	184	159
Perfection (without paper)	" 6	4	18	12	141	139	159	151

On the mulched plot, the first picking was done two days earlier than on the unmulched plot, and yielded 25 cucumbers more.

ONIONS

The onion plot was 15 feet long and the rows 19 inches apart; the plants were thinned to two inches. The dates of germination and harvesting were noted. The total weight of onions measuring two inches in diameter or over, and of onions under two inches are recorded separately. The weight of unripe onions is also recorded.

ONIONS—RESULTS OF PAPER EXPERIMENT

Variety	Date sown	Unripe onions	Size		Yield of plot
			2 inches and over	Less than 2 inches	
		lb. oz.	lb.	lb. oz.	lb. oz.
Yellow Globe (with paper)	May 5	8 8	25	5 8	39 0
Yellow Globe (without paper)	" 5	9 0	22	5 14	36 12

It is seen by the above table that the plot protected with paper yielded slightly more onions measuring two inches or over.

TOMATOES

The tomato plants were transplanted in the open on June 1. The rows were 55 inches apart, and the plants three feet apart in the rows. There were 12 plants in each plot.

TOMATOES—RESULTS OF PAPER TEST

Variety	Date of first picking	Yield	Ripe fruit				Total yield for season		Green tomatoes
			Aug. 23 to Sept. 9		Aug. 23 to Sept. 19				
			Good	Poor	Good	Poor	Good	Poor	
		lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb.	lb.
Alacrity (with paper)	Aug. 23	0 15	12 0	2 5	31 1	3 0	51 5	7	40
Alacrity (without paper)	" 28	4 8	10 10	2 0	29 0	4 10	47 2	9	35

The tomato plants were stronger on the paper-protected plot, but they were later than on the unprotected plot; however, there was a slight increase in yield on the protected plot.

CORN

The rows were 37 inches apart, and the plants were thinned to eight inches, with a single stem per plant. The corn was planted on May 30.

CORN—RESULTS OF PAPER TEST

Variety	Ready for use		Height of stem	Number of ears		Total
	Date	Number of ears		Good	Poor	
Golden Bantam (with paper)	Aug. 23	19	68	60	5	65
Golden Bantam (without paper)	" 26	6	63	52	7	59

The paper-protected plot yielded six ears more than the unprotected one. Likewise, the crop was three days earlier on the former.

CARROTS

This crop was planted in 15-foot rows, and was pulled as soon as the carrots had reached one inch in diameter. A record was kept of the date of each pulling and of the number of carrots. On a second plot, with rows measuring also 15 feet long, the crop was pulled when it reached maturity. The seed was sown on May 30.

CARROTS—RESULTS OF PAPER TEST

Variety	Date sown	Date of first pulling	Number of carrots	Yield	
				Number	Pounds
First pulling—					
Chantenay (with paper)	May 30	July 23	8	86	.....
Chantenay (without paper)	" 30	" 23	11	105	.....
At maturity—					
Chantenay (with paper)	" 30	Oct. 22	.....	69	26
Chantenay (without paper)	" 30	" 22	.....	103	40

The unprotected plot yielded 20 per cent more than the protected one. The crop dug at maturity yielded slightly more also.

BEETS

The seed was sown on May 30 in 30-foot rows. The plants were thinned to 2 inches apart. On one half of the plot, the crop was pulled as soon as the beets reached one and one-half inches in diameter; on the other half, the beets were pulled at maturity. The number and weight of the beets pulled on the two plots were recorded.

BEETS—RESULTS OF PAPER TEST

Variety	Date of first pulling	Number of beets	Total yield
First pulling—			
Detroit Dark Red (with paper)	Aug. 10	6	48
Detroit Dark Red (without paper)	" 10	12	66
At maturity—			
Detroit Dark Red (with paper)	Oct. 14	28	24
Detroit Dark Red (without paper)	" 14	42	48

The yields of early-pulled beets and of fall-pulled beets were higher on the unprotected plot.

CABBAGE

On both plots, the rows were 37 inches apart with the plants 18 inches apart in the rows. The first crop was harvested when the heads had reached six inches in diameter.

CABBAGE—RESULTS OF PAPER TEST

Variety	Date of planting	Date ready for use	Yield	Total yield		
				Heads	lb.	oz.
			lb. oz.			
Golden Acre (with paper)	May 20	July 18	2 4	25	51	12
Golden Acre (without paper)	" 20	" 16	4 2	25	91	13

The unprotected plot yielded 40 pounds more than the protected one, and moreover the cabbage on the former were two days earlier.

SPINACH

The spinach seed was sown on May 30; four weeks later, measurements were taken of twelve leaves representative of the foliage of each plant. The date when the plants began to form their seed as well as the total weight of spinach for a 15-foot row are shown in the following table:—

SPINACH—RESULTS OF PAPER TEST

Variety	Seed stems		Leaves		Total yield	
	Date	Per cent	Length	Width		
			in.	in.	lb.	oz.
King of Denmark (with paper)	July 1	6	2½	2¼	7	2
King of Denmark (without paper)	" 1	12	2¾	2⅓	8	4

The spinach plants were slower in running to seed on the paper-protected plots; however, the total yield was lower than on the check plot.

LIST OF PROJECTS UNDERTAKEN FOR THE HORTICULTURAL DIVISION—1930

VEGETABLES

H. 61—Beans—Variety test.
H. 62—Pole beans—Variety test.
H. 68—Beets—Variety test.
H. 70—Brussels sprouts—Variety test.
H. 77—Cabbage—Variety test.
H. 83—Carrots—Variety test.
H. 88—Cauliflower—Variety test.
H. 94—Celery—Variety test.
H. 102—Corn—Variety test.
H. 106—Cucumbers—Variety test.
H. 109—Spinach—Variety test.
H. 112—Leeks—Variety test.
H. 116—Lettuce—Variety test.
H. 122—Muskmelon—Variety test.
H. 125—Water melon—Variety test.
H. 137—Onions—Transplanting vs. sowing in the open.
H. 138—Onions—Variety test.
H. 140—Parsley—Variety test.
H. 145—Parsnips—Variety test.
H. 153—Peas—Variety test.
H. 157—Peppers—Variety test.
H. 160—Potatoes—Cost of production.
H. 171—Potatoes—Hill selection for seed.
H. 182—Potatoes—Spraying test.
H. 186—Potatoes—Variety test.
H. 188—Pumpkins—Variety test.
H. 192—Radishes—Variety test.
H. 197—Salsify—Variety test.
H. 199—Spinach—Variety test.
H. 201—Squash—Variety test.
H. 203—Swiss chard—Variety test.
H. 211—Tomatoes—Variety test.
H. 214—Turnips—Variety test.
H. 216—Vegetable marrow—Variety test.
H. 685—Growing various varieties of vegetables on paper-protected plots vs. unprotected plots.

CEREALS

THE SEASON

Spring opened rather early for the district, and the land was in very good condition. The first sowing on plots was done on May 12. Owing to the fairly warm weather and to the large quantity of moisture in the soil, germination and first growth were very rapid. Unfortunately, while the frequent and heavy rains favoured hay crops and pastures, they rather injured cereal crops, and particularly oats, the quality of which was badly affected. As a result of wind and rainstorms at the end of July and the beginning of August, all oat plots and a few barley and wheat plots lodged badly. The wheat and barley plots recovered, but oats remained on the ground, and, as the result of the irregular and incomplete maturity, the quality is very much lower than the average of the past years.

For the information of the reader, the number of plots worked during the year is given in the following table:—

NUMBER OF PLOTS WORKED IN 1930

Kind of plots	Spring wheat	Oats	Barley	Peas	Beans	Mixed grains	Fall wheat
I—Number of standard 1/120 acre plots	30	58	35	33	21	32	.....
II—Number of rod-row plots	90	90	115	50	.....	.....	30
III—Number of multiplication plots	14	.....	26	.....	.....	.....	.....
IV—Number of selection, one head per row	50	35	24	.....	.....	.....	.....
V—Elite stock seed	Wheat: Huron Ottawa 3 ..... ½ acre						
	Oats: Banner Ottawa 49 ..... 7 acres						
	Barley: O.A.C. 21 ..... 1 acre						
VI—Seed grain registered in co-operation with the Field Husbandry Division	Fall wheat: Karkhov No. 22 ..... ½ acre						
	Spring wheat: Huron Ottawa 3 ..... 1 acre, 2nd generation						
	Oats: Banner Ottawa 49 ..... 15 acres, 3rd generation						
	Oats: Alaska ..... 16 acres, 5th generation						
	Peas: Arthur ..... 2 acres, 1st generation						
	Barley: O.A.C. 21 ..... 1 acre, 2nd generation						

The following tables show the yield for 1930 as well as the average yields obtained to date. 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 sown on standard 1/120 acre plots on May 12 and harvested from August 23 to September 4. The results obtained are given in the accompanying table.

SPRING WHEAT—COMPARISON OF VARIETIES—SIX-YEAR AVERAGE

Variety	Source	Yield per acre 1930	Days to mature	Length of straw	Strength of straw	Average yield per acre 1925-1930	Relative yield in percent of Huron O. 3 used as check	Average weight per measured bushel 1925-1930
		lb.	days	in.		lb.	%	lb.
Huron Ott. 3....	Ste. Anne...	2,376	108·5	42	9·9	2,312	100·0	62·3
Pringle's Champlain M.C. 307.	MacDonald.	2,280	111·3	43	9·0	2,324	100·5	61·5
Marquis Ott. 15.	Ottawa.....	2,160	109·3	40·5	9·8	2,257	97·6	62·1
Garnet Ott. 652.	Ottawa.....	2,376	98	36·2	9·8	2,212	95·6	62·4
Reward Ott. 928	Ottawa.....	2,016	100·6	37·8	9·8	2,146	92·8	63·6

The above table shows that there is very little difference as regards yield and maturity between the first three varieties, i.e., Huron Ottawa 3, Pringle's Champlain M.C. 307 and Marquis Ottawa 15. In fact, the difference in yield is only 2·9 per cent, and the difference in maturity, 2·8 days. Therefore, anyone of these varieties may be sown without fear of obtaining unsatisfactory results. These yields are the result of comparisons conducted on clay soil, of average fertility but well worked, and typical of a large number of farms of the district, where similar results may be anticipated.

There is much difference between Garnet and Reward and the above-mentioned varieties as regards maturity and yield, but there is little difference between the two. However, Garnet is two days earlier, and yielded 2·8 per cent more than Reward. Nevertheless, the latter will always be more popular with the farmers of the district on account of the better appearance of the kernel which is much larger, always plump, round and glazed, while that of Garnet is small, angular and of a dull colour. These two varieties will be useful for farmers who are unable to sow early on account of the condition of their land or for localities where the other varieties do not ripen properly.

OATS

Ten varieties or selections were sown on May 19 and harvested from August 14 to September 6. The results obtained are as follows:—

COMPARISON OF VARIETIES—SIX-YEAR AVERAGE

Variety	Source	Yield per acre 1930	Days to mature	Length of straw	Strength of straw	Average yield per acre 1925-1930	Relative yield in percent of Banner O. 49 used as check	Average weight per measured bushel, 1925-30
		lb.	days	in.		lb.	%	lb.
Banner.....	Macdonald college....	2,580	107·5	42·9	9·5	2,815	100·0	37·3
La Salle*.....	"	2,904	110	43·0	9·1	3,052	108·4	37·0
Gold Rain.....	.....	2,572	103	45·2	9·1	2,935	104·2	40·5
Victory.....	.....	2,572	108	43·0	9·3	2,901	103·0	37·6
Cartier.....	MacDonald college....	2,480	93	39·4	9·4	2,415	98·6	40·7
Banner 49.....	Ste. Anne...	2,668	108	42·7	9·3	2,773	98·5	37·4
Legacy*.....	Ottawa.....	2,476	100	38·9	8·3	2,642	93·8	37·5
Brant*.....	Macdonald college....	2,504	107	44·4	9·3	2,488	88·3	38·9
Brome***.....	.....	2,352	102	45·2	4·4	.....	83·5	40·9
Alaska.....	Ottawa.....	2,452	92	38·7	9·2	2,281	81·0	39·0

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

While figures given for all varieties do not cover the same number of years, the comparative yields are computed from the average yields obtained during the same years, in order to make an accurate comparison with the check variety.

The Lasalle variety, recently introduced by Macdonald college, is at the head of the list, with a yield 8·4 per cent higher than that of Banner, 4·2 per cent higher than that of Gold Rain, and 5·4 per cent higher than that of Victory. This variety is very similar to Banner; the straw is a little longer, less resistant to lodging; it ripens a few days later, but, on the other hand, its kernel contains less hull, and therefore is superior to that of the other varieties. However, the claim for superiority cannot be established on two years' results.

The two varieties Gold Rain and Victory are practically equal in yielding capacity, and in that respect they are superior to the other varieties mentioned for the same number of years. In fact, compared with Banner, Gold Rain yielded 104·2 per cent and Victory 103 per cent.

The fact that Gold Rain has a yellow kernel, which is considered as an objection in the trade, and the rough straw of Victory account for the lack of popularity of these varieties.

As indicated by the heading "maturity," Alaska is the earliest variety, and notwithstanding its lower yield in bushels, its feeding value is higher on account of its lower percentage of hull, which reduces its apparent inferiority. This variety will always have a place on the farm in districts where late oats do not ripen regularly.

Cartier is another promising new early variety, judging from the results obtained to date. The other varieties mentioned in the table have no particular advantage to warrant their use in preference to Alaska and Cartier, in the early group, and to Banner in the late group.

BARLEY

Eight six-rowed varieties and four two-rowed varieties were sown on May 19 and cut from August 13 to 29. The yields are given in the following table:—

COMPARISON OF VARIETIES—SIX-YEAR AVERAGE

SIX-ROWED BARLEY

Variety	Source	Yield per acre 1930	Days to mature	Length of straw	Strength of straw	Average yield per acre 1925-1930	Relative yield in percent of O.A.C. 21, used as check	Average weight per measured bushel, 1925-1930
		lb.	days	in.		lb.	%	lb.
O.A.C. 21	C.E.F.	2,328	88·3	35·6	9·0	2,533	100	48·2
*Trébi	Ottawa	2,760	94	25·0	10	2,760	128·4	49·5
**Canadian Thorpe	Ottawa	2,640	95	27·0	9·0	2,700	125·6	52·2
Bearer Ott. 475	Ottawa	2,928	98·5	38·3	8·9	2,910	114·8	48·3
Star	MacDonald college	2,280	90·1	27·7	9·8	2,634	103·9	49·3
Chinese O. 10	Ottawa	2,352	88·3	36·6	9·5	2,523	99·6	49·0
Manchurian C.R. 14	Cap Rouge	2,328	91·3	37·5	9·1	2,405	94·6	49·5
**Pontiac	MacDonald college	1,992	89·6	37·2	8·8	1,914	75·5	48·2

*Two-year average. **Three-year average.

TWO ROWED BARLEY—FIVE-YEAR AVERAGE

**Plumage Archer	Ottawa	2,160	106	30	10	2,220	103·3	50·5
Charlottetown 80	Charlottetown	2,136	98·1	33·6	9·3	2,578	101·7	51·9
Hannchen	Ottawa	2,160	98·1	33·4	8·3	2,531	99·9	51·5
**Monk	Ottawa	1,068	97·9	39·5	9·4	1,840	72·6	51·1

**Three-year average.

As in the case of oats, the relative yields are computed from the average yields obtained during the same years; it is therefore possible to compare all varieties to the check variety on the same basis.

Of the six-rowed varieties, Bearer is the latest, but on the other hand it is the heaviest yielder. It yielded 14·8 per cent more than the check variety, O.A.C. 21, and ripened 8 to 10 days later. On account of maturity and yield, this variety is well suited for the production of mixed grains, in combination with Banner oats.

The Star variety, which comes in second place, is also a good yielder, but on account of its straw, which is very short, it is not suitable for the production of grain mixtures.

The three varieties O.A.C. 21, Chinese Ottawa 60, and Manchurian Cap Rouge 14 are much similar in every respect; the maturity as well as the yields are practically the same. Pontiac is also similar to the three previous varieties; its low yield is due to the fact that it shatters badly in the field as it ripens. Canadian Thorpe and Trebi have given heavy yields, but it would be premature, after only two years of testing, to conclude as to their quality.

In the two-rowed group, Hannchen and Charlottetown 80 are very similar as regards maturity and yield. These varieties would be admirably suited for combining with medium-early oat varieties to be cut for grain.

PEAS

Six varieties were sown on May 16 and cut from August 23 to September 5. The results are given in the following table:—

PEAS—COMPARISON OF VARIETIES

Variety	Source	Yield per acre 1930	Days to mature	Length of straw	Average yield per acre 1925, '26, '27, '30	Relative yield in percent of Chancellor, used as check	Average weight per measured bushel, 1925-1930
		lb.	days	in.	lb.	%	lb.
Chancellor	Ottawa	1,944	101	50·8	2,787	100·0	62·1
Mackay	"	2,304	110	45·4	3,315	118·8	63·7
O.A.C. 181	"	1,968	100	51·8	2,802	100·5	62·8
Prussian Blue	"	1,704	111	47·8	2,778	99·6	63·7
Golden Vine	"	1,752	110	46·0	.....	.....	63·5
Arthur	"	2,112	98	51·6	.....	.....	63·3

As seen in the above table, figures for the two varieties, Golden Vine and Arthur are available only for 1930. Owing to the lack of uniformity of the land used, the results of 1928 and 1929 were not sufficiently representative to establish an average. Of the first four varieties that have been under test since 1925, Mackay heads the list with a yield 18·8 per cent higher than that of the check variety. This variety is well suited to the growing of green fodder in combination with oats. However, this variety and the Prussian Blue are not popular

for domestic consumption, and for this reason the demand will never reach that of white peas, such as Chancellor, O.A.C. 181, Golden Vine and Arthur, which may be profitably used for domestic consumption as well as for fodder production.

BEANS

Three varieties were sown in the spring. The results obtained to date with these three varieties are as follows:—

BEANS—COMPARISON OF VARIETIES—SIX-YEAR AVERAGE

Variety	Source	Yield per acre, 1930	Days to mature	Average yield per acre 1925-1930	Ralotive yield in percent. of Navy O. 711 used as check	Average weight per measured bushel, 1925-30
		lb.	days	lb.	%	lb.
Navy Ott. 711	Ottawa	1,928	111·0	1,640	100·0	64·0
Robust	Macdonald College	1,551	117·6	1,673	102·0	65·7
Imp. Yellow Eye	Ottawa	1,609	115·6	1,424	86·8	62·5

SELECTION OF WHEAT, OATS AND PEAS FOR THE PRODUCTION OF SUPERIOR LINES

The object of these experiments, undertaken in 1924, is to produce by selection pure seed of superior quality from good standard varieties. Several hundreds of heads are selected among the best ones, and each one is sown separately over a number of years, while all selections that are not representative of the variety are carefully discarded each year, unless the individual qualities of the plots are really superior. When the respective qualities of these selections are known, they are multiplied separately if they are different, or collectively if they are similar. The resulting seed is recognized in the trade under the same of Elite Stock Seed.

PEA AND OAT MIXTURES FOR GRAIN PRODUCTION

As grain mixtures are fairly extensively grown in this district, some experiments were started in 1928 in order to ascertain the varieties and proportions which give the best yields. Three varieties of oats and three varieties of peas are being compared for the last three years, and the average results are given in the following table:—

PEA AND OAT MIXTURE FOR GRAIN

Mixture	Yield per acre, 1930	Weight per bushel	Average yield per acre, over three years	Weight per bushel
	lb.	lb.	lb.	lb.
I Oats: Banner 49 (2) Peas: Mackay (1)	2,280	41·5	2,940	42·5
II Oats: Banner (2) Peas: Arthur (1)	2,610	41·5	3,140	42·5
III Oats: Gold Rain (2) Peas: Golden Vine (1)	2,820	43	3,320	43
IV Oats: Alaska (2) Peas: Chancellor (1)	2,580	40	3,300	42

OAT AND BARLEY MIXTURES FOR GRAIN PRODUCTION

Eight different mixtures of oats and barley were sown. The oat varieties included Banner, Victory, Gold Rain and Alaska; the barley varieties, Beaver, Charlottetown 80, Duckbill and O.A.C. 21. The yields given during the last three years by these various mixtures are shown in the following table:—

OAT AND BARLEY MIXTURES FOR GRAIN

Mixture	Yield per acre, 1930	Weight per bushel	Average yield per acre over three years	Weight per bushel
	lb.	lb.	lb.	lb.
Oats: Banner (2) Barley: Bearer (1)	2,760	42	2,860	41
Oats: Banner 49 (2) Barley: Charlottetown 80 (1)	3,180	43·5	2,738	42·5
Oats: Banner 49 (2) Barley: Duckbill 57 (1)	2,880	42	2,750	42
Oats: Victory (2) Barley: Bearer (1)	3,180	43	3,160	42
Oats: Victory (2) Barley: Charlottetown 80 (1)	3,000	45	3,110	43
Oats: Victory (2) Barley: Duckbill 57 (1)	2,940	45	2,910	43
Oats: Gold Rain (2) Barley: O.A.C. 21 (1)	2,700	44	2,560	42·5
Oats: Alaska (2) Barley: O.A.C. 21 (1)	2,460	43	2,460	42

As shown by the above table, Victory oats and Bearer barley gave the highest yield.

WHEAT, OAT AND BARLEY MIXTURES FOR GRAIN PRODUCTION

Four different combinations are being compared as follows:—

1. Oats, Banner Ottawa 49, wheat, Huron Ottawa 3, barley, Duckbill 57; 2. Oats: Banner Ottawa 49, barley, Bearer Ottawa 475, wheat, Marquis Ottawa 15; 3. Oats, Alaska, barley, O.A.C. 21, wheat, Reward; 4. Oats, Banner Ottawa 49, wheat, Huron Ottawa 3, barley, Bearer.

The results obtained to date are as follows:—

WHEAT, OAT AND BARLEY MIXTURES FOR GRAIN

Mixture	Yield per acre, 1930	Weight per bushel	Average yield per acre, over 3 years	Weight per bushel
	lb.	lb.	lb.	lb.
Wheat: Huron Ottawa 3 (½) Oats: Banner O. 49 (1½) Barley: Duckbil 57 (¾)	2,760	44	3,060	42
Oats: Banner O. 49 (1½) Barley: Bearer (¾) Wheat: Marquis (½)	2,640	44	2,780	41·5
Oats: Alaska (1½) Barley O.A.C. 21 (¾) Wheat: Reward	2,640	45	.....	.....
Oats: Banner 49 (1½) Barley: Bearer (¾) Wheat: Huron (½)	2,820	44·5	.....	.....

ROD-ROW TESTS OF CEREALS

These tests are conducted in rod-rows with the object of comparing new varieties or selections with old and known varieties, before including them in the regular comparisons on large plots. After a four- or five-year test, the varieties or selections that do not prove superior are discarded and replaced by by others; this is the reason why several new varieties are included this year.

The quantity of seed sown in each row is based upon the weight of 1,000 seeds and the percentage of germination of each variety. The object is to sow as much as possible the same number of living seed for each variety.

The results obtained to date are given in the following tables:—

WHEAT—ROD-ROW TESTS

Variety	Average yield per acre, 1930	Days to mature	Length of straw	Strength of straw	Average yield per acre, 1925-1930	Relative yield in per cent of Huron O. 3 used as check	Average weight per measured bushel 1925-1930	Weight of 1,000 kernels
	bush.	days	in.		bush.	%	lb.	grms.
Huron Ott. 3	39·0	112	41·0	9·7	36·0	100·0	62·9	44·8
Chelsea	18·9	108	41·3	9·1	36·5	101·4	62·0	42·0
Bishop	21·3	109	41·0	9·6	36·1	100·3	62·3	42·7
Marquis Ott. 15	34·8	112	40·4	9·6	36·0	100·0	62·6	41·8
Reward 928	30·4	102	38·0	9·7	35·0	97·2	64·0	42·3
Garnet 652	33·8	99	37·0	9·5	34·0	94·4	63·0	36·7
White Russian	19·1	114·6	42·1	8·5	33·3	92·5	60·1	42·3
Red Fife 17	34·0	115	42·0	9·3	32·0	88·9	60·8	38·6
929 B	18·8	104	36·0	9·8	31·6	87·7	63·6	35·1
Early Red Fife	35·7	112	42·0	9·7	31·0	86·1	63·0	46·0
White Fife	34·7	117	43·0	9·4	30·8	85·5	60·7	40·7
1930 RESULTS								
Goose	42·4	120	48·8	9·2	.....	108·7	66·0	56·0
Mindum	41·8	120	48·0	9·0	.....	107·1	66·0	55·0
O.A.C. 85	36·7	120	46·6	8·4	.....	94·1	62·0	44·0
Fisher 5	35·8	109	39·0	9·8	.....	91·7	63·0	42·5
Garnet 22-17	34·9	104	41·6	10	.....	89·4	62·0	37·0
Ceres	34·3	109	40·0	9·6	.....	87·9	62·5	41·5
Red Quality A	30·9	107	40·2	10	.....	79·2	63·0	48·0
Marquis Strange H	30·9	142	42·0	9·0	.....	79·2	62·0	42·5
Quality A 101	30·8	107	39·0	10	.....	79·0	61·5	54·0
Early Triumph	28·5	111	36·0	10	.....	73·0	64·0	42·5
928 W.T.D.	20·0	115	41·0	9·0	.....	51·2	62·0	38·5
Brownie	14·0	117	42·0	10	.....	35·8	62·0	40·0

BARLEY—ROD-ROW TESTS

Six-Rowed Varieties

Variety	Yield per per acre, 1930	Days to mature	Length of straw	Strength of straw	Average yield per acre 1925-1930	Relative yield in percent. of O.A.C. 21, used as check	Average weight per measured bushel 1925-1930	Weight of 1,000 kernels
	bush.	days	in.		bush.	%	lb.	grms.
O.A.C. 21	58·2	93·5	30·7	9·3	62·8	100·0	51·0	42·5
Star	69·2	96·0	27·9	10·0	63·2	99·0	48·6	39·4
Beaver 475	68·7	105·0	37·8	8·0	63·1	98·8	51·0	47·0
Chinese 60	55·1	93·8	36·7	9·3	60·8	95·3	49·6	43·5
Manchurian CR 31	56·7	98·0	38·5	9·6	58·6	91·8	48·8	42·9
Guymale	46·5	91·6	25·1	9·5	57·7	90·4	62·4	45·2
Hymalayan 59	52·6	92·0	25·5	9·3	56·2	88·0	62·3	45·0
Albert 54	56·2	85·8	29·5	9·5	43·5	68·1	50·0	47·8
1930 RESULTS								
Trebi	70·0	95·0	29·6	8·4	.....	120·2	52·0	63·5
Stella 58	62·6	92·0	40·8	8·8	.....	107·5	51·0	46·0
Manchurian 50	59·1	93·0	40·4	9·6	.....	101·5	51·0	47·5
Canadian Thorpe	58·0	104·0	35·0	5·6	.....	99·6	54·0	50·5
Pontiac	56·3	95·0	41·2	9·4	.....	96·7	51·0	49·0
Velvet	41·7	91·0	42·8	10·0	.....	71·6	50·0	46·5

BARLEY—ROD-ROW TESTS—*Concluded*

Two-rowed Varieties

Variety	Yield per acre, 1930	Days to mature	Length of straw	Strength of straw	Average yield per acre 1925-1930	Relative yield in percent. of O.A.C. 21, used as check	Average weight per measured bushel 1925-1930	Weight of 1,000 kernels
	bush.	days	in.		bush.	%	lb.	grms.
Gold	57·6	102·3	29·4	8·3	60·4	94·6	51·7	42·1
Early Chevalier	53·5	94·3	34·0	8·6	58·9	92·3	50·0	46·4
Charlottetown 80	55·7	102·3	31·7	9·0	57·6	90·2	52·0	42·9
Duckbill 207	48·2	105·0	37·4	9·6	54·7	85·7	51·6	54·7
French Chevalier	46·8	102·0	39·3	9·3	51·1	80·0	52·1	48·8
Duckbill 57	45·5	104·8	36·7	9·6	48·4	75·9	51·5	55·1
1930 RESULTS								
Hannchen, Sask	64·1	104·0	39·0	4·0	.....	110·1	51·5	47·0
Binder	65·8	99·0	34·0	8·0	.....	113·0	53·0	53·0
Horn	63·4	100·0	35·5	5·5	.....	108·9	54·0	52·5
Plumage Archer	49·2	106·0	35·6	6·8	.....	84·5	53·0	55·0
Gordon A	44·1	100·0	41·2	9·5	.....	75·7	52·0	54·0

OATS—ROD-ROW TESTS

Variety	Yield per acre, 1930	Days to mature	Length of straw	Strength of straw	Average yield per acre 1925-1930	Relative yield in per cent Banner 49, used as check	Average weight per measured bushel 1925-1930	Weight of 1,000 kernels
	bush.	days	in.		bush.	%	lb.	grms.
Banner O. 49	89·4	109	43	8·9	87	100·0	35·3	40·0
Danish Island	78·4	107	43	8·6	96	110·3	32·9	40·5
Leader B	84·2	105	42	8·3	94	108·0	31·8	41·5
O.A.C. 144	73·2	109	46	9·1	91	104·6	34·1	41·3
Victory	84·8	110	43	8·5	90	103·4	37·4	42·0
Gold Rain	82·1	105	45	9·2	87	100·0	38·0	35·6
Legacy O. 678	86·5	108	43	8·5	86	98·8	35·8	38·8
O.A.C. 72	76·1	108	45	8·4	85	97·7	35·5	43·7
Longfellow	82·2	102	42	8·4	82·8	95·1	34·3	46·9
Alaska	85·8	95	38	9·1	78·4	90·1	36·0	39·9
Laurel O. 477	71·0	101	40	9·2	61·8	71·2	47·0	26·8
Banner Waugh	90·1	109	44	8·2	92	105·7	35·6	40·9
Banner C.R.	87·1	110	45	8·3	88	101·1	34·6	39·7
Banner Sask 133	84·8	110	44	8·4	87	100·0	35·7	40·5
Banner 44	83·8	109	43	8·6	85	97·7	34·8	39·7
1930 RESULTS								
Columbian 78	85·2	112	46·4	5·2	.....	95·3	38·0	41·5
Abundance	80·3	138	44·7	3·0	.....	89·8	37·0	45·0
White Cross	75·8	97	43·5	3·2	.....	84·7	32·0	33·0

PEAS—ROD-ROW TESTS

Variety	Yield per acre, 1930	Days to mature	Length of straw	Relative yield in per cent of Chancellor used as check	Average weight per measured bushel 1925-30	Weight of 1,000 kernels
	lb.	days	in.	%	lb.	grms.
Chancellor	53·6	92	36·4	100·0	64·0	142·5
Early Raymond	51·4	92	35·6	95·8	63·0	376·0
Early Blue	51·4	92	24·6	95·8	63·0	170·0
Arthur	47·8	100	38·0	89·1	63·5	262·0
Champlain	45·4	104	39·6	84·7	63·5	211·0
Golden Vine	40·1	104	40·6	74·8	63·5	153·5
Lemaire*	38·2	83	.....	71·2	65·0	211·0
Canadian Beauty	37·2	104	40·2	69·4	63·0	333·0
Mackay	34·7	104	38·6	64·7	64·0	271·0
O.A.C. 181	30·4	100	34·6	56·7	64·0	195·5

* 1930 results only.

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. 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. 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

The growing of forage crops is of great importance in this district, where live stock husbandry is the chief source of revenue and receives therefore a great deal of attention. Live stock are kept in the stable for a rather long period, and succulent feeds must be provided in order to maintain the herds in the best possible condition.

The old haphazard method of keeping milch cows on old pastures and feeding them with straw and a small quantity of poor timothy or fescue hay, must ultimately disappear to be replaced by the rational feeding of good clover or alfalfa hay, roots, corn, sunflower or pea and oat silage. Moreover, the production of fodder crops in the shape of hay or pasture is also of prime importance, as it is not sufficient to feed live stock well during the winter. They must also be provided with good pastures during the summer months.

The experimental work carried on this station during a number of years with various varieties of corn, sunflowers roots, and various combinations of legumes and grasses, deserves the fullest attention.

CORN

Twenty varieties or selections of corn were compared. They were sown in hills, three feet apart, on June 3, and cut on September 23. As ten of these varieties under test five years or more have not yielded sufficiently to be profitable for silage, they were left uncut and the degree of maturity only was recorded. Incidentally, none of these varieties has completely matured here.

The green weight and dry matter yields per acre in 1930 as well as the average results over an eight-year period for eight varieties are given in the following table:—

CORN—COMPARISON OF VARIETIES

Varieties	Source	Height	Rate of yield per acre 1930		Average yield per acre (8 years)	
			Green weight	Dry matter	Green weight	Dry matter
		in.	tons lb.	tons lb.	tons lb.	tons lb.
Hybrid	Wimple	84	19 043	2 1,516	16 1,159	2 1,136
90-Day Dent	Dakota Imp. seed	78	14 371	2 1,156	14 706	2 810
Golden Glow	Duke	80	15 1,031	2 909	12 1,872	2 686
Yellow Dent	Wimp'e	82	17 1,061	2 1,511	13 280	2 574
Bailey	Duke	82	16 643	2 1,441	14 405	2 535
Longfellow	Duke	80	16 885	2 1,186	13 1,056	2 480
North Dakota	Steele-Briggs	83	14 210	2 310	13 1,879	2 253
Leaming	Duke	86	14 1,016	2 590	12 1,065	2 106

As may be seen in the above table, there is but little difference in the dry matter yields between the different varieties. However, there is a gradual decrease from the highest to the lowest variety, and as pointed out in previous reports, this difference would be even more marked if the green weight only were considered showing the importance of making the comparison on the dry matter for each variety, i.e., the Golden Glow variety which comes in eighth place on a green weight basis is third in dry matter yield.

While the growing of corn is not to be generally recommended for this district, it might prove useful for farmers with large herds producing milk the year round.

RUSSIAN SUNFLOWERS

Five varieties or selections of Russian sunflowers were compared during the season. They were sown on June 3, and cut when each variety was approximately three-fourths in bloom. Thus, the Ottawa 76 and Mennonite varieties were cut almost three weeks earlier than the three other varieties.

RUSSIAN SUNFLOWERS—COMPARISON OF VARIETIES

Variety	Source	Height	Yield per acre, 1930		Average per acre		Number of years tested
			Green weight	Dry weight	Green weight	Dry weight	
		in.	tons lb.	tons lb.	tons lb.	tons lb.	
Mammoth Russian	Kenneth McDonald	94	20 991	3 743	18 951	2 958	8
Manchurian	McKenzie	76	17 569	2 1,130	15 1,299	2 184	7
Mammoth Russian	Disce	74	15 1,665	2 017	14 1,887	2 267	5
Ottawa 76	C.E.F.	65	11 1,529	2 950	12 1,787	1 1,917	5
Mennonite	Rosthern	60	9 1,660	1 159	12 1,285	2 055	5

MANGELS—VARIETY TEST FOR YIELD AND PURITY

Thirty-one varieties or selections of mangels, representative of the various types found in the trade, were sown on May 9, on ridges thirty inches apart, and later thinned to ten inches apart in the row. They were pulled from October 13 to 20.

The yields for the year as well as the average dry matter and green weight yields per acre for each type are given in the following table:—

MANGELS—TEST OF VARIETIES—1930

Varieties	Source	Yield per acre, 1930		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.	
Danish Sludstrup	Dupuy & Ferguson	27 448	3 909	26 1,199	3 749	9
Taarcje Barres	Hartmann	28 662	3 799	27 1,172	3 563	7
Rosted Barres	Hartmann	28 662	3 232	27 496	3 4	5
Sludstrup	Penticton	26 1,341	3 219	25 1,077	2 1,997	5
Yellow Intermediate	Ottawa	21 847	3 54	21 638	2 1,972	9
Sludstrup Barres	Hartmann	24 1,692	2 1,963	23 1,207	2 1,956	7
Stryno Barres	Hartmann	29 1,641	2 1,901	28 838	2 1,719	7
Red Eckendorffer	Hartmann	26 726	2 1,799	25 1,814	2 1,608	7
Rose Danish (½ sugar)	Ste-Anne	21 804	2 1,136	21 320	2 1,040	8
Ferritslev Barres	Hartmann	25 266	2 825	24 1,176	2 899	7
Yellow Eckendorffer	Hartmann	26 644	2 737	25 1,960	2 693	7
Eclipse	McKenzie	26 275	3 863	25 645	2 486	5
Barres Oval	General Swedish	25 342	3 41	24 1,547	2 1,895	7
Yellow Eckendorffer	General Swedish	26 890	2 1,817	26 14	2 1,604	7
Red Eckendorffer	General Swedish	23 1,068	2 1,648	23 857	2 1,474	7
Improved Tankard Cream	Rennie	27 612	2 1,461	26 1,259	2 1,320	7
Golden Tankard	Rennie	20 1,410	2 969	20 620	2 1,067	7
Yellow Ideal	Rennie	25 1,414	2 1,141	25 634	2 1,039	7
Golden Tankard	Dupuy & Ferguson	17 864	2 509	17 1,160	2 456	7
Mammoth Red Long	Sutton	24 1,036	3 262	24 562	3 99	7
Mammoth Red Long	Dupuy & Ferguson	25 1,332	3 159	24 1,914	2 1,956	7
Perfect Mammoth Long Red	Rennie	24 1,856	2 1,484	24 226	2 1,460	8
Elvetham Mammoth	Hartmann	23 1,314	2 1,204	23 448	2 1,140	7
Barres	General Swedish	25 1,578	3 1,220	25 778	3 917	7
Svalof Red	General Swedish	21 394	3 359	21 109	3 134	7
Giant White Sugar	R. Moore	26 808	2 1,708	26 69	2 1,673	6
Danish Improved	Dupuy & Ferguson	13 76	2 954	13 313	2 1,104	5
Giant Sugar	Rennie	21 722	2 1,553	20 1,953	2 1,376	7
Yellow Globe	Sutton	25 881	2 904	25 797	2 811	7
Yellow Globe	Dupuy & Ferguson	19 996	1 1,899	19 1,755	1 1,917	7
Yellow Giant Globe	Rennie	19 704	1 1,483	19 1,712	1 1,557	7

It will be seen by the above table that there is but little difference in the average yields of most of the varieties tested.

The land where these experiments were carried on is very well adapted to the growing of roots. As mentioned in previous reports, varieties belonging to the Globe and Tankard types give the best results on heavy and shallow soils. Varieties of the Intermediate and Half-long types are better adapted to medium soils, i.e., more or less clayey and more or less deep. Long type beets generally give better yields on very deep and loose soils.

Most of the varieties mentioned in this table are included in seedmen's catalogues, and it would be advisable for farmers desirous of growing roots to choose the varieties that have given the best results here during five to eight years, and of the type best suited to their respective soils.

EARLY VS. LATER SOWING OF BEETS AND TURNIPS

This experiment has been under way for two years only, and it is too early as yet to draw definite conclusions. However, from observations made to date, the germination of beets and turnips sown as early as possible in the spring was better than when the sowing was done three or four weeks later. Another advantage in favour of early sowing is that thinning may be done before the haying season and thus is less likely to be neglected.

SWEDES—VARIETY TEST FOR YIELD AND PURITY

Eighteen varieties or selections of swedes were sown on May 9 in rows thirty inches apart. They were thinned to ten inches apart in the row. The yields obtained as well as the average yields given by the varieties for seven to eight years are given in the following table:—

SWEDES—COMPARISON OF VARIETIES

Variety	Source	Yield per acre 1930		Average yield per acre	
		Green weight	Dry matter	Green weight	Dry matter
		tons lb.	tons lb.	tons lb.	tons lb.
GROWN FOR 8 YEARS					
Goodluck	Ste. Anne	22 1,666	2 1,479	22 1,539	2 1,422
Bangholm	Dupuy & Ferguson.	24 1,149	2 1,406	24 373	2 1,284
Kangaroo	Dupuy & Ferguson.	22 505	2 895	22 411	2 909
Sutton's Champion Purple Top.	Dupuy & Ferguson.	19 1,861	2 1,181	19 1,938	2 113
Elephant or Monarch	Dupuy & Ferguson.	20 635	2 876	20 1,021	2 855
GROWN FOR 7 YEARS					
Olsgaard Bangholm	Hartmann	25 1,393	3 167	24 1,983	2 1,910
Skirvings	Kenneth McDonald	15 960	1 1,715	15 1,834	1 1,774
Prize Purple Top	Rennie	24 762	2 1,851	22 298	2 1,687
Magnun Bonum	Rennie	21 1,344	2 767	21 1,976	2 769
Jumbo	Rennie	23 440	2 1,108	22 1,828	2 1,042
Best of All	Rennie	21 1,344	2 767	21 1,286	2 700
Ne Plus Ultra	Dupuy & Ferguson.	26 1,019	2 1,832	26 266	1 1,685
Invicta Bronze Top	Rennie	22 1,666	2 1,470	23 308	2 1,376
Canadian Gem	Rennie	21 570	2 1,239	21 1,578	2, 1,258
Bangholm	General Swedish	24 762	2 1,851	23 1,612	2 1,760

It is seen by the above table that there is but little difference in the yield of dry matter between the varieties tested during seven and eight years. The Good Luck variety, selected and multiplied on this station, yielded 2 tons and 1,422 pounds of dry matter per acre, or 138 pounds more than Bangholm variety from Dupuy and Ferguson, which comes second. A few varieties under test during seven years have a slightly higher average; they are as follows: Bangholm, Hartman, Prize Purple Top, Rennie, and Bangholm from the General Swedish Seed Co.

FIELD CARROTS—VARIETY TEST FOR YIELD

Nine varieties or selections were compared last season. The yields obtained are as follows:—

CARROTS—COMPARISON OF VARIETIES

Variety	Source	Yield per acre 1930		Average yield per acre	Number of years under test
		Green weight	Dry matter		
		tons lb.	tons lb.	tons lb.	
White Belgian	Hartmann	22 1,856	2 1,085	21 1,811	8
Champion	Hartmann	18 1,540	2 370	17 1,699	7
Danish Champion	Dupuy & Ferguson.	23 807	2 1,706	22 227	8
Vosges Large White	Dupuy & Ferguson.	20 1,342	2 1,279	19 987	7
White Belgian	Hartmann	22 1,144	2 1,891	21 1,188	8
James	Dupuy & Ferguson.	13 1,720	2 203	13 646	3
Mammoth Short White	Rennie	28 1,578	3 385	27 61	7
Large White Belgian	Rennie	23 886	2 1,551	22 87	7
Champion, Svalof		25 925	2 1,612		1

For the first time an analysis was made to ascertain the percentage of dry matter of each variety, and the dry matter yield is given opposite the green weight yield obtained in 1930.

While a fair dry matter yield per acre was secured with carrots, we are not prepared to recommend the growing of this crop on an extensive scale, as the cost of production is very high, on account of the difficulty of harvesting. As in the case of sugar beets, the pulling of carrots is difficult and takes a long time. However, those who wish to grow a small quantity of carrots would be well advised to select a variety belonging to the half-long or short types from among those giving the highest yields.

Several other experiments have been under way with roots for a number of years, but as the results are not definite and conclusive, the observations made each year are carefully recorded and the results will be published in later reports.

SUGAR BEETS—VARIETY TEST FOR YIELD AND PURITY

Three varieties only were compared during the season. The yields obtained as well as the average yields obtained to date are given in the following tables:—

SUGAR BEETS—TEST OF VARIETIES

Variety	Source	Yield per acre	
		tons.	lb.
Dippe	Dominion Sugar Co	13	1,436
Fredericksen	Dominion Sugar Co	13	220
Rabbethge & Gieseke	Dominion Sugar Co	11	1,788

SUGAR BEETS—CHEMICAL ANALYSIS

Variety	Sugar in liquid matter	Coefficient of purity	Average weight per root	
	%	%	lb.	oz.
Dippe	15·94	77·49	1	9
Fredericksen	19·85	85·55	1	10
Rabbethge & Gieseke	21·19	88·94	1	6

SUGAR BEETS—AVERAGE YIELD, 1922-30

Year	Number of varieties	Average yield		Average weight per root		Average yield of sugar in liquid matter	Coefficient of purity
		tons	lb.	lb.	oz.	%	%
1930	3	12	1,481	1	8	18·99	83·96
1929	3	11	1,224	1	9	22·02	85·47
1928	6	8	924	1	0	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
8-year average	3 to 8	11	1,955	1	6	19·51	85·44

As may be seen by the above table, the yields of sugar beets secured in this district are fairly satisfactory and compare favourably with those secured in districts which specialize in that crop.

This crop is not recommended for feeding purposes, as it is very difficult to pull and it is almost impossible to remove all the earth from the roots.

FLESHY, SUCCULENT ANNUAL CROPS

This experiment was started this year with the object of comparing the yields as well as the suitability of fleshy annuals with the various other crops in this district. Eight varieties were sown in the spring in rows 38 feet long and 30 inches apart. The plants were thinned later in the season to four to six inches in the rows. The results are given in the following table:—

FLESHY AND SUCCULENT ANNUAL CROPS—RESULTS OF TEST

Kind	Yield	
	Green weight	Dry matter
	tons lb.	tons lb.
Green stem marrow kale	14 424	2 067
Purple stem marrow kale	13 1,892	2 044
Giant rape	10 1,140	1 1,788
Thousand-head kale	10 1,280	1 1,658
Giant Drumhead Cabbage	11 1,560	1 1,440
Improved Thousand-head kale	11 192	1 1,435
Improved Dwarf Essex rape	8 1,100	1 847
Sheep kale	7 1,900	1 603

Without drawing any conclusions as to the respective value of the different crops, it may be stated, for the information of the reader, that the percentage of dry matter varies from 14·31 per cent to 17·87 per cent and that the yields of green weight secured are not representative of the yielding capacity of these crops. The object of the sowing in rows 30 inches apart this spring was to compare the growth and development made by the different crops rather than the yields. It would be advisable to sow in closer rows in order to cover the ground more fully.

LEGUMES AND GRASSES

Several experiments undertaken a few years ago with the object of comparing various combinations of legumes and grasses for the production of better hay and of better pastures, were continued this year. Furthermore, approximately 10 acres of land were ploughed and levelled with a view to starting another experiment in connection with the improvement of permanent pastures next spring.

ALFALFA

The following selections of alfalfa are under test to ascertain their yield and adaptability : Grimm, Ontario Variegated, a selection of Turkestan alfalfa, a selection of Medicago Falcata and a selection made on the station of a few plants found in an old meadow.

The yields obtained are given in the following table:—

ALFALFA—VARIETY TEST

Variety	Yield per acre, 1930				Average yield for five years			
	Green weight		Dry matter		Green weight		Dry matter	
	tons	lb.	tons	lb.	tons	lb.	tons	lb.
Grimm	10	800	2	632	7	1,450	1	1,525
Ontario Variegated	10	—	2	218	8	320	1	1,592
Turkestan	7	800	1	1,266	7	1,983	1	1,552
Medicago Falcata	6	1,600	1	1,121	9	762	2	489
Ste. Anne Selection*	11	400	2	735	.....		.....	

*This year's results only.

As may be seen by the yields secured, the first four selections of alfalfa mentioned in the table appear to be sufficiently adapted to the district. However, these tests have not been conducted a sufficient number of years to enable us to recommend a particular selection. This work will be continued in order to corroborate these data.

The attention of the reader is directed to the yield given by the selection made on the station a few years ago from seed grown here. The growth made by this selection during the season was most luxuriant and it seems also more hardy than the others. The first seeds obtained from each one of the plants selected in 1927 were sown in small rows in order to ascertain their respective characteristics. The following years, several rows were replicated, and the seed of the most hardy plants only was harvested. This is the seed that gave such a fine crop this year. Work is being done at the present time with a selection of this alfalfa, and it is hoped that it will be possible to compare it with other lines in the near future.

RED CLOVER

Thirteen varieties of red clover of different sources are being compared since a few years, with a view to ascertaining their respective yielding ability and their adaptability to the local soil and climatic conditions.

The yields secured are as follows:—

RED CLOVER—VARIETY TEST

Variety	Season	Average yield per acre, 1930				Average yield for two years			
		Green weight		Dry matter		Green weight		Dry matter	
		tons	lb.	tons	lb.	tons	lb.	tons	lb.
Red clover, Ottawa	Early	7	1,100	1	1,228	9	900	2	108
Red clover, Kenora	Late	12	1,700	2	1,371	13	1,525	2	1,430
Red clover, Chateauguay	Early	7	1,750	2	1,260	9	1,902	2	131
Red clover, Chateauguay Cooperative federee of Ste-Rosalie	Late	13	1,700	2	1,598	12	1,425	2	1,246
Atlas Swede, Alberta	Late	9	900	1	1,718	11	1,850	2	1,348
Late Swedish	Late	9	1,100	1	1,814	12	850	2	1,097
Early Swedish	Early	5	900	1	214	9	25	1	1,648
Medium early Swedish	Late	9	1,200	1	1,796	12	1,150	1	1,875
Northern France	.....	4	550	0	1,845	.....		.....	
Western France	.....	5	150	2	120	.....		.....	
Southern France	.....	5	50	0	1,933	.....		.....	
Ufa 1 (Russia)	.....	13	1,250	2	1,281	.....		.....	
Perm 2 (Russia)	.....	14	1,350	2	1,902	.....		.....	
Bisk 3 (Russia)	.....	14	500	2	1,330	.....		.....	
Kiev 4 (Russia)	.....	9	1,000	1	1,914	.....		.....	

It may be seen from the preceding table that the selections under test for a few years appear to be fairly well suited to our district.

As shown in the above table, early and medium early clovers from Swedish sources gave lower yields. The difference between the clovers from the Co-opérative Fédérée and from Kenora, Ontario and between clovers from Ottawa and Châteauguay, is not sufficiently marked to enable us to draw conclusions as to the respective merits of these varieties, from the results of two crops only.

These comparisons will be continued.

SWEET CLOVER

Four different selections of sweet clover have been compared on this station for several years. From 1923 to 1926, sowing was done on 1/100 acre plots, on heavy land. The germination of sweet clover has never been good enough to permit of comparisons, due, undoubtedly, to the nature of the land. For this reason, this experiment is now conducted on light gravelly soil and sowing is done in rows, to facilitate observations on the germination and growth of the crops. Germination and growth were very good this year, probably on account of the unusually large amount of moisture.

ALSIKE CLOVER

Only one selection of alsike clover is under test and is being compared with red clover. Only two years' results are available at the present time. This experiment will be continued on a more extensive scale next season.

TIMOTHY

The following results were given by the three selections of timothy mentioned in the following table:—

TIMOTHY—VARIETY TEST

Variety	Average yield per acre, 1930		Average yield for six years, per acre	
	Green weight	Dry matter	Green weight	Dry matter
	tons lb.	tons lb.	tons lb.	tons lb.
Boon	7 800	2 1,593	5 1,425	2 015
Commercial	6 1,400	2 1,057	5 946	1 1,813
Ohio 9237	7 1,150	2 1,718	5 1,815	1 1,508

WHITE CLOVER

Six varieties or selections of white clover are being compared, with the object of ascertaining their hardiness and their suitability for the formation of good pastures. Growth was rather irregular at first on account of a certain number of weeds on the land, and it was rather difficult to make comparisons. During the last two years, however, results were much better, and it may be stated that these white clovers are well suited to our district.

DIFFERENT GRAIN AND LEGUME MIXTURES FOR HAY OR SILAGE

Twenty-two different combinations of oats, peas, vetches, soya beans and horse beans were sown in the spring on duplicate 1/100 acre plots. The results obtained during the year as well as the average yields for three years are given in the folowing table:—

HAY MIXTURES—RESULTS OF TEST

Mixture number	Mixture	Seeding rate per acre	Average yield per acre, 1930				Average yield for three years			
			Green weight		Dry matter		Green weight		Dry matter	
		lb.	tons	lb.	tons	lb.	tons	lb.	tons	lb.
1	Banner oats Mackay peas Vetches	85 90 15	11	500	2	1,098	11	1,650	2	1,313
2	Banner oats Mackay peas Vetches	85 75 15	11	700	2	967	12	973	2	1,781
3	Banner oats Mackay peas Vetches	85 60 15	11	500	2	1,933	11	1,917	2	1,667
4	Banner oats Mackay peas Vetches	85 45 15	11	700	2	1,475	11	1,717	2	1,574
5	Banner oats Mackay peas Vetches	85 30 15	11	800	2	1,276	12	—	2	1,605
6	Banner oats Mackay peas Vetches	34 75 15	10	1,400	2	1,037	13	166	2	1,256
7	Banner oats Mackay peas Vetches	34 60 15	11	—	2	899	12	1,633	2	1,332
8	Banner oats Mackay peas Vetches	42·5 60·0 15·0	11	400	2	1,338	12	983	2	1,284
9	Banner oats Mackay peas Vetches	51 60 15	11	360	2	1,073	12	980	2	1,454
10	Banner oats Mackay peas Vetches	59·5 60·0 15·0	12	1,500	2	934	12	1,250	2	1,511
11	Banner oats Mackay peas Vetches	68 60 15	11	1,600	2	1,048	13	17	2	1,530
12	Banner oats Mackay peas Vetches	76·5 60·0 15	11	100	2	533	12	1,350	2	1,467
13	Banner oats Mackay peas Vetches	85 60 15	11	800	2	1,276	12	617	2	1,691
14	Victory oats Arthur peas Vetches	85 60 15	10	600	2	1,492	12	850	2	1,800
15	Banner oats Mackay peas	68 90	10	—	2	824	12	1,650	2	1,819
16	Victory oats Mackay peas	68 90	10	200	2	379	12	1,283	2	1,347

HAY MIXTURES, 1930—*Concluded*

Mixture number	Mixture	Seeding rate per acre	Average yield per acre, 1930		Average yield for three years	
			Green weight	Dry matter	Green weight	Dry matter
		lb.	tons lb.	tons lb.	tons lb.	tons lb.
17	Banner oats Arthur peas	68 90	8 1,200	2 804	11 133	2 1,341
18	Victory oats Arthur peas	68 90	9 400	2 708	11 666	2 1,411
19	Banner oats Mackay peas	85 75	9 1,700	2 1,425	11 1,233	2 1,460
20	Banner oats Mackay peas	85 60	10 200	2 1,327	11 750	2 1,587
21	Banner oats Mackay peas Vetches Soya beans	85 60 10 10	10 1,300	2 1,387		
22	Banner oats Mackay peas Vetches Horse beans	85 60 10 10	10 500	2 323		

While it is too early to recommend any mixture in particular, the attention of the reader is called to the fact that it is possible to secure a good yield with any mixture of oats, peas and vetches. In many cases, it would be profitable for farmers to plough a few acres of old meadow that hardly yields 1,000 pounds of dry matter per acre and to sow any one of the above mixtures which would yield at least twice as much.

MILLETS

Five varieties are being compared since 1924 on duplicate 1/100 acre plots. Heretofore, the seed was sown broadcast by hand and covered with a rake at the end of May or during the first week of June; this year, however, sowing was done in rows with a Planet Junior drill. The germination of the millets grown as above stated, has never been good, and weeds were gradually encroaching upon the land, resulting in a rather uneven growth.

To date, no variety has reached full development nor made a sufficient growth to permit of comparisons. This experiment will be conducted under a somewhat different plan next year in order to see if better results can be secured.

COMPARISONS OF VARIOUS PERENNIAL GRASSES

Approximately fifteen perennial grasses are sown each year in order to determine their yielding capacity for hay or pasture purposes. This experiment was started in 1924 on 1/100 acre plots.

Since the land was not entirely free from weeds and as the plants were sown broadcast, the germination and growth of a few of them during the first years were rather uneven. The following have always made a good growth: fescues, orchard grass, tall oats, red top, brome grass and Western rye grass. Kentucky and Canada blue grasses and rye-grass have produced only a few plants.

HAY AND PASTURE MIXTURES

Twenty-eight different mixtures were sown in the spring on duplicate 1/100 acre plots. Sowing was done by hand. Germination was very good and there was sufficient growth to leave a good mulch, which protected the roots against frost.

The average yields given by six crops of these mixtures are as follows:—

HAY AND PASTURE MIXTURES—RESULTS OF TEST

Mixture	Rate of seeding per acre	Yield per acre, 1930		Average yield for six years	
		Green weight	Dry matter	Green weight	Dry matter
	lb.	tons lb.	tons lb.	tons lb.	tons lb.
Alfalfa	6				
Timothy	6				
Red clover	10	9 1,450	1 1,894	7 1,806	1 1,865
Alsike clover	2				
White Dutch clover	1				
Alfalfa	3				
Timothy	6	8 825	2 16	7 1,919	2 204
Red clover	5				
White Dutch clover	1				
Timothy	8				
Red clover	10	7 896	1 1,651	7 282	1 1,873
White Dutch clover	1				
Timothy	8				
Red clover	10				
Kentucky blue grass	2	8 26	1 1,960	8 824	2 210
Red top	2				
White Dutch clover	1				
Timothy	8				
Red clover	8	10 681	2 604	8 105	2 183
Alsike clover	2				
White Dutch clover	2				
Timothy	8				
Red clover	8				
Alsike clover	2	10 282	2 188	8 468	2 363
Kentucky blue grass	2				
Red top	2				
White Dutch clover	1				
Timothy	8				
Alsike clover	4	9 1,783	2 210	7 1,925	2 282
White clover	1				
Timothy	8				
Alsike clover	4				
Kentucky blue grass	2	9 1,285	1 1,898	7 1,622	2 40
Red top	2				
White Dutch clover	1				
Timothy	6				
Meadow fescue	4	8 1,822	1 1,942	7 1,670	2 328
Red clover	10				
White clover	1				
Timothy	6				
Meadow fescue	4				
Red clover	10	8 359	1 1,841	7 380	1 1,775
Kentucky blue grass	2				
Red top	2				
White Dutch clover	1				
Timothy	6				
Meadow fescue	4				
Red clover	8	9 85	1 1,955	7 801	2 178
Alsike clover	2				
White Dutch clover	1				

HAY AND PASTURE MIXTURES—*Continued*

Mixture	Rate of seeding per acre	Yield per acre, 1930		Average yield for six years	
		Green weight	Dry matter	Green weight	Dry matter
	lb.	tons lb.	tons lb.	tons lb.	tons lb.
Timothy	6				
Meadow fescue	4				
Red clover	8				
Alsike clover	2	9 1,351	2 441	7 1,242	2 295
Kentucky blue grass	2				
Red top	2				
White Dutch clover	1				
Timothy	6				
Orchard grass	4				
Red clover	10	10 482	2 379	7 690	2 196
White clover	1				
Timothy	6				
Orchard grass	4				
Red clover	10	8 487	1 1,855	7 273	1 1,790
Kentucky blue grass	2				
Red top	2				
White clover	1				
Timothy	6				
Orchard grass	4				
Red clover	8	9 1,484	2 166	7 1,380	2 24
Alsike clover	2				
White Dutch clover	1				
Timothy	6				
Orchard grass	4				
Red clover	8				
Alsike clover	2	10 1,080	2 735	8 638	2 134
Kentucky blue grass	2				
Red top	1				
White Dutch clover	1				
Timothy	6				
Orchard grass	2				
Meadow fescue	2	8 625	1 1,956	7 1,020	2 243
Red clover	10				
White Dutch clover	1				
Timothy	6				
Orchard grass	2				
Meadow fescue	2				
Red clover	10	8 891	1 1,598	7 1,182	2 104
Kentucky blue grass	2				
Red top	2				
White Dutch clover	1				
Timothy	6				
Orchard grass	2				
Meadow fescue	2	9 1,019	2 659	7 1,139	2 271
Red clover	8				
Alsike clover	2				
White Dutch clover	1				
Timothy	6				
Orchard grass	2				
Meadow fescue	2				
Red clover	8	9 1,285	2 628	7 1,808	2 276
Alsike clover	2				
Kentucky blue grass	2				
Red top	2				
White Dutch clover	1				
				Five-year	average
Timothy	8				
White sweet clover	10	7 1,750	2 1,045	6 242	1 1,829
White Dutch clover	1				
Timothy	6				
Orchard grass	4	6 100	2 164	5 1,684	1 1,524
White sweet clover	10				
White Dutch clover	1				

HAY AND PASTURE MIXTURE—*Concluded*

Mixture	Rate of seeding per acre	Yield per acre, 1930				Average yield for six years			
		Green weight		Dry matter		Green weight		Dry matter	
	lb.	tons	lb.	tons	lb.	tons	lb.	tons	lb.
Timothy	6								
Meadow fescue	4	8	300	2	981	6	205	1	1,930
White sweet clover	10								
White Dutch clover	1								
Timothy	6								
Meadow fescue	2								
Orchard grass	2	6	850	2	142	6	274	1	1,878
White sweet clover	2								
White Dutch clover	1								
Timothy	8								
Yellow sweet clover	10	8	1,150	2	1,176	6	1,297	1	1,930
White clover	1								
Timothy	6								
Orchard grass	4	6	1,300	2	215	6	1,440	1	1,525
Yellow sweet clover	10								
White clover	1								
Timothy	6								
Meadow fescue	4	8	100	2	1,085	6	310	1	1,775
Yellow sweet clover	10								
White clover	1								
Timothy	6								
Meadow fescue	2								
Orchard grass	2	6	1,950	2	421	5	1,274	1	1,518
Yellow sweet clover	10								
White clover	1								

The outstanding feature of the above table is that the majority of mixtures have given practically equal yield; therefore, any one of these may be sown without fear of obtaining inferior results. These crops were sown on a rather heavy clay land, well tilled and of average fertility.

From observations made each year on each individual plot, it may be stated that blue grasses, red top and sweet clovers do not appear to be as well suited to the production of hay on clay land as orchard grass, tall oats or fescues. The per cent stand given by these crops in the plots did not correspond with the rate of sowing; therefore, the yields given by the plots containing these grasses are not due to their being included in the mixture. Furthermore, in the last eight plots, when sweet clover was sown in the heaviest quantity, the percentage of this crop was low, and consequently all the yields are lower.

ACTIVE FORAGE CROP PROJECTS

Ag. 1—Indian Corn—Variety tests for ensilage purposes.
Ag. 16—Mangels—Variety tests for yield and purity.
Ag. 17—Mangels—Breeding of pure strains.
Ag. 20—Mangels—Early vs. late seeding for fodder.
Ag. 36—Field Carrots—Variety tests for yield and purity.
Ag. 46—Turnips—Variety tests for yield and purity.
Ag. 51—Swede Turnips—Variety tests for yield and purity.
Ag. 52—Swede Turnips—Breeding of pure strains.
Ag. 53—Swede Turnips—Early vs late seeding.
Ag. 60—Field Roots—Swedes—Distance of thinning.
Ag. 64—Variety Tests—Fleshy annuals—rape, kale, etc.

Ag. 66—Sugar Beets—Variety tests for yield and purity.
Ag. 76—Sunflowers—Variety tests for yield and purity.
Ag. 126—Alfalfa—Variety tests for hardiness, yield and suitability.
Ag. 146—Red Clover—Variety tests for yield and general suitability.
Ag. 161—Sweet Clover—Variety tests.
Ag. 178—Alsike Clover—Variety tests.
Ag. 201—Timothy—Variety tests for yield and purity.
Ag. 231—White Dutch Clover—Variety tests for yield and suitability.
Ag. 246—Variety tests of grain varieties for suitability for annual hay.
Ag. 247—Annual hay crops—Variety tests of legumes for suitability as annual hay.
Ag. 248—Annual hay crops—Variety tests of miscellaneous grasses for suitability as annual hay.
Ag. 249—Annual hay crops—Testing mixtures for annual hay.
Ag. 251—Millets—Variety tests.
Ag. 256—Plant Introduction—Miscellaneous legumes.
Ag. 257—Plant Introductions—Miscellaneous forage crops other than grasses and legumes.
Ag. 264—Hay and pasture mixtures—Grasses and clovers alone and in combination.

POULTRY

Only Barred Plymouth Rocks are kept on this Station. On December 31, 1930, the flock included 118 hens, 131 pullets, 24 cockerels and 8 cocks. Two hundred and forty hens were entered in the laying contest under our supervision.

Experimental work with poultry deals chiefly with the improvement of the laying capacity by pedigree breeding, feeding of layers, incubation and chick rearing. The sole object is to minimize the rearing costs and the cost of production of eggs. Moreover, work is under way with a view to improving the quality of poultry in the district. A certain number of hatching eggs, day-old chicks, cockerels and pullets are sold at reasonable prices every year. However, it is impossible to meet all the demands in this connection.

INCREASING PRODUCTION BY MEANS OF PEDIGREE BREEDING

For the purpose of this experiment, all hens are trap-nested, and only the best layers are used for breeding purposes. They are mated with males issued from several generations of females with a good laying record. To give an illustration of the good results secured with this system, the production of the fifteen best pullets for each year since 1923 is 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
1930	15	3,946	263·0

The preceding table shows clearly the importance of trap-nesting, culling of poor layers and using only males from good parentage for breeding purposes. As a result of these three practices, the average production of the fifteen best pullets was raised from 123·6 to 263 eggs in 8 years, or an increase of 139·4 eggs per bird.

FEED COST OF EGGS

In order to determine the profits that may be made in poultry keeping with good layers fed in a judicious manner, the number of eggs laid and the feeding costs are recorded for each month of the year. During the last year, these records were kept for ten Barred Plymouth Rock pullets fed a commercial grain mixture and a dry mash made up of one part of bran, one part of shorts, one part of cornmeal, 15 per cent tankage, 5 per cent bone meal, and 1 per cent salt. They also received gravel, oyster shell, charcoal, cod liver oil and greens. The results are as follows:—

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	10	42	2 04	59	1 93	−0 11
December	10	119	1 79	18	5 45	3 66
January	10	140	1 64	14	6 44	4 80
February	10	163	2 07	15	6 53	4 46
March	10	263	2 40	11	7 67	5 27
April	10	240	2 17	11	7 00	4 83
May	10	230	2 22	12	6 72	4 50
June	10	231	1 75	09	6 72	4 97
July	10	193	1 84	11	5 64	3 80
August	10	193	1 48	09	5 64	4 16
September	10	98	1 56	19	4 51	2 95
October	10	74	1 97	32	3 72	4 70
Total for the year	10	1,986	22 93	18	67 97	45 04

It is seen by the above table that this group of pullets left a profit of $45 over the cost of feed. The value of eggs was $6.79 per bird with an average production of 199 eggs, and the cost of feed $2.29, leaving a profit of $4.50 per bird. It must be borne in mind, however, that high profits in poultry-keeping are in close relation to winter production, when eggs are sold at their maximum prices. Thus, it is necessary to have early pullets that will be in proper condition to give a good production as early as the month of November, and to give them special feeds and care during the whole wintering period.

NUMBER OF EGGS REQUIRED TO COVER THE COST OF FEED

Taking as a basis the figures given in the above table, and assuming that the average selling price of eggs during the year was 40 cents per dozen, it is seen that the number of eggs required to cover the cost of feed for one hen during the year is 68. This gives an idea of the number of eggs that a hen must lay to leave a profit after deducting all other costs such as manual labour, use of buildings, investment, etc.

PULLETS VS. HENS FOR EGG PRODUCTION

An experiment has been under way for four years in order to ascertain and compare the value of pullets and yearling hens for egg production. A summary of the results is given in the following table:—

PULLETS VS. HENS FOR EGG PRODUCTION

Lot	Number of birds	Production per bird
		eggs
Hens	44	142
Pullets	44	215

As shown in the above table, pullets produced 73 eggs more than the hens, which shows clearly that old hens are not sufficiently good layers to be kept for the production of eggs. On the other hand, it is advisable to select and keep a number of yearling hens or even older birds with a good egg record, for breeding purposes, as in this respect they usually give better results than pullets.

INCUBATION

The incubation results for 1930 were only fairly satisfactory. Out of a total of 7,656 eggs incubated, the per cent of fertility was 70·5 per cent, the per cent of hatching 33 per cent and the per cent of chicks alive at three weeks 88·4 per cent. Three makes of incubators are used at this Station, as follows: a Jamesway incubator with 1,440-egg capacity, a Buckeye with 600-egg capacity, and a Miller Ideal with 300-egg capacity. Good results are secured with the three machines when they are properly operated.

BEST INCUBATION DATE

Incubation lasts from March to May on this Station, and in order to determine in which month best results are secured, the egg fertility, per cent of hatching and per cent of mortality of chicks up to three weeks of age are recorded. The results of this experiment for two years are given in the following table:—

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	1,047	758	72·3	460	60·7	1·6	90·7
April	2,775	2,001	72·0	1,045	52·2	1·9	88·5
May	1,386	1,116	80·4	492	44·0	2·2	89·1

It will be noted in the above table that the percentage of fertility was highest with the eggs incubated in May, 80 per cent compared with 72 per cent for eggs incubated in March and April. On the other hand, the percentage of eggs hatched was much higher in March than in April or May. Mortality up to the age of three weeks was practically the same for the three months. On the whole, it may be stated that the best incubation results were secured in March.

PULLETS' EGGS VS. HENS' EGGS FOR INCUBATION

An experiment is being conducted with a view to comparing the value of pullets' and hens' eggs for incubation. This year it included 764 eggs of old hens and 6,892 eggs of pullets. The results noted at candling time, at hatching time and three weeks after hatching, for each group, are as follows:—

PULLETS' EGGS VS. HENS' EGGS FOR INCUBATION

—	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
Hens	764	623	81·5	352	56·5	1·7	93·9
Pullets	6,892	4,872	70·6	2,175	44·6	2·2	85·2

As shown in the above table, hens' eggs gave better results in all respects. Therefore, poultry-keepers would be well advised to keep a few old hens with a good egg-record for hatching purposes.

BEST HATCHING DATE FOR EGG PRODUCTION

An experiment has been under way for two years to ascertain if early-hatched pullets will give more eggs than late-hatched ones. The egg production of two equal lots of pullets, one hatched in April and the other in May, was compared in order to obtain this information. The April-hatched pullets gave 27 eggs more per bird than the May-hatched ones; this is a strong argument in connection with the previous experiment relative to the best incubation date.

SOURCES OF ANIMAL PROTEIN

The object of this experiment is to find the best means of supplying animal protein to poultry. A comparison is made of skim-milk, horse meat, beef scrap, given in addition to the regular ration. The results obtained over a seven-year period are given in the following table:—

SOURCES OF ANIMAL PROTEIN

Seven-year average		Lot receiving skim-milk	Lot receiving horse meat	Lot receiving beef scrap
Birds in lot	No.	12	12	12
Eggs laid	No.	905	898	839
Cost of feed	$	14 72	14 11	13 83
Value of eggs	$	34 47	33 48	31 33
Cost per dozen	$	0·195	0·189	0·197
Profit over cost of feed	$	19 75	19 37	17 50

It is shown by the above table that animal protein may be given under three different forms with profit. Over a seven-year period, skim-milk and horse meat have given practically equal results, and they have proven superior to beef-scraps. In 1930, the lot receiving skim-milk laid 1,122 eggs; the lot receiving horse meat 1,238; the lot receiving beef scraps 1,023.

ROOTS VS. CLOVER VS. SPROUTED OATS VS. EPSOM SALTS

An experiment has been under way for the last six years to compare the value of roots, clover and sprouted oats as greens for poultry, and to ascertain if Epsom salts can be used as a substitute for greens.

Four equal groups of pullets were fed in the same manner, except that one group received beets, another received clover, a third received sprouted oats and the fourth group received Epsom salts at the rate of $1\frac{1}{4}$ ounce per day for 12 birds. The results are as follows:—

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.	960	1,004	958	919
Cost of vegetable feed	$	0 87	0 31	0 65	1 73
Total cost of feed	$	13 48	13 00	13 71	14 34
Value of eggs	$	36 11	36 91	35 25	33 67
Cost per dozen	cts.	17	15·8	17·3	18·7
Profit over feed cost	$	22 63	23 91	21 53	19 33

The above table shows that the lot receiving clover gave the best results. Epsom salts gave as good results as beets and better results than sprouted oats. The lot receiving clover laid 1,004 eggs compared with 960 for the lot receiving beets, 958 for the lot receiving sprouted oats and 919 for the lot receiving Epsom salts.

BARLEY VS. CORN

The object of this experiment is to ascertain if barley may profitably take the place of corn in the meal ration of layers. Two lots of pullets were fed in the same manner, with this exception that one lot received a meal mixture containing corn and the other a meal mixture containing barley. The results obtained are as follows:—

BARLEY VS. CORN

—		Lot receiving corn		Lot receiving barley	
		1930	5-year average	1930	5-year average
Number of birds in lot	No.	10	10	10	10
Cost of feed	$	12 20	12 58	9 70	10 63
Eggs laid	No.	960	817	1,030	780
Value of eggs laid	$	34 90	30 23	38 10	29 10
Cost per dozen	$	15·3	18·5	11·3	16·3
Profit over cost of feed	$	22 70	17 65	28 40	18 47

Over a five-year period, the barley-fed lot produced 37 eggs more per bird than the corn-fed lot. This result shows that barley may profitably replace corn in the meal mixture for poultry, and that it is more economical generally as it may be produced on the farm.

WATER VS. SNOW

In order to determine if snow may replace water as a drink for poultry, two equal lots of pullets were fed similarly, with the exception that one lot received snow and the other water.

The results obtained are as follows:—

WATER VS. SNOW

		Lot receiving water		Lot receiving snow	
		1930	4-year average	1930	4-year average
Number of birds in lot	No.	10	10	10	10
Total cost of feed	$	12 20	11 60	11 90	11 40
Eggs laid	No.	960	904	930	806
Value of eggs	$	34 90	32 76	34 10	29 10
Cost per dozen	ct.	15	15·3	15·3	16·9
Profit over cost of feed	$	22 70	21 16	22 20	17 70

Over a four-year period, the ten birds receiving water laid 98 eggs more than those receiving snow, and the surplus profit more than compensated for the greater amount of work required.

QUEBEC-EAST EGG-LAYING CONTEST

The eighth egg-laying contest conducted at this station ended on October 23, 1930. Nineteen pens were entered, including 12 of Barred Plymouth Rocks, 6 of White Leghorns and 1 of Rhode Island Reds.

The total number of eggs laid by the 190 birds entered during the 51 weeks was 31,645, an average production of 166 eggs per bird. Forty-six birds were registered, and 57 laid more than 200 eggs.

The best layer in the contest was the property of Mr. C. D. Calder, of Cowansville Co., Missisquoi, Que., which laid 251 eggs from the 1st of November to the 23rd of October, and obtained a rating of 286·1 points. The best pen, which belonged to the Ste. Anne Experimental Station, laid 2,141 eggs and obtained 2103·9 points, an average of 214 eggs and 210 points per bird. The Barred Plymouth Rock pens gave a much higher production than the White Leghorn or Rhode Island Red pens.

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
1929–30	190	31,645	166·0

LIST OF PROJECTS UNDER WAY—POULTRY KEEPING

P. 1—Best make of incubator.
P. 3—Best incubation date.
P. 15—Cost of incubation.
P. 22—Brooding costs.
P. 28—Rate of growth in rearing.
P. 29—Separation of sexes in rearing.
P. 42—Cost and increase in weight in fattening roasters.
P. 47—Milk substitutes for fattening purposes.

P. 48—Best date to sell surplus stock.
P. 56—Pedigree breeding for egg production.
P. 58—Best hatching date for egg production.
P. 60—Pullets vs. hens for egg production.
P. 62—Cost of producing eggs.
P. 64—Quebec East egg-laying contest.
P. 74—Temperature of hen-houses of different sizes.
P. 78—Corn vs. barley.
P. 83—Skim-milk vs. beef scrap vs. meat scrap.
P. 88—Influence of different animal feeds on fertility of eggs.
P. 93—Roots vs. clover.
P. 94—Roots vs. clover vs. sprouted oats.
P. 95—Roots vs. clover vs. sprouted oats vs. Epsom salts.
P. 106—Snow vs. water as drinking supply.
P. 111 and 111a—Breeding for fertility of eggs and strong chicks.
P. 113—Relation between winter laying and fertility of eggs.
P. 114—Breeding for size of eggs.
P. 134—Intestinal parasites of fowls.
P. 150—Egg preservatives.
P. 154—Time required for trap-nesting.
P. 157—Improvement of poultry in the district.
P. 159—Influence of various greens on the fertility of eggs.
P. 163—Relation between the annual production and the date first egg is laid.

BEEKEEPING

THE SEASON

The year 1930 was favourable to the production of clover, the sole source of honey in this district. Likewise, the winter of 1929-30 was favourable to the wintering of bees; out of a total of 102 colonies wintered, only six were lost during the winter. Spring favoured the development of brood. In May the bees had 22 days of flight. The first dandelion flowers appeared on May 22. The crop of pollen was fairly good, and fruit trees began to bloom on May 24.

The number of hours of sunshine, the precipitation and the yield given by the colony on scales are as follows:—

Month	Hours of sunshine	Rain	Colony on scales	
		in.	lb.	oz.
May	196·15	2·94	Decrease.... 13	8
June	134·15	3·68	Increase.... 7	12
July	257·30	5·78	Increase.... 205	14
August	194·50	4·88	Increase.... 33	8
September	88·30	4·32	Decrease.... 10	8

On the first of June, after the weak or queenless colonies had been united, three colonies sold and two packages of bees purchased, there were 77 colonies, 74 of which were on the station and three at the out-apiary.

There was an abundance of clover, which is our only source of honey, during the first blooming period, from July 1 to 17, but the weather conditions were unfavourable to nectar production. From July 18 to 30, the temperature was very favourable and the production of nectar was plentiful. After this date, on account of the heavy rains, the crop was very light. Swarming lasted from June 15 to August 15.

The total honey crop produced by the station's apiary was 7,267 pounds and 8 ounces, an average of 98·3 pounds per colony. The highest producing colony gave 303 pounds. The honey crop from the out-apiary amounted to 160 pounds, an average of 53·5 pounds per colony.

During August and September the bees gathered sufficient honey to feed themselves.

Several neighbouring apiaries were visited during the summer. A Beekeepers' Day was held at the station on July 17 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 queen cells, the queen was taken from the hive and all queen cells were destroyed. Nine days later the queen cells were again destroyed. Of the seven colonies thus treated, three received a young fertilized queen after the second destruction; in the four others, a queen cell was left at the second destruction.

One of these seven colonies swarmed after having been treated. These seven colonies averaged 105·9 pounds per colony. A new colony was formed by using one of the queens removed and two frames of brood.

CONTROL OF SWARMING BY SEPARATING THE QUEEN FROM THE BROOD

At the first appearance of larvae in the queen 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 queen cells were destroyed.

The five colonies thus treated gave an average of 160·3 pounds per colony. One colony swarmed seven days after the second inspection; the swarm was returned to the colony which then assumed its normal condition.

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

At the beginning of the main clover honey flow, a very strong colony was treated as follows:—

The hive was removed from its stand; 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 queen 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; on the third day, the hive was placed in the same position as that occupied by the swarm, the two entrances being adjacent. Five days later, when all the bees were out gathering nectar, the original hive was removed to another place in the apiary.

The new swarm gave 20 sections No. 1, 4 sections No. 2, 14 sections No. 3, and in addition 8 pounds of extracted honey. The parent colony yielded 39 pounds of extracted honey. This low yield is due to the fact that after the colony was treated on June 30 and until July 17, the crop was very poor on account of the adverse weather conditions.

METHOD FOR DETECTING 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 queen cells were found, the super was put back into place and the brood chamber was not inspected. On the other hand, if queen cells were found to be present, the brood chamber was inspected and swarm control practised.

All ten colonies made preparations for swarming and all contained queen cells in the half-super and in the brood chamber.

Year	Number of colonies	Number of colonies having queen cells in the super and in the hive	Number of colonies having queen cells in the super only	Number of colonies having no queen cells in the super that did not swarm
1926	10	6	.....	4
1927	10	10	.....	.....
1928	10	8	2	.....
1929	10	8	2	.....
1930	10	10	.....	.....

It is seen by the above table that all the colonies that had made preparations for swarming had queen cells in the half-super. Thus, by following this system it is easy to detect swarming preparations and to inspect a large number of colonies in a short time.

WINTERING IN CELLAR

In the fall of 1929, 79 colonies were placed in the cellar on November 16 and taken out on April 25 of the following year.

November and December were very favourable to bees. It was possible to maintain the temperature of the cellar between 44 and 48 degrees. January and February were fairly favourable to bees also, but there were frequent variations in the temperature of 45 to 50 degrees. March and April were very unfavourable, and the temperature of the cellar varied from 42 to 55 degrees, causing the largest losses of bees. The average quantity of food consumed per hive was 18·3 pounds. Five colonies died in the cellar and ten suffered from dysentery.

Two colonies were placed on scales every week; the weight and the temperature were recorded. The average temperature recorded during the winter was 48 degrees, and, notwithstanding the fact that a few colonies were weak when taken out, wintering was satisfactory.

The results of eight years of cellar wintering are as follows:—

WINTERING IN CELLAR

Year	Number of colonies			Per cent. losses	Average honey quantity consumed	Date		Wintering period	Temperature		
	Placed in cellar	Lost	Suffering from dysentery			Placed in cellar, November	Taken out, April		Maximum	Minimum	Average
					lb. oz.			days	° F.	° F.	° F.
1922-23	38	2	3	5·2	12 6	3	27	175	52	48	49
1923-24	38	1	1	2·6	9 8	8	28	175	54	42	48
1924-25	52	1	2	1·9	11 6	8	24	167	56	45	50
1925-26	68	.....	6	.....	15 0	10	30	172	55	45	50
1926-27	69	4	.....	5·7	12 0	12	18	157	56	46	50
1927-28	68	1	2	1·3	14 0	19	28	161	54	42	46
1928-29	73	2	6	2·7	18 2	6	24	168	54	44	49
1929-30	79	5	10	6·3	18 3	16	25	160	55	42	48
Total	485	17	30	.....	.....	.....	.....	.....	.....	.....	.....
8-year average	.....	.....	6·2	3·5	13·6	.....	.....	167	.....	.....	.....

WINTERING IN FOUR-COLONY CASES

Eight colonies were placed in two four-colony cases on September 30. Three of these were wintered with a half-super in addition to the brood chamber. In each wintering case, two hives had their entrances facing north and the other two facing southwest; they were placed side by side. Mill shavings were used for insulating purposes, four inches thick on the bottom and around the hives, and ten inches on top. Two openings one inch in diameter, one on each side and opposite each other, were made in order to ensure proper ventilation over the shavings. An entrance 1 inch by $1\frac{1}{2}$ inches was left. The hives were taken out on June 10.

Of the eight colonies thus wintered, one died in March, one was robbed in the spring and one weak colony was united. The five other colonies gave an average production of 128·1 pounds of honey.

WINTERING IN THREE-COLONY CASES

Nine colonies were wintered in three cases containing three colonies each. The hives were placed side by side with entrances facing south; mill shavings were used for insulating purposes as follows: five inches on the bottom, three inches and a half around the sides and eight inches on top.

Six colonies were wintered on the station, of which four were 10-frame Langstroth and two 10-frame Jumbo. The average production of the six colonies was 103·8 pounds. The three others were wintered in the out-apiary satisfactorily. They gave an average yield of 53·5 pounds of honey per colony.

WINTERING IN TWO-COLONY CASES

Four colonies were put in two-colony cases on October 1; a half-super was added to the brood chamber of two of these colonies. One of these colonies was weak in the spring. Six inches of shavings were placed on the bottom and around the hives, and eight inches on top. Entrances faced south. The three remaining colonies gave an average of 61·5 pounds of honey per colony.

WINTERING IN SINGLE-COLONY CASES

Two colonies of Caucasian bees were placed in single-colony cases on October 2, with entrances facing south. Mill shavings were used for insulating purposes, six inches thick on the bottom and around the sides, and 10 inches on top. These hives had a half-super in addition to the brood chamber; one was weak in the spring and yielded only 28 pounds of honey; the other colony yielded 190 pounds of honey.

TWO-QUEEN SYSTEM

Three hives with a brood chamber divided into two equal sections were wintered; a partition placed in the centre of the chamber completely isolated the two groups of bees. Each group had a young queen.

These colonies wintered satisfactorily; the six young queens were alive in the spring. Two of these were introduced into queenless colonies and four colonies were formed with the others. These four colonies gave an average yield of 30·8 pounds of honey.

COMPARISON OF HIVES OF DIFFERENT SIZES

Four 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	Average quantity of honey consumed during the winter		Percentage of swarming	Average production per hive	
		lb.	oz.	%	lb.	oz.
2	Langstroth 10 frames	18	8	50	159	8
2	Langstroth 12 frames	22	0	50	135	8
2	Jumbo 10 frames	16	0	100	120	0
2	Dadant 11 frames			100	63	8

NOTE.—The Dadant hives did not winter; they were stocked in the spring.

PACKAGES OF BEES

Two three-pound packages of bees were received in good condition on May 3, and they were introduced in 10-frame Langstroth hives on the same day. Two combs of honey and three drawn combs were placed 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 entrance of the hive was 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.

These packages gave good results; one made a good development and produced 143 pounds of honey. In the other, after the queen had laid two frames of brood, the bees began to form queen cells that were destroyed. Eight days later, several queen cells were again destroyed and the queen was replaced as she had practically stopped laying. However, this package of bees gave 70 pounds of honey. These two colonies did not produce any swarm.

STUDY OF THE HONEY FLOW

The two colonies placed on scales were used in this experiment which lasted from July 15 to July 30. Their weight was carefully noted every hour from 7 a.m. until 7 p.m. The temperature was also recorded.

OBSERVATIONS ON THE HONEY FLOW

Date	Hive No. 21, increase	Hive No. 94, increase	Hours of sunshine	Inches of rain	Temperature		Direction of wind	Strength of wind
					Maximum	Minimum		
	lb. oz.	lb. oz.	hrs. min.	in.	°F.	°F.		
July 15.....	4 0	5 0	13 40	.....	72	54	N.W.	Breeze
" 16.....	2 8	4 0	10 10	.....	76	63	S.W.	Strong wind
" 17.....	9 8	14 0	6 10	0·24	76	64	S.W.	Strong breeze
" 18.....	0 8	1 0	.....	0·26	75	62	S.W.	Breeze
" 19.....	7 0	8 8	8 0	0·52	80	68	N.E.	Breeze
" 20.....	9 0	14 0	13 20	.....	78	62	West	Strong breeze
" 21.....	6 0	13 0	3 15	0·20	82	66	S.W.	Breeze
" 22.....	10 8	12 8	13 0	.....	74	66	West	Breeze
" 23.....	9 0	13 8	12 10	.....	72	67	S.W.	Breeze
" 24.....	4 8	14 0	7 55	.....	80	67	SW.	Strong wind
" 25.....	11 0	17 0	13 10	.....	80	64	N.E.	Breeze
" 26.....	11 0	19 8	8 10	.....	80	70	S.W.	Breeze
" 27.....	8 0	14 0	9 55	.....	82	70	West	Breeze
" 28.....	9 8	17 0	8 45	1·60	86	77	S.W.	Breeze
" 29.....	4 0	4 0	8 05	.....	82	70	S.W.	Strong breeze

The observations that were made show, generally speaking, that there is a loss in weight up to 9 or 10 a.m., followed by a slight increase until one p.m., and the heaviest increase takes place between 2 and 6 p.m.

WINTERING IN CELLAR VS. 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 seventeen colonies in the wintering-case group, and fourteen in the cellar-wintered group. Two of the former died during the winter and one was united. Three of the latter died during the winter from dysentery, two were robbed in the spring, and one was united.

The average production per colony was 103·15 pounds of honey for the wintering-case group, and 102·14 pounds for the cellar-wintered group. There were six swarms in the former group and three in the latter.

HOW TO PREVENT SWARMING BY GIVING MORE SPACE

Five colonies were treated in the following manner in this experiment: four colonies in 10-frame Langstroth hives were given another hive body as an additional brood chamber; another colony in a 10-frame Jumbo hive was given a half-super in addition to the brood chamber. None of the five colonies thus treated made any preparations for swarming, and an average yield of 188·6 pounds of honey was obtained.

SPRING PROTECTION OF BROOD CHAMBER

Fourteen colonies were divided in two equal groups of seven colonies each. The first group was protected by means of an outside case from the time it was taken out of the cellar until June 2; no protection whatsoever was given to the other group.

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

	Unprotected group		Protected group	
	May 7	June 2	May 7	June 2
Number of frames of bees	6·7	8·1	7·0	9·0
Number of frames of brood	2·1	5·4	2·2	6·1

As seen by the above table, there was not much difference in the development of the colonies; this is due to the fact that the apiary is facing south and is very well protected against the wind.

The average production for the unprotected group was 104·11 pounds of honey per colony, and for the protected group, 129·15 pounds.

QUEEN REARING

During the season, twenty queens were reared from our best producers, by natural grafting of queen cells in mating nuclei made up of one frame of brood and bees and one frame of honey. These nuclei were placed in a young orchard about two acres distant from the apiary. Two of these twenty queens were lost during their mating flight. The eighteen remaining queens were introduced in the apiary.

PRODUCTION OF COMB AND EXTRACTED HONEY

Two colonies of equal strength were chosen for this experiment. One was swarmed artificially on June 30 and was given section supers. It produced 20 sections No. 1, 4 No. 2, 14 No. 3 and, in addition, 47 pounds of extracted honey. The other swarmed on June 29 and was given drawn combs; it produced 120 pounds of extracted honey. In both cases, the swarm supplanted the original colony.

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.

During the six years that this experiment has been under way, it has been demonstrated that in order to obtain a honey crop of 120 pounds or over, it is necessary that a colony should have at least 20 frames of bees at the beginning of the honey flow. The colonies having but 10 frames of bees have produced only 50 pounds per year. Therefore, the beekeeper who wants to get a good revenue out of his apiary should stimulate the development of his colonies in May and June in order that they reach their maximum strength at the beginning of the honey flow, thus lowering the cost of production.

WINTERING BEES IN DOUBLE HIVES

Eighteen colonies were placed in winter quarters in the fall of 1929, nine in the cellar and nine in wintering-cases. Three of the nine cellar-wintered colonies had a double brood chamber, and the five others had a half-super in addition to the brood chamber. One of these nine colonies died during the winter, five were weak in the spring and were united, and produced an average of 139 pounds of honey. The average quantity of food consumed by the nine colonies was 28·1 pounds.

Of the nine colonies wintered in wintering-cases and which had a half-super in addition to the brood chamber, one died during the winter, three were weak and were united in the spring. The seven remaining colonies produced an average of 102·4 pounds of honey per colony.

Since this experiment was started, it has been noted that the cellar-wintered colonies, equipped with a half-super, consumed much more food than the others and were much weaker in the spring. The colonies which had an additional hive

body were in much better condition. The colonies wintered in winter-cases are always weaker than the others. In the colonies equipped with a half-super, it was also noted in the spring that the queen started laying in the half-super and it was some time before it started laying in the hive body, which delayed the development of these colonies.

OUT-APIARY

The out-apiary is located approximately four miles from the station; it includes three colonies which were wintered in wintering-cases. The three colonies swarmed at the beginning of July. The crop amounted to 160 pounds of honey, an average of 53·5 pounds per colony. In the fall, five colonies were available for wintering purposes; three were placed in wintering-cases to be wintered in the out-apiary, and the three others were brought to the station to be wintered in the cellar.

PRODUCTION IN THE OUT-APIARY

Year	Average production per colony	
	lb.	oz.
1926	54	8
1927	33	9
1928	52	10
1929	36	7
1930	53	5
5-year average	46	1

This low yield is due to the fact that the district is not suitable for the production of honey, on account of the small acreage of clover available. However, there are blueberries, raspberries and golden rods, but these are not in sufficient quantity to ensure a surplus of honey. On the other hand, the colonies make a rapid development in the spring.

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.
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

The experiments undertaken in 1923 and 1925 to stimulate the production of fibre flax were continued during the season of 1930. Seeding was done fairly early, and the ground was in very good condition. Germination was very good and rapid, and growth was luxuriant. Unfortunately, the frequent showers weakened the flax straw to such an extent that a general lodging resulted, causing losses in every field. The yields obtained were therefore much lower than in previous years.

During the winter of 1929-30, 44,290 pounds of flax straw were broken and scutched at the station for farmers of the locality, giving an average yield of 12·9 per cent of fibre. During the winter and spring, 535 pounds of good seed of the J.W.S. variety were distributed to farmers through the Women's Clubs, and 625 pounds of fibre were marketed.

FLAX—VARIETY TEST

Seven varieties were sown on May 9 in triplicate 1/120 acre plots. A few days prior to cutting, a strip one foot wide was pulled around the plots to remove the border plants which are always more or less affected by the paths, and which would influence the yields. The average results obtained during the last five years are as follows:—

FLAX—RESULTS OF TEST OF VARIETIES

—	Five-year average					Yield per acre in 1930	
	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	2,416	693	357	308	292	260
Saginaw	98	2,622	741	384	306	332	280
Longstem	98	2,484	816	384	322	290	345
Dutch Blue Blossom	93	2,371	807	282	313	287	330
829 C	93	2,430	775	304	297	365	280
J. W. Stewart	94	2,863	588	381	332	287	520
Pure Line No. 6	92	2,490	724	354	328	283	360

DEDUCTIONS.—Long Stem and Saginaw are the two latest varieties but to date they have given the highest yield of fibre. Furthermore, Long Stem heads the list of varieties for the quantity of seed per acre.

J. W. Stewart variety, recently introduced in Canada and more recently still in this district, did not fulfill the expectations of producers. However, the low yield given by this variety this year is probably due to the fact that as its stems are much longer than those of other varieties, it lodged to a much greater extent, which in turn resulted in a low fibre yield. As the yields obtained in previous years were much higher, it follows that the average yield to date is practically equal to that of the other good varieties.

METHODS OF SEEDING FLAX

Two methods of seeding are compared in this experiment: seeding in rows by hand, and broadcast.

RESULTS FROM DIFFERENT METHODS OF SEEDING FLAX

—	Five-year average					Yield per acre in 1930	
	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	2,038	666	292	271	241	240
Riga Blue broadcast	88	2,223	713	399	259	290	240

The results obtained this year, as well as the average results over a five-year period, are clearly in favour of the broadcast method. With this method, the yield of fibre was greater, that of tow smaller, and that of straw and seed per acre higher also. Another advantage which does not appear in the table and deserves to be reported is that the stems of broadcast-sown flax are much stronger. This fact was especially marked this fall; at pulling time, approximately one-third of this plot was affected by lodging, while the whole plot seeded in rows had lodged.

FLAX—SEEDING AT DIFFERENT DATES

For the purpose of this experiment, the first sowing is done as early as possible, and the others at one-week intervals. The results obtained over a five-year period are as follows:—

FLAX—RESULTS OF SEEDING AT DIFFERENT DATES

—	Five-year average					Yield per acre in 1930	
	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 9	88	2,277	743	326	302	287	330
Riga Blue, 2nd seeding, May 17	88	2,165	681	335	245	305	260
Riga blue, 3rd seeding, May 23	93	2,266	714	340	260	290	274
Riga Blue, 4th seeding, May 30	97	2,310	658	311	261	188	203

As shown by the above table, the sowings gave practically equal yields of fibre and straw, but the last sowing yielded less seed. As temperature is an important factor in this type of experiments, definite conclusions as to the advantage of a particular date for sowing cannot be drawn until results of a larger number of tests are available. However, as stated in last year's report, it may be said that the last seeding ripens very late in the fall, and retting cannot always be done the same year, which is a serious handicap.

FLAX—RATE OF SEEDING

Three different quantities of seed are being compared in this experiment as follows: 84 pounds, 98 pounds and 112 pounds per acre. The rate of seeding in this district is generally 84 pounds per acre.

FLAX—RESULTS FROM DIFFERENT RATES OF SEEDING

——	Five-year average					Yield per acre in 1930	
	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.	83	2,300	756	337	262	230	220
Riga Blue, 98 pounds per acre.	83	2,274	710	342	293	308	220
Riga Blue, 112 pounds per acre	83	2,230	709	358	278	282	280

The results given in the above table are well in accord with the object of the experiment, and are readily interpreted, if the temperature which prevailed during the growing season is considered. Thus, the fibre yield increases gradually with the higher rate of seeding, while the yield of seed decreases. The plots seeded at the rate of 84 pounds yielded 756 pounds of seed and 337 pounds of fibre; those seeded at the rate of 98 pounds yielded 710 pounds of seed and 342 pounds of fibre, and those seeded at the rate of 112 pounds yielded 709 pounds of seed and 358 pounds of fibre. When the yields of the current season are considered, it is seen that the plots seeded at the rate of 112 pounds produced the smallest flax yield. Temperature has a great deal of influence on the performance of this crop in this district; with the greater rate of seeding, it necessarily follows that the number of stems is also greater, but the stems are weaker and the percentage of lodging is greater also. The flax lying on the ground deteriorates and the yield of fibre is lighter.

FLAX—CHEMICAL FERTILIZER TEST

The following chemical fertilizers are being compared: nitrate of soda at the rate of 100, 200, 300 and 400 pounds per acre; phosphoric acid at the rate of 500 pounds per acre, and muriate of potash, at the rate of 100 pounds per acre. Furthermore, a series of three plots receive 200 pounds of nitrate of soda and 500 pounds of phosphoric acid per acre. Another series receives the same fertilizers supplemented by 100 pounds of muriate of potash.

FLAX—RESULTS OF CHEMICAL FERTILIZER TEST

—	Five-year average					Yield per acre in 1930	
	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.
Check	77	2,503	727	294	494	291	300
Nitrate of soda (100 pounds)	80	2,292	729	280	340	265	280
Nitrate of soda (200 pounds)	80	2,252	710	252	332	182	260
Check	80	2,224	717	258	325	330	280
Nitrate of soda (300 pounds)	81	2,173	725	240	365	407	477
Nitrate of soda (400 pounds)	81	2,130	715	175	340	97	280
Check	80	2,344	754	317	325	322	260
Phosphoric acid (500 pounds)	79	2,373	759	298	318	312	260
Muriate of potash (100 pounds)	79	2,413	806	311	326	295	260
Check	79	2,344	770	298	346	322	260
Nitrate of soda (200 pounds) Phosphoric acid (500 pounds)	80	2,409	739	269	360	210	320
Nitrate of soda (200 pounds) Phosphoric acid (500 pounds) Muriate of potash (100 pounds)	86	2,296	763	254	334	223	280
Check	86	2,469	787	267	368	315	300

As in the case of the dates of seeding experiment, the yields may be so readily influenced by weather conditions that no definite conclusions will be drawn until further results are available.

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 FARM MANURE

This experiment with chemical fertilizers is carried on at this station since 1924 on rather compact but fertile clay land. The rotation as well as the different treatments applied are as follows:—

Four-year rotation: 1st year, swedes; 2nd year, barley; 3rd year, clover; 4th year, timothy.

The land is ploughed in the fall and fertilizers are applied in the spring on ploughed land for swedes. The 1931 swede crop will complete the second cycle of the rotation.

The results to date are as follows:—

EXPERIMENTS WITH CHEMICAL FERTILIZERS, LIME, GROUND LIMESTONE AND MANURE

No. of plot	Fertilizer applied per acre	Yield per acre									
		Swedes				Barley				Clover hay				Timothy hay			
		1930		Seven year average		1930		Six year average		1930		Five year average		1930		Four year average	
		tons	lb.	tons	lb.	bush.	lb.	bush.	lb.	tons	lb.	tons	lb.	tons	lb.	tons	lb.
1	Ground limestone—4,000 lbs.	21	1,326	18	866	47	24	49	28	3	640	2	986	2	1,720	2	1,110
2	Quicklime—2,240 lbs.	21	1,326	17	1,171	42	44	39	39	3	340	2	824	2	1,820	2	725
3	Basic Slag (16% P O) — 750 lbs.	20	1,760	17	1,773	40	20	40	18	3	460	2	1,348	3	20	2	917
4	Check	22	22	18	1,828	43	36	43	40	3	600	2	1,094	3	1,320	2	580
5	Superphosphate—750 lbs.	23	1,676	20	1,969	40	20	43	19	3	1,400	2	1,306	2	1,680	2	1,240
6	Manure—20 tons.	26	1,070	23	1,324	50	20	47	0	3	1,560	2	1,450	3	60	2	1,690
7	Manure—20 tons. Ground limestone—4,000 tons.	28	1,246	24	1,803	51	12	47	17	3	1,800	2	1,618	3	100	2	1,560
8 9	Manure—10 tons. Nitrate of Soda—100 lbs. Sulphate of Ammonia-75 lbs Superphosphate—400 lbs. Muriate of Potash—100 lbs.	25	1,678	22	1,976	43	36	39	3	3	520	2	1,216	2	1,920	2	1,090
9	Nitrate of Soda—100 lbs. Sulphate of Ammonia-75 lbs Superphosphate—400 lbs. Muriate of Potash—100 lbs.	24	720	22	290	40	0	39	0	2	400	2	1,200	2	1,940	2	1,152
10	Nitrate of Soda—100 lbs. Sulphate of Ammonia-75 lbs Superphosphate—400 lbs.	22	1,066	19	1,909	38	16	37	9	3	700	2	1,006	3	60	2	106
11	Check	19	106	15	1,743	37	4	38	8	3	620	2	718	2	1,860	2	345
12	Nitrate of Soda—100 lbs. Sulphate of Ammonia-75 lbs Muriate of Potash—100 lbs.	20	890	18	440	39	8	41	17	3	1,840	2	1,110	2	1,860	2	1,090
13	Superphosphate—400 lbs. Muriate of potash—100 lbs	24	1,764	20	862	42	24	42	12	4	0	2	1,616	3	240	2	1,370

The following deductions may be drawn from the above table:—

1. The applications of farm manure increased the yields of all the crops in the rotation to a greater extent than any of the other treatments given in the experiment.

2. The application of the complete chemical fertilizer mentioned in the table also increased the yields of all crops, but to a lesser extent than was the case where manure was applied.

3. The effect of the fertilizers in this experiment is most marked in the case of swedes and barley. It might be expected, however, that these two crops would receive more direct benefit than the hay crops which are three and four years removed from the year of application of the fertilizers.

ILLUSTRATION STATIONS

During the year a number of Illustration Stations were under the supervision of an inspector located on this Station, in co-operation with the officers of the Division of Illustration Stations, Central Experimental Farm, Ottawa, and the Superintendent of this Station.

The eastern edition of the report of the Division of Illustration Stations, which contains the results of the work conducted on these stations throughout this district of supervision may be obtained by writing to the Publications Branch, Department of Agriculture, Ottawa. But, in order to stress the importance and the necessity of this work, a few tables extracted from this report are published here.

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.
Murray Bay	11	Gr.	272	6,032	.....	5,133	.....	6,350	.....
St-Pierre I.O	13	Gr.	268	5,055	190	3,052	123	6,242	255
St-Valier	10	Gr.	236	4,002	185	3,940	176	4,206	209
Montmagny	9	Ayr.	288	6,436	.....	4,676	.....	10,273	.....
L'Islet	11	Can.Gr.	256	6,138	268	3,218	149	7,510	326
Ste-Helene	9	C. Gr.	256	4,134	159	2,814	164	5,385	202
Riviere Bleue	9	Ayr.	307	5,633	.....	3,928	.....	6,575	.....
St-Eleuthere	13	Gr.	244	4,016	122	3,365	101	4,070	162
St-Arsene	7	Gr.	273	4,805	188	3,195	119	8,978	350
St-Fabien	17	Gr.	252	4,444	189	3,073	150	5,655	260
Sayabec	8	Gr.	268	3,997	153	2,322	116	5,163	175
Causapscal	11	Ayr.	250	4,995	200	3,304	144	6,408	253
Nouvelle	4	Gr.	209	2,752	111	3,228	106	3,276	133
New Richmond	6	Gr.	243	5,176	181	4,478	154	5,666	203
St. Alphonse de Caplan	8	Gr.	239	5,617	242	5,060	183	5,572	286

NOTE:—Gr.: Grade. Ayr.: Ayrshire. Can. Gr.: Grade French-Canadian.

It will be noted in the above table that the production of some herds is too low. However, if the figures for 1930 are compared with those for previous years, it will be seen that there has been a slight increase from year to year on most of the Illustration Stations.

CROPS—AVERAGE YIELD AND COST OF PRODUCTION, 1929

Crop	Number of stations	Yield per acre	Cost per ton or bushel
			$
Swedes	20	16·0 tons	4 17
Potatoes	12	186·2 bush.	0 38
O.P.V. hay	10	2·60 tons	10 06
Oats	18	39·1 bush.	0 62
Clover hay	17	2·2 tons	8 70
Timothy hay	15	1·87 tons	7 40

COST OF PRODUCTION OF SWEDES ON THE FIVE BEST ILLUSTRATION STATIONS IN 1930

Station	10 tons manure and 200 pounds nitrophoska per acre				10 tons manure per acre, check				10 tons manure and 750 pounds 4-8-4 per acre			
	Yield	Cost per ton	Number of hours		Yield	Cost per ton	Number of hours		Yield	Cost per ton	Number of hours	
			Manual labour	Horse labour			Manual labour	Horse labour			Manual labour	Horse labour
	tons	$			tons	$			tons	$		
Montmagny	29·0	2 17	150	103	18 0	3 07	140	98	26·0	2 59	145	101
New Richmond	29·0	1 72	124	98	15 7	2 73	120	95	29·0	1 92	124	98
Nouvelle	28·0	1 94	124	107	18·0	2 67	120	106	28·0	2 14	124	107
Riviere Blue	27·2	2 30	168	88	22½	2 42	160	80	25·8	2 60	163	84
Causapscal	23·4	2 00	106	110	15·6	2 71	100	107	21·2	2 37	102	108
Average	27·3	2 03	134	101	17·9	2 72	128	98	26·0	2 32	131	100

The average yield of swedes was only 16 tons per acre, and the average cost of production $4.17 per ton. On the other hand, it is possible to produce roots at the approximate price of $2 per ton.

GENERAL NOTES

As in previous years, educational exhibits were presented at several local fairs by the Experimental Station. A group of Percheron horses was exhibited at the Horse Show held at the Agricultural School of Ste. Anne de la Pocatière and met with great success.

During the summer months, eight parties including 1,200 persons from different parts of the province visited the Station to inspect the work being carried on. As in previous years, the Superintendent and his assistants co-operated in the agricultural activities of the district at the local and provincial fairs. Lectures were given at short courses, and a number of articles were prepared for the agricultural page of various newspapers.

From January 1 to December 31, 1930, 7,320 letters were received and 6,621 forwarded. In addition, 1,200 circulars and 4,950 weekly reports of the laying contest were mailed.

OTTAWA: Printed by F. A. ACLAND, Printer to the King's Most Excellent Majesty, 1931