DOMINION OF CANADA

DEPARTMENT OF AGRICULTURE

DOMINION EXPERIMENTAL FARMS

EXPERIMENTAL STATION

LENNOXVILLE, QUE.

REPORT OF THE SUPERINTENDENT

J. A. McCLARY

FOR THE YEAR 1928

Large circular bed of cannas edged with *Perilla nankinensis.*

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THE SEASON

The fall of 1927 was wet and mild. The St. Francis river froze over on January 19, forty-five days later than in the previous year. The weather was milder than usual and the snowfall normal in February and March. The month of April was cloudy and cold, and seven inches of snow fell from April 23 to 25. The ice went out of the river on April 6, causing considerable damage from high water. Due to ice and weather conditions during the winter and spring there was more winter-killing of clover than usual on new seeded land. The spring was unusually late. Harrowing was begun on May 5. The first dates of sowing field crops were: oats, May 8; barley, May 11; O.P.V., May 15; corn, June 4; and potatoes were planted May 10.

Seeding was well started by May 12, but heavy rains after May 19 made the ground difficult to work. The wet weather continued throughout June. Grain seeding was late and on many farms the corn crop was replaced by oats, peas and vetch for ensilage. Wet unsettled weather continued throughout the season with the exception of two weeks in August. Haying was two weeks later than usual and much of it was harvested in poor condition. Grain harvesting commenced August 15, and the crop was fair. The wet weather continued during the fall months, which made it difficult to harvest the root crops. Ploughing was possible until the middle of November. Winter set in November 26, with several inches of frost in the ground and about three inches of snow.

METEOROLOGICAL RECORDS AT LENNOXVILLE, P.Q., 1928

Month	Temperature °F.					Precipitation			Sunshine
	Highest	Date	Lowest	Date	Mean	Rainfall	Snowfall	Total precipitation	
						inches	inches	inches	hours
January	40	1	−30	16	15·04	0·94	29·5	3·89	78·9
February	44	15	−21	3	15·06	0·82	11·0	1·92	115·8
March	63	26	−20	9	23·45	0·90	23·1	3·21	118·7
April	75	6	5	2	36·56	1·85	8·0	2·65	139·8
May	78	10	24	14–15	51·64	4·23	.....	4·23	167·0
June	83	13	36	16	59·73	3·45	.....	3·45	174·5
July	89	9	43	21	67·43	4·30	.....	4·30	247·5
August	88	14-15-16	40	12	68·00	4·72	.....	4·72	179·2
September	80	13	26	24	54·35	4·43	.....	4·43	149·1
October	78	12	15	30	45·75	6·03	0·25	6·055	124·7
November	57	16	4	28–30	31·88	2·96	8·5	3·81	63·4
December	43	17	−6	22	25·03	1·06	12·0	2·26	58·5
Total	.....	.....	.....	.....	.....	35·69	92·35	44·925	1,617·1

RAINFALL, SNOWFALL AND TOTAL PRECIPITATION, TAKEN FROM 1915 TO 1928, ALSO THE ANNUAL AVERAGE AMOUNT THAT HAS FALLEN

Year	Rainfall	Snowfall	Total precipitation
	inch	inch	inch
1915	27·57	48·3	32·40
1916	34·51	72·3	41·74
1917	32·21	77·5	39·96
1918	32·50	73·0	39·80
1919	27·82	78·9	35·71
1920	33·24	93·0	42·54
1921	19·47	66·2	26·09
1922	29·78	65·1	36·29
1923	27·03	97·9	36·82
1924	34·33	80·0	42·33
1925	32·31	98·8	42·19
1926	26·90	111·6	38·06
1927	36·05	70·5	43·10
1928	35·69	92·35	44·925
Total for 14 years	429·41	1,125·45	541·955
Average for 14 years	30·67	80·39	38·71

ANIMAL HUSBANDRY

BEEF CATTLE

WINTER FEEDING OF BEEF CATTLE

Ninety-three steers were purchased in the fall of 1927 for experimental feeding purposes, to consume the hay and ensilage produced on the farm, and to keep up the fertility of the soil. These steers were two-year-old grade Shorthorns. They averaged 847 pounds when weighed November 6, and 1,093 pounds when sold May 26, making an average gain per steer of 246 pounds in 180 days.

The following experiments were conducted in 1928, and the results obtained will be found in this report:—

1. Uniform vs. gradual increased feeding of meal to fatten steers.
2. Comparison of different meal mixtures.
3. Winter feeding of steers in pens vs. tied.

The following table gives the price at which feeds were charged in all the beef cattle experiments:—

Corn	$40 00 per ton
Screenings	40 00 "
Meal mixture	41 00 "
Oil cake	50 00 "
Hay	8 00 "
Ensilage	3 00 "

UNIFORM VS. GRADUALLY INCREASED FEEDING OF MEAL TO FATTEN STEERS

Object of Experiment.—To ascertain which of the two methods of feeding meal to steers is the most practical and profitable.

Plan of Experiment.—Two lots of six steers each were used for this experiment. They were tied in the barn November 6, and sold May 26. The feed used for each lot consisted of 10 pounds of clover and timothy hay and 30 pounds of oats, peas and vetch ensilage per steer per day throughout the feeding period. The meal mixture fed to both lots, from January 1 to April 1, consisted of 50 per cent of ground standard recleaned elevator screenings, and 50 per cent of

ground corn, and the balance of the feeding period the mixture contained 40 per cent of screenings, 40 per cent of ground corn and 20 per cent of oil cake. Lot 1 received 5 pounds of the meal mixture per head per day throughout the feeding period. Lot 2 was started on 3 pounds per head per day, January 1, and increased 1 pound per day the first of each month to the first of May, when they were eating 7 pounds per head per day, and this amount was fed until May 26.

UNIFORM VS. GRADUALLY INCREASED FEEDING OF MEAL TO FATTEN STEERS

		1928		Average for three years	
		Lot 1	Lot 2	Lot 1	Lot 2
—		Meal mixture 5 pounds per day from January 1 to May 26	Meal mixture 3 pounds per day January 1 and increased 1 pound the first of each month to May 26	Meal mixture 5 pounds from January 1 to finish of experiment	Meal mixture 3 pounds per day January 1 and increased 1 pound the first of each month to finish of experiment.
Number of steers in each lot	No.	6	6	6	6
Total initial weight	lb.	5,895	5,124	5,922	5,519
Average initial weight	"	982·5	854	987	919·8
Total finished weight	"	7,275	6,467	7,662	7,192
Average finished weight	"	1,212·5	1,077·8	1,277	1,198·7
Number of days on test	days	180	180	185	185
Total gain per lot	lb.	1,380	1,343	1,740	1,673
Average gain per steer	"	230	223·8	290	278·8
Average daily gain per steer	"	1·28	1·24	1·57	1·51
Total meal consumed	"	4,350	4,290	4,110	3,942
Total hay consumed	"	10,800	10,800	11,100	11,100
Total ensilage consumed	"	32,400	32,400	33,300	33,300
Pounds of meal eaten per pound of gain	"	3·15	3·19	2·36	2·36
Pounds of hay eaten per pound of gain	"	7·83	8·04	6·38	6·63
Pounds of ensilage eaten per pound of gain	"	23·48	24·31	19·14	19·90
Total cost of feed	$	180 98	179 75	171 66	168 65
Cost of feed per head	$	30 16	29 96	28 61	28 11
Cost of feed per head per day	cts.	16·76	16·64	15·46	15·19
Cost of feed per pound of gain	"	13·11	13·38	9·87	10·08

Deductions.—It will be observed from the table that lot 1, fed 5 pounds of meal per head per day from January 1 to May 26, made a daily gain of 1·28 pounds, being a gain of 0·04 of a pound more than lot 2, at a cost of 0·27 of a cent less per pound of gain. An average of the results obtained, for the three years that this experiment has been conducted, shows that slightly larger and cheaper gains were made by the lot consuming a uniform amount of meal throughout the feeding period.

COMPARISON OF DIFFERENT MEAL MIXTURES

Object of Experiment.—To ascertain the value of a mixture of screenings and corn compared with a mixture of screenings and oil cake as a feed for fattening steers, taking into consideration the gain, cost of feed per pound, and the quality of finish.

Plan of Experiment.—Twelve steers were divided into two equal lots and were fed 10 pounds of clover and timothy hay and 30 pounds of oats, peas and vetch ensilage per steer per day during the feeding period. Lot 1 was fed a mixture of 60 per cent of screenings and 40 per cent of corn, and lot 2 a mixture of 60 per cent of screenings and 40 per cent of oil cake. Grain feeding was com-

menced January 1. They were fed 3 pounds of meal per steer per day, and this amount was increased 1 pound per day the first of each month to the first of May, when they were eating 7 pounds per steer per day, and this amount was fed until they were sold on May 26.

COMPARISON OF DIFFERENT MEAL MIXTURES

—		Lot 1 Screenings 60 per cent; Corn 40 per cent	Lot 2 Screenings 60 per cent; Oil cake 40 per cent
Number of steers in each lot	No.	6	6
Total initial weight	lb.	5,076	4,995
Average initial weight	"	846	832·5
Total finished weight	"	6,450	6,348
Average finished weight	"	1,075	1,058
Number of days on test	days	180	180
Total gain per lot	lb.	1,374	1,353
Average gain per steer	"	229	225·5
Average daily gain per steer	"	1·27	1·25
Total meal consumed	"	4,290	4,290
Total hay consumed	"	10,800	10,800
Total ensilage consumed	"	32,400	32,400
Pounds of meal eaten per pound of gain	"	3·12	3·17
Pounds of hay eaten per pound of gain	"	7·86	7·98
Pounds of ensilage eaten per pound of gain	"	23·58	23·95
Total cost of feed	$	177 60	186 18
Cost o 'eed per head	$	29 60	31 03
Cost of feed per head per day	cts.	16·44	17·24
Cost of feed per pound of gain	"	12·93	13·76

Deductions.—Lot 1, fed a mixture of screenings and corn, made a slightly larger daily gain at a cost of 0·83 of a cent per pound of gain less than lot 2, fed a mixture of screenings and oil cake.

WINTER FEEDING OF STEERS IN PENS VS. TIED

Objects of Experiment.—To determine the relative merits of the two methods of housing steers for winter feeding, namely, loose in a large pen or tied in the stable.

Plan of Experiment.—Two uniform lots of ten steers each were compared. Both lots were tied in the barn November 6, and fed 10 pounds of clover and timothy hay and 30 pounds of oats, peas and vetch ensilage per steer per day until May 26, when they were marketed. Commencing January 1, each lot received an average per steer of 3 pounds of meal per day, which was increased 1 pound per day the first of each month until May 1, when they were eating 7 pounds per head per day, and this amount was fed until May 26. The meal mixture consisted of 60 per cent of screenings and 40 per cent of corn.

—		1928		Average for ten years	
		Lot 1 Loose	Lot 2 Tied	Lot 1 Loose	Lot 2 Tied
Number of steers in each lot	No.	10	10	10	10
Total initial weight	lb.	8,795	8,460	8,576	9,477
Average initial weight	"	879·5	846	857·6	.947·7
Total finished weight	"	10,915	10,750	11,082	11,926
Average finished weight	"	1,091·5	1,075	1,108·2	1.192·6
Number of days on test	days	180	180	184	184
Total gain per lot	lb.	2,120	2,290	2,506	2,449
Average gain per steer	"	212	229	250·6	244·9
Average daily gain per steer	"	1·18	1·27	1·36	1·33
Total meal consumed	"	7,150	7,150	7,455	7,455
Total hay consumed	"	18,000	18,000	18,420	18,420
Total ensilage consumed	"	54,000	54,000	55,260	55,260
Pounds of meal eaten per pound of gain	"	3·37	3·12	2·97	3·04
Pounds of hay eaten per pound of gain	"	8·49	7·86	7·35	7·52
Pounds of ensilage eaten per pound of gain	"	25·47	23·58	22·05	22·56
Total cost of feed	$	299 58	299 58	301 35	301 35
Cost of feed per head	$	29 96	29 96	30 14	30 14
Cost of feed per head per day	cts.	16·64	16·64	16·38	16·38
Cost of feed per pound of gain	"	14·13	13·08	12·03	12·31

Deductions.—This experiment has been conducted for ten years. In the ten-year average lot 1, which was run loose in a pen, made a gain of 1·36 pounds per steer per day at a cost of 12·03 cents per pound of gain. The lot which was tied gained 1·33 pounds per steer per day, which cost 12·31 cents per pound of gain. These results show that steers wintered in a pen make larger and more economical gains, and there is also quite a saving in the time and labour required to care for them.

DUAL-PURPOSE SHORTHORNS

The Shorthorn herd at the Lennoxville Station on December 31, 1928, numbered 32 head, consisting of the herd sire "Kentville Major 2nd" —172627— bred at the Kentville Experimental Station, Kentville, N.S., 13 cows, 3 two-year-old heifers, 5 yearling heifers, 6 heifer calves and 4 bull calves.

At present there are 10 cows, 1 two-year-old and 1 yearling heifer in the herd which were sired by the old herd bull "Weldwood Lassie's Lad" —135100— whose dam has an R.O.P. record of 13,820 pounds of milk and 563 pounds of fat, and granddam a record of 13,535 pounds of milk and 540 pounds of fat. Four of these cows have made very creditable R.O.P. records.

FEED COST OF MAINTAINING A SHORTHORN HERD BULL FOR ONE YEAR

The following table gives the amount of feed consumed and cost of feed for a Shorthorn herd bull for one year:—

1,883 pounds meal at $1.50 per cwt	$28 25
5,480 pounds ensilage at $3 per ton	8 22
3,660 pounds hay at $8 per ton	14 64
Total cost of feed	51 11
Average cost of feed for 5 years	48 94

DAIRY CATTLE

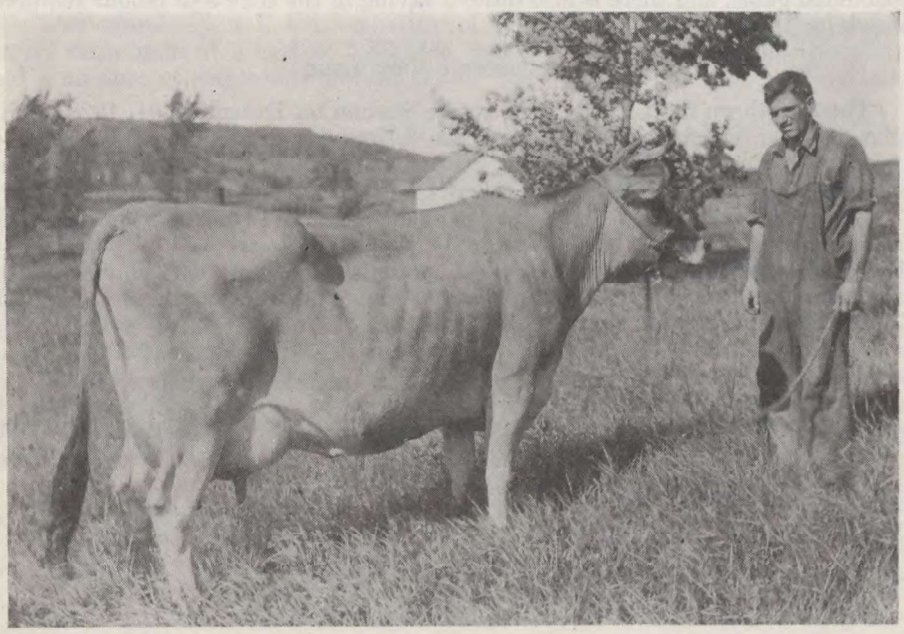
AYRSHIRES

Following a general policy adopted this year by the Experimental Farm System, that not more than two breeds of cattle should be kept on any Experimental Farm, it was decided to retain the Shorthorns and Jerseys at the Lennoxville Station and transfer the Ayrshires to other farms. Therefore, 32 Ayrshires were shipped to the Central Experimental Farm, Ottawa, and 16 Ayrshires to the Experimental Station, Fredericton, N.B. on August 17.

Eight females and three male calves were born during the six months the Ayrshire herd was at the Lennoxville Station in 1928, and five cows completed their lactation periods and qualified in the R.O.P. "Lennoxville Pansy"—73701—produced 12,335 pounds of milk and 485 pounds of butter fat in 365 days in the mature class, and "Lennoxville Roxie"—55864—gave 11,706 pounds of milk and 483 pounds of butter fat in 303 days.

JERSEYS

The Jersey herd at the end of the year 1928, consisted of one herd bull, 19 cows, 5 two-year-old heifers, 6 yearling heifers, 8 heifer calves and 4 bull calves, making a total of 43 head. The herd sire "Ottawa Gamboge 5th"—32116—is an Advanced Registry, Class A bull, whose sire was the imported "Castlehill Sybil's Gamboge"—12271—and dam "Brampton Erica's Pride (imp.)—22428—with a record of 496 pounds of butter fat as a two-year-old.



Premier's Pinehurst Lottie—21274—a good typical Jersey cow with plenty of size and capacity.

Fourteen of these Jerseys were transferred from the Central Experimental Farm, Ottawa, to the Lennoxville Station, on August 17, as the same rule applied to the Central Experimental Farm, Ottawa, as to the other Farms, that is, that not more than two breeds of cattle should be kept on any one farm, and as the Central Farm had Ayrshires, Holsteins and Jerseys, their Jerseys were sent to the Lennoxville Station.

Two cows were purchased in May from the Grayburn Farms, Waterville, P.Q., as an addition to the Jersey herd. One of them namely, "Eleanor King of Grayburn"—18404—completed her lactation period on September 17, and qualified in the R.O.P. producing 12,870 pounds of milk and 740 pounds of butter fat in 365 days.

FEED COST OF RAISING JERSEY CALVES FROM BIRTH TO ONE YEAR

The cost of raising calves from birth to one year was figured from the average amount and cost of feed for five calves during that period.

AVERAGE FEED COSTS OF RAISING JERSEY CALVES FROM BIRTH TO ONE YEAR

—		Amount of feed	Cost of feed
			$ cts.
Whole milk at $1.50 per cwt.	lb.	625	9 38
Skim-milk at $0.25 per cwt.	"	2,890	7 23
Meal at $1.50 per cwt.	"	450	6 75
Ensilage at $3 per ton.	"	1,390	2 09
Hay at $8 per ton.	"	815	3 26
Pasture at $1.50 per month.	month	1	1 50
Total cost of feed.		.....	30 21

CALF-FEEDING EXPERIMENT

Object of Experiment.—To test the value of a home-mixed calf meal as a substitute for whole milk versus a commercially mixed meal and also oil cake meal, after the calves are weaned from whole milk.

Plan of Experiment.—Twelve calves were used for this experiment and divided into three lots of four calves each. They were fed whole milk for 8 weeks, commencing with 8 pounds per head per day, which was gradually increased until they were getting 12 pounds per day at 60 days, when they were gradually weaned from whole milk to skimmed milk. Lot 1 was fed a meal mixture composed of 3 parts finely ground oats, 2 parts of ground corn and 1 part of ground flax seed. Lot 2 was fed a commercial calf meal called Royal Purple, and lot 3 was fed on oil cake meal. These meals were made into a porridge by using boiling water and stirring the dry meal into it until it becomes a jelly. This was added to the skim-milk at feeding time, as a substitute for the butter fat that was lacking in the skim-milk. This experiment was conducted for three months. For the first month one-half pound of meal was fed per head per day, for the second month 1 pound and for the third month 1½ pounds per head per day. This was fed in conjunction with 14 pounds of skim-milk and 3 pounds of hay per head per day.

VALUATION OF FEEDS

Meal mixture	$2 25 per cwt.
Royal Purple	4 40 "
Oil cake meal	2 65 "
Skim-milk	0 25 "
Hay	8 00 per ton

RESULTS OF CALF-FEEDING EXPERIMENT

—		Lot 1	Lot 2	Lot 3
		Oats, 3 parts; corn, 2 parts; gr. flaxseed, 1 part	Royal Purple calf meal	Oil cake meal
Number of calves in experiment	No.	4	4	4
Length of feeding period	days	90	90	90
Total initial weight	lb.	624	540	588
Average initial weight	"	156	135	147
Total finished weight	"	1,236	1,050	1,149
Average finished weight	"	309	262·5	287·3
Total gain per group	"	612	510	561
Average gain per calf	"	153	127·5	140·3
Average daily gain per calf	"	1·70	1·42	1·56
Amount of skim-milk fed per group	"	5,040	5,040	5,040
Amount of skim-milk fed per calf	"	1,260	1,260	1,260
Amount of meal in milk fed per group	"	360	360	360
Amount of meal in milk fed per calf	"	90	90	90
Amount of hay fed per group	"	1,080	1,080	1,080
Amount of hay fed per calf	"	270	270	270
Cost of feed per group, milk-substitute neglected	$	16 92	16 92	16 92
Cost of milk-substitute per group	$	8 10	15 84	9 54
Total cost of feed per group	$	25 02	32 76	26 46
Cost of feed per calf	$	6 26	8 19	6 62
Cost of feed, milk-substitute neglected, per pound gain	cts.	2·76	3·32	3·02
Cost of milk-substitute per pound gain	"	1·32	3·11	1·70
Cost of feed per pound gain	"	4·09	6·42	4·72

Deductions.—The above table shows that the best and most economical gains were made by lot 1 fed the home mixture, which made an average daily gain of 1.70 pounds per day at a cost of 4.09 cents per pound of gain. Lot 2, fed Royal Purple, made a gain of 1.42 pounds each per day at a cost of 6.42 cents per pound, and lot 3, on oil cake meal, made an average daily gain of 1.56 pounds each per day at a cost of 4.72 cents per pound of gain.

SERUM TEST

A very important line of work has been started through the co-operation of the Experimental Farm System with the Health of Animals Branch whereby all herds on Experimental Farms are subjected to the agglutination and complement-fixation tests, as a means of determining the presence of infectious genital diseases. The Lennoxville Station herd was tested the last of June with the following results:—30 per cent re-acted to the test and 70 per cent were negative. The re-acting herd is isolated in a separate barn, under the instructions and supervision of the Health of Animals Branch, according to regulations governing this line of work. All calves from the re-acting herd are thoroughly washed and disinfected as soon as they are dropped and moved to neutral quarters and fed milk from the negative herd. They are tested in 90 days and if negative they can be added to the negative herd after being thoroughly disinfected.

DAIRY HERD RECORDS OF PRODUCTION

In the following table is given a record of the cows that finished a lactation period during the year 1928. In the case of heifers with their first calves, charges for feed include the consumption from a date approximately two months before freshening. In the case of cows with previous lactation periods, the charges for feed includes the period during which they were dry before beginning the lactation period herein recorded. The following prices were charged for feed:—

Hay	$8 00 per ton
Roots	3 00 "
Ensilage and green feed	3 00 "
Meal mixture	1 50 per cwt.
Pasture	1 50 per month

Individual Milk Records Completed During the Year 1928

Jerseys

Name of Cow	Age at beginning of lactation period	Date of dropping calf	Number of days in the lactation period	Total pounds of milk for period	Daily average yield of milk	Average per cent fat in milk	Pounds of butter fat produced in period	Pounds of butter produced in period	Value of butter at 40 cts. per pound	Value of skim-milk and butter-milk at 25 cts. per cwt.	Total value of product	Amount of meal eaten at $1.50 per cwt.	Amount of roots, ensilage and green feed at $3.00 per ton	Amount of hay eaten at $8.00 per ton	Months pasture at $1.50 per month	Total cost of feed	Cost to produce 100 lb. milk.	Cost to produce 1 lb. butter skim-milk neglected	Profit on 1 lb. of butter, skim-milk neglected	Profit over cost of feed per cow
	y. m.			lb.	lb.	p.c.	lb.	lb.	$	$	$	lb.	lb.	lb.		$	$	cts.	cts.	$
Sophie Magnet's Corrine	7– 8	Oct. 12–27	322	10,086·7	31·33	5·88	592·90	697·53	279 01	23 47	302 48	3,670	8,895	1,838	4·5	82 49	0 82	11·8	28·2	219 99
Lennorville Roxanna	2–10	Nov.13–26	499	8,876·3	17·79	6·04	536·28	630·92	252 37	20 61	272 98	3,645	14,695	2,996	5·5	96 95	1 09	15·4	24·7	176 03
Maxwelton Sultan's Betty	4– 3	Jan. 6–28	330	8,184·9	24·80	5·23	428·17	503·73	201 49	19 20	220 69	2,951	6,240	1,692	5·0	67 90	0 83	13·5	26·5	152 79
Maplehurst Fox Rosana	7– 4	Apr. 20–27	286	6,969·6	24·37	4·76	331·98	390·56	156 22	16 45	172 67	2,406	8,330	1,556	4·5	61 56	0 88	15·8	24·2	111 11
Kingsway's Beauty Spot	8– 2	July 11–27	326	6,849·6	21·01	5·02	344·18	404·91	161 96	16 11	178 07	2,331	9,155	1,788	4·25	62 23	0 91	15·4	24·6	115 84
Lennorville Corinne	2–10	June 29–27	352	6,347·0	18·03	6·19	392·74	462·05	184 82	14 71	199 53	2,625	9,230	1,813	4·75	67 61	1 07	14·6	25·4	131 92
Mascot Mary Belle	4– 0	Sept. 3–27	302	4,813·2	15·94	6·10	293·59	345·40	138 16	11 17	149 33	2,351	8,585	1,838	4·5	62 25	1 29	18·0	22·0	87 08
Lennorville Princess	4– 0	May 13–27	257	3,789·7	14·75	5·72	216·83	255·09	102 04	8 84	110 88	1,421	8,130	1,556	4·5	46 49	1 23	18·2	21·8	64 39
Total for herd (8 cows)	.....	.....	2,674	55,917·0	.....	.....	3,136·67	3,690·19	1,476 07	130 56	1,606 63	21,400	73,260	15,077	37·5	547 48	.....	.....	.....	1,059 15
Ave. for herd (8 cows)	.....	.....	334	6,989·6	20·91	5·61	392·08	461·27	184 51	16 32	200 83	2,675	9,158	1,885	4·69	68 44	0 98	4·8	28·7	132 39

Shorthorns

Village Ruby	10–11	Aug. 27–27	366	9,326·7	25·48	4·18	389·74	458·52	183 41	22 17	205 58	3,454	9,005	2,264	5·5	82 63	0 89	18·0	22·0	122 95
Lennorville Gem 4th	2– 9	Jan. 18–27	379	7,005·0	18·48	4·66	326·36	383·95	153 58	16 55	170 13	2,876	10,000	2,514	4·5	74 95	1 07	19·5	20·5	95 18
Lennorville Ruby 2nd	3– 0	June 24–27	384	6,817·6	17·75	4·72	321·88	378·68	151 47	16 10	167 57	3,028	9,305	2,264	6·5	78 19	1 15	20·6	19·4	89 38
Lennorville Gem 6th	2– 7	Nov. 7–27	329	6,081·6	18·49	4·57	278 13	327·21	130 88	14 38	145 26	2,650	6,535	2,180	4·5	65 02	1 07	19·9	20·1	80 24
Lady Hope 13th	3–10	Aug. 9–27	279	4,945·2	17·72	4·47	220·89	259·87	103 95	11 71	115 66	2,226	9,030	2,214	2·0	58 80	1 19	22·6	17·4	56 86
Lennorville Victoria	2– 8	Sept.28–27	308	4,592·7	14·91	4·55	208·95	245·82	98 33	10 87	109 20	2,517	8,585	2,264	3·5	64 95	1 41	26·4	13·6	44 25
Lennorville Ruby	4–11	Sept.22–27	253	3,855·6	15·24	4·07	156·98	184·68	73 87	9 18	83 05	1,981	8,235	2,214	2·25	54 31	1 41	29·4	10·6	28 74
Total for herd (7 cows)	.....	.....	2,298	42·624·4	.....	.....	1,902·93	2,238·73	895 49	100 96	996 45	18,732	60,695	15,914	28·75	478 85	.....	.....	.....	517 60
Ave. for herd (7 cows)	.....	.....	328	6,089·2	18·55	4·46	271·85	319·82	127 93	14 42	142 35	2,676	8,671	2,273	4·11	68 41	1 12	25·2	23·1	73 94

In calculating the value of products, 40 cents per pound has been allowed for butter, and 25 cents per cwt., for skim-milk. Butter production has been figured on the basis of 85 per cent fat content.

The labour cost of caring for the cattle, handling of milk, etc., has not been accounted for, as it is considered that the value of the manure and calves offset these items.

HORSES

There are at present at this Station 18 horses, made up of 13 work-horses, 1 general-purpose horse, used for delivery work, 1 three-year-old gelding, 2 two-year-old fillies and 1 foal. The work-horses are required during the spring and summer, but in winter there is only work for three pairs. The idle horses are wintered on hay, a few roots and a small amount of bran. They are turned into yards during the day for exercise.

COST OF HORSE LABOUR

The following table gives the cost of feed and maintenance and the total number of hours of horse labour performed for the different divisions during 1928:—

Number of work horses	No.	13
Average value of each horse	$	150
Total work done during year by 13 horses	hrs.	19,250
Cost of feed for 13 horses—		
63,714 pounds oats at $2 per cwt.	$	1,274 28
2,678 pounds bran at $1.60 per cwt.	$	42 85
73,520 pounds hay at $8 per ton	$	294 08
Total cost of feed for 13 horses for 12 months	$	1,611 21
Average cost of feed per horse for 12 months	$	123 94
Labour (stable attendance), 2,190 hours at 30 cents per hour	$	657 00
Interest (6 p.c. on $1,950; value of horses)	$	117 00
Shelter, $20 per horse	$	260 00
Harness (depreciation, repairs, interest), $10 per horse	$	130 00
Miscellaneous (shoeing, veterinary, brooms, brushes)	$	139 75
Total cost of 19,250 horse hours labour	$	3,038 90
Average cost per hour horse labour	cts.	15·79
Average cost per hour horse labour for past 8 years	"	13·16

SHEEP

The flock on January 1, 1928, consisted of 18 registered Oxford Down ewes, 9 registered ewe lambs, 1 registered Oxford Down ram, 29 grade ewes and 3 grade ewe lambs. A registered Shropshire ram and a registered Cheviot ram were used for cross-breeding work, which is carried on with Oxford Down ewes to ascertain the most practical cross for market lambs, taking into consideration early maturity, quality and size, since the market demands an early-maturing, well-fleshed lamb weighing around 85 pounds.

The sheep are fed, during the winter months, 2 pounds of good clover hay and 2 pounds of ensilage or roots per head per day. Commencing a month or six weeks before lambing they are given 1 pound per day of a mixture of oats, 1 part; bran, 1 part; and oil cake, ½ part, until they go to pasture.

All ewes were bred to lamb after April 15 to May 1. The shearing was done before the sheep had lambs. The sheep and lambs were dipped before they went to pasture. The fleeces averaged 8·01 pounds per sheep, which were graded and marketed by the Canadian Co-operative Wool Growers Limited. Their warehouse and grading station for the province of Quebec, is at Lennoxville, P.Q. The following table gives the grades and prices realized:—

TABLE OF WOOL GRADING

Grade	Weight	Price per pound
	lb.	cts.
Medium Staple (⅜ Blood Sta.)	20	34
Low Medium Staple (¼ Blood Sta.)	322	33
Low Staple (Low ¼ Blood Sta.)	136	32
Medium Seedy	11	23

COST OF KEEPING A BREEDING FLOCK OF SHEEP

Number of ewes January 1, 1928	No.	47
Number of ewes December 31, 1928	"	41
Value of ewes January 1, 1928 at $12 each	$	564 00
Cost of feed—		
15,854 pounds of hay at $8 per ton	$	63 42
15,854 pounds of ensilage at $3 per ton	$	23 78
5,836 pounds of meal at $40 per ton	$	116 72
6 months pasture at 20 cents per head per month	$	49 20
Total cost of feed	$	253 12
Interest on investment, 6 per cent of $564	$	33 84
Depreciation, 5 per cent of $564	$	28 20
Replacement, 6 ewes at $12	$	72 00
Total charges against ewes	$	387 16
Average charge per ewe (47 ewes)	$	8 24
Value of wool per fleece, 8·01 pounds at 32·57 cents per pound	$	2 61
Average cost of keeping ewes (less value of fleece)	$	5 63
Average cost of maintaining a ewe per year for six years	$	5 37

COST OF KEEPING A RAM FOR ONE YEAR

Value of ram January 1, 1928	$	50 00
Cost of feed—		
366 pounds hay at $8 per ton	$	1 46
366 pounds ensilage at $3 per ton	$	0 55
260 pounds meal at $40 per ton	$	5 20
6 months pasture at 20 cents per month	$	1 20
Total cost of feed per ram per year	$	8 41
Interest on investment, 6 per cent of $50 (value of ram)	$	3 00
Depreciation charge, 25 per cent of $50	$	12 50
Total charge against ram	$	23 91
Value of fleece, 10 pounds at 32·57 cents per pound	$	3 26
Cost of keeping ram (chargeable against lambs)	$	20 65
Average cost of maintaining a ram per year for six years	$	19 19

NOTE.—The depreciation charge on ram is figured at 25 per cent as a ram's usefulness is about four years' duration.

COST OF RAISING LAMBS TO MARKET AGE

Number of lambs saved for market from 47 ewes	No.	54
Average number of lambs per ewe	"	1·15
Average weight of lambs at birth	lb.	11
Average weight of lambs at weaning	"	68
Average weight of lambs when marketed	"	88
Average value of lambs at 11 cents per pound	$	9 68
Cost of keeping 47 sheep (less value of wool)	$	264 61
Cost of keeping ram (less value of wool)	$	20 65
Three months pasture for 54 lambs at 20 cents per head per month	$	32 40
Cost of extra labour at lambing time	$	15 00
Medicine	$	5 00
Total cost of raising 54 lambs to market age	$	337 66
Average cost of raising a lamb to market age	$	6 25
Average cost of raising a lamb to market age per year for six years	$	5 39

With each lamb worth $9.68 at marketing and costing $6.25 to raise to market age, and each ewe raising 1·15 lambs each, this shows a profit of $3.94 per ewe. The average profit per ewe for the past six years is $5.96.

CROSS-BREEDING EXPERIMENT WITH SHEEP FOR MARKET PRODUCTION

Object of Experiment.—To ascertain the results of crossing Shropshire, Cheviot and Oxford Down rams with high-grade Oxford Down ewes for market lamb production, taking into consideration size, quality and finish.

Plan of Experiment.—Three lots of Oxford Down ewes, each lot containing 6 ewes, were used for this experiment. The weight of lambs at birth, weaning and when marketed will be found in the following table, as well as the gain per day during the different periods of the experiment:—

CROSS-BREEDING EXPERIMENT WITH SHEEP FOR MARKET PRODUCTION OF LAMBS

		Lot 1	Lot 2	Lot 3
		Oxford Down ewes bred to Shropshire ram	Oxford Down ewes bred to Cheviot ram	Oxford Down ewes bred to Oxford Down ram
Number of ewes bred	No.	6	6	6
Number of lambs raised	"	7	7	6
Total weight of lambs at birth	lb.	82·87	84·5	65
Average weight of lambs at birth	"	11·84	12·07	10·83
From birth to weaning—				
Number of days	days	131	135	136
Total weight of lambs at weaning	lb.	481	475	442
Average weight of lambs at weaning	"	68·71	67·86	73·67
Total gain per lot from birth to weaning	"	398·13	390·50	377·00
Average gain per lamb from birth to weaning	"	56·88	55·79	62·83
Average daily gain per lamb from birth to weaning	"	0·43	0·41	0·46
From weaning to marketing—				
Number of days	days	61	61	61
Total weight when marketed	lb.	625	626	564
Average weight per lamb when marketed	"	89·29	89·43	94
Total gain per lot from weaning to marketing	"	144	151	122
Average gain per lamb from weaning to marketing	"	20·57	21·57	20·33
Average daily gain per lamb from weaning to marketing	"	0·34	0·35	0·33

Deductions.—It will be noted from the above table that the grade Cheviot lambs in lot 2 weighed at birth an average of 12·07 pounds, while lot 1, consisting of grade Shropshires, averaged 11·84 pounds and lot 3, the Oxfords, only weighed 10·83 pounds. From birth to weaning lot 3, grade Oxfords, made an average daily gain of 0·46 of a pound, while lot 1, grade Shropshires, averaged 0·43 of a pound and lot 2, grade Cheviots, made an average daily gain of 0·41 of a pound.

During the period between weaning, on August 27, and marketing, on October 27, 61 days, lot 2, Cheviots, made an average daily gain of 0·35 of a pound. Lot 1, Shropshires, gained 0·34 of a pound and the Oxfords 0·33.

Although the Oxford Down ewes made the largest gains during the period, the Cheviots, owing to their superior finish and quality, were worth one cent per pound more than the Oxford ewes. The Shropshires, were not as well finished as the Cheviots, but were of better quality than the Oxfords.

SWINE

On December 31, 1928, the herd of swine at this Station consisted of 44 head, including 1 herd boar, 4 breeding sows, and 39 feeders. During the year 99 pigs were farrowed and from these litters 66 pigs were raised. Forty-seven pigs were sold for pork, three for breeding purposes and two young pigs died. Advanced Registry work will be carried on during the winter with some of the young feeders.

FARROWING RECORDS

The farrowing records in 1928 are the highest yet attained at this Station. Three brood sows farrowed 87 pigs during the year, an average of 29 pigs each, and the average number of pigs raised per sow was 19.33.

FARROWING RECORDS

Sow number	Farrowing date	Number of pigs in litter	Number of pigs reared	Date weaned	Average weight when weaned
					lb.
465	March 14, 1928	17	9	May 1	29
521	March 3, 1928	14	2	May 1	45
539	March 5, 1928	15	14	May 1	37·5
465	July 26, 1928	10	9	Sept. 15	38
521	Aug. 5, 1928	14	11	Oct. 1	32
539	Aug. 23, 1928	17	13	Oct. 1	31

Average number of pigs farrowed per spring litter	15·3
Average number of pigs reared per spring litter	8·3
Average number of pigs farrowed per fall litter	13·66
Average number of pigs reared per fall litter	11·0

COST OF RAISING PIGS TO WEANING AGE

The following statement is made from records kept of three brood sows. The total feed the sows consumed and the amount the young pigs ate until time of weaning is charged against the sows. The young pigs from three to six weeks of age received ground oats and sweet skim-milk in addition to the mother's milk. The meal mixture consisted of 2 parts oats, 4 parts screenings, 2 parts bran and 1 part middlings.

VALUATION OF FEEDS

Screenings	$1 90 per cwt.
Bran	1 75 "
Ground oats	2 30 "
Middlings	2 30 "
Meal mixture	2 00 "
Skim-milk	0 25 "

COST OF RAISING PIGS TO WEANING AGE

Number of sows	No.	3
Total number of pigs saved from 3 sows (2 litters per year)	"	58
Average number of pigs saved per sow	"	19·33
Cost of feed—		
6,297 pounds meal at $2 per cwt.	$	125 94
29,229 pounds skim-milk at $0.25 per cwt.	$	73 07
6 months pasture for 3 sows at $0.50 per sow per month	$	9 00
Total cost of feed for sows and pigs to weaning age	$	208 01
Extra labour required at farrowing time $2 per litter	$	12 00
Cost of service of boar at $1 per litter	$	6 00
Interest on investment, $40 per sow at 6 per cent	$	7 20
Cost to raise 58 pigs to weaning age	$	233 21
Cost to raise 1 pig to weaning age	$	4 02
Average cost to raise pigs to weaning age for the past eight years	$	3 22

NOTE.—All costs in connection with the upkeep of the sows are charged against the young pigs, with the exception of labour and housing charges, which are considered to be offset by the value of the manure. Each sow is valued at $40 in order to arrive at the interest charges.

COST OF PORK PRODUCTION

Object of Experiment.—To ascertain the cost of raising bacon hogs to around 200 pounds in weight.

Plan of Experiment.—Twenty-three pigs were used in this experiment. They were farrowed March 1, and were weaned May 1, when they were started on the test which was conducted for 138 days. In the following table will be found the results for the first 60 days, the second 30 days and the last 48 days. The meal mixture consisted of 48 per cent of middlings, 32 per cent of oats, 16 per cent of corn and 4 per cent of oil cake meal, which cost $2.10 per hundred.

FEED COST OF PORK PRODUCTION

——		First 60 days	61 to 90 days	91 to 138 days	Total period
Number of pigs	No.	23	23	23	23
Initial weight, gross	lb.	792	2,529	3,420	792
Initial weight, average	"	34·4	109·96	148·70	34·4
Final weight, gross	"	2,529	3,420	5,003	5,003
Final weight, average	"	109·96	148·70	217·52	217·52
Number of days fed	days	60	30	48	138
Total gains for period	lb.	1,737	891	1,583	4,211
Average gain per hog	"	75·52	38·74	68·83	183
Average daily gain per hog	"	1·26	1·29	1·43	1·33
Amount of meal eaten per group	"	3,174	2,974	6,344	12,492
Amount of milk eaten per group	"	12,644	4,278	1,656	18,578
Amount of meal eaten per pound gain	"	1·83	3·34	4·01	2·97
Amount of milk eaten per pound gain	"	7·28	4·80	1·05	4·41
Total cost of feed	$	98 26	73 14	137 36	308 77
Cost of feed per head	$	4 27	3 18	5 97	13 42
Cost of feed per head per day	cts.	7·12	10·60	12·44	9·72
Cost of feed per pound gain	"	5·66	8·21	8·68	7·33

STATEMENT OF RETURNS

Cost of 23 pigs at weaning at $4.02 per head	$ 92 46
Total cost of feed for 138 days	308 77
Cost of pigs when finished at 217·52 pounds	401 23
Value of 5,003 lb. pork at $12.50 per cwt	625 38
Profit over cost of feed for 23 pigs	224 15
Average profit per pig	9 75

Deductions.—The above table shows that the cost of feeding a pig from weaning to finishing, 138 days, was $13.42. With these pigs at weaning costing an average of $4.02, this makes a total cost of $17.44 per pig when sold on September 15. At this time they averaged 217.52 pounds and were sold at 12½ cents per pound, making $27.19. This gave a profit of $9.75 per hog. It will also be noted that for the first feeding period of 60 days it cost 5.66 cents to produce a pound of gain, in the second period of 30 days 8.21 cents and in the third period of 48 days 8.68 cents, and for the total 138 days 7.33 cents.

MILK AND MILK SUBSTITUTES FOR HOG FEEDING

Object of Experiment.—To determine the value of buttermilk powder diluted in water as a skim-milk substitute in hog feeding to supplement the meal ration.

Plan of Experiment.—Three uniform lots of hogs were selected and fed as follows:—

Lot. 1. Meal and buttermilk powder, 3 pounds of powder to 8 gallons of water.

Lot. 2. Meal and buttermilk powder, 2 pounds of powder to 8 gallons of water.

Lot. 3. Meal and skim-milk.

Lots 1 and 2 were fed 10 pounds of diluted buttermilk powder per pig per day and lot 3 was fed 10 pounds of skim-milk per day. The following is the meal ration for each of the three lots.

MEAL RATION FOR ALL LOTS

First 30 days			Second 30 days			Third 30 days			Fourth period 17 days		
Middlings	200	pounds	Middlings	100	pounds	Oats	200	pounds	Barley	200	pounds
Oats	100	"	Oats	100	"	Barley	150	"	Shorts	100	"
Shorts	50	"	Shorts	100	"	Shorts	100	"	Oats	150	"
Barley	50	"	Barley	100	"	Oil meal	3	%	Oil meal	3	%
Bran	50	"	Bran	50	"						
Oil meal	3	%	Oil meal	3	%						

VALUATION OF FEEDS

Barley	$2 00 per cwt.
Bran	1 75 "
Middlings	2 20 "
Oats	2 25 "
Shorts	2 00 "
Oil cake meal	2 50 "
Meal mixture	2 15 "
Skim-milk	0 25 "
Buttermilk powder	0 09 per lb.

MILK AND MILK SUBSTITUTES FOR HOG FEEDING

		Lot 1	Lot 2	Lot 3
		Meal and buttermilk powder 3 pounds to 8 gallons of water, 10 pounds per day	Meal and buttermilk powder 2 pounds to 8 gallons of water, 10 pounds per day	Meal and skim-milk 10 pounds per day
Number of hogs in experiment	No.	6	6	6
Total initial weight	lb.	605	570	562
Average initial weight	"	100·8	95	93·7
Total finished weight	"	1,337	1,320	1,375
Average finished weight	"	222·8	220	229·2
Number of days in experiment	days	106	106	106
Total gain per lot	lb.	732	750	813
Average gain per hog	"	122	125	135·5
Average daily gain per hog	"	1·15	1·18	1·28
Total meal consumed	"	3,154	3,154	2,910
Total buttermilk substitute consumed	"	6,360	6,360	
Total skim-milk consumed	"			6,360
Pounds of meal eaten per pound gain	"	4·31	4·21	3·58
Pounds of buttermilk substitute eaten per pound gain	"	8·69	8·48	
Pounds of skim-milk eaten per pound gain	"			7·82
Total cost of feed	$	89 27	82 12	78 46
Cost of feed per head	$	14 88	13 69	13 08
Cost of feed per head per day	cts.	14·04	12·92	12·34
Cost of feed per pound gain	"	12·20	10·95	9·65

Deductions.—Lot 3, which was fed skim-milk, made the largest gains in this test. The lot fed 2 pounds of buttermilk powder to 8 gallons of water made a gain of 1·18 pounds per hog per day, while the lot fed 3 pounds of buttermilk powder to 8 gallons of water made the smallest gain of 1·15 pounds per hog per day.

In economy of gains the lot fed skim-milk made the most economical gain at a cost of 9·65 cents per pound of gain, and the lot fed 2 pounds of

buttermilk powder cost 10·94 cents per pound of gain. Lot 3, fed 3 pounds of buttermilk powder, cost 12·19 cents per gound of gain.

Judging from the foregoing results the lot fed 10 pounds of skim-milk per pig per day made the largest and cheapest gains. Of the two lots fed buttermilk powder, the greater gains were made by the lot receiving 2 pounds of the powder in 8 gallons of water. This mixture was fed at the rate of 10 pounds per pig per day, and the feed cost was 1·25 cents less per pound of gain than that of the lot fed 3 pounds of buttermilk powder.

FIELD HUSBANDRY

COST OF PRODUCING CROPS

In order to arrive at some means of determining the profits which may be derived from the growing of various crops, it is necessary to know the cost of producing these crops. For seven years, at the Lennoxville Station, accurate records have been kept on several of the more important field crops, as to the cost of various operations connected therewith and cost in general of producing the crops based as nearly as possible on average farm conditions. The charges and return values used, which are the average for the locality as nearly as can be ascertained, are as follows:—

COST VALUES

Rent of land—interest on investment and taxes	$ 4 86 per acre
Manure	2 00 per ton
Fertilizer—Nitrate of soda	59 60 "
Superphosphate	18 25 "
Muriate of potash	45 60 "
Lime	6 30 "
Seed—Oats	1 20 per bushel
Peas	2 75 "
Vetches	2 85 "
Corn	2 75 "
Red clover	0 35 per pound
Alsike	0 24 "
Timothy	0 08½ "
Barley	1 80 per bushel
Twine	0 16 per pound
Threshing	0 05 per bushel
Manual labour	0 21 per hour
Horse labour	0 10 "
Tractor labour	0 60 "

RETURN VALUE

Hay	$10 00 per ton
Straw	4 00 "
Oats	0 72 per bushel
Barley	0 85 "
Potatoes	0 90 "
Corn (silage)	Containing 25 per cent
Sunflower (silage)	dry matter 300 pounds
O.P.V. (silage)	silage = 100 pounds hay

The following summaries show the cost of producing corn, oats, and hay in 1928, and also the average for the seven year period 1922 to 1928 inclusive.

COST OF PRODUCING CORN

In 1928 about 20 acres of corn were harvested. The crop this year was sligthly above average in yield and maturity. The record of the cost of producing corn was kept on an eight acre field which was the largest of several fields planted to the crop.

COST OF PRODUCING AN ACRE OF CORN AT LENNOXVILLE

Item	Statement	Amount 1928	Seven-year average
		$ cts.	$ cts.
Rent of land	Interest and taxes	4 86	4 86
Manure	6·4 tons at $2 per ton	12 80	12 80
Seed	½ bushel at $2.75	1 37	1 16
Twine	3¾ pounds at 16 cents	0 60	0 57
Machinery (including ensiling outfit)		5 85	5 85
Manual labour	44·0 hours at 21 cents	9 24	11 60
Horse labour	53·0 hours at 10 cents	5 30	6 44
Tractor labour	1·2 hours at 60 cents	0 72	0 20
Total cost per acre		40 74	43 48
Yield per acre	tons	13·65	11·69
Cost per ton	$	2 98	3 80

COST OF PRODUCING OATS

Approximately 40 acres of oats were grown on the farm in 1928. Due to rather wet weather early in the season and bright hot weather just as the grain was filling, the yield of oats was below the average and the quality of the grain was not as high as usual. The following table shows the cost of producing the crop in 1928, and also the average for seven years:—

COST OF PRODUCING AN ACRE OF OATS AT LENNOXVILLE

Item	Statement	Amount 1928	Seven-year average
		$ cts.	$ cts.
Rent of land		4 86	4 86
Manure	4·8 tons at $2 per ton	9 60	9 60
Seed	2½ bushels at $1.20	3 00	2 54
Twine	3¼ pounds at 16 cents	0 52	0 55
Machinery		2 85	2 85
Manual labour	18·9 hours at 21 cents	3 97	4 30
Horse labour	26·5 hours at 10 cents	2 65	3 58*
Tractor labour	0·9 hour at 60 cents	0 54	0 16
Threshing charges	39·7 bush. at 5 cents	1 98	3 25*
Total cost per acre		29 97	31 69
Yield per acre	Grain, bush.	39·70	44·90
	Straw, tons	0·86	.....
Cost per bushel (considering value of straw)	cts.	65·50	61·4

* Six-year average.

COST OF PRODUCING HAY

Due to rather severe climatic conditions in the winter of 1927-28 and the spring of 1928, the clover hay was practically all killed out. The timothy, however, came through very well and with ideal conditions prevailing during the growing season, filled in, in places, where the clover had been killed out and the yield in general was fairly average. Lacking clover, however, the quality of the hay, as roughage for cattle, was very materially lower. Some 160 acres were harvested and the following table shows the cost of production on 20 acres which is fairly representative of the cost over the entire area.

COST OF PRODUCING AN ACRE OF HAY AT LENNOXVILLE

Item	Statement	Amount 1928	Seven-year average
		$ cts.	$ cts.
Rent of land		4 86	4 86
Manure	2·4 tons at $2 per ton	4 80	4 80
Seed	½ of 10 pounds timothy at 8½ cents	0 41	.....
	½ of 8 pounds clover at 35 cents	1 40	.....
	½ of 2 pounds alsike at 24 cents	0 24	2 07
Machinery		2 85	2 85
Manual labour	11·4 hours at 21 cents	2 39	3 07
Horse labour	8·0 hours at 10 cents	0 80	1 01
Total cost per acre	$	17 75	18 76
Yield per acre	tons	2·49	2·49
Cost per ton	$	7 13	7 49

CROP ROTATIONS

In spite of the fact that the rotation of crops is one of the most important practices in the successful growing of farm crops, many farmers still do not follow any particular systematic rotation. It is quite obvious to any one who has put some thought on the matter that a crop rotation, or the growing of crops in proper sequence directly and indirectly, affects farming as it is generally practised. Not only does it aid very materially in keeping up soil fertility, which is probably the most important factor in successful farming, but it also helps to combat weeds and disease, and distributes labour. A rotation planned to suit the needs of the type of farming practised will provide for the largest amount of feed for stock or for the cash crops desired, at the least possible cost, providing, of course, other recommended practices are also followed.

For seven years five different rotations have been operated and compared and from the results to date information is available which should give any one interested some idea as to what rotation would best suit the conditions under which various types of farming in the Eastern Townships are carried on. Except in rather isolated or special sections the most general type followed in the district is mixed farming. The rotations were planned with this fact in mind and the various systems are more especially adapted to a mixed farm or a stock farm operated in varying degrees of intensity.

In all rotations the same conditions are maintained as nearly as possible, the only variation being in the order of sequence of crops or the kind and number of crops in the rotation. Manure is applied to all rotations at 4 tons per acre for each crop in the rotation applied once or twice in the course of the rotation cycle. The same amount of seed is sown for the same crop in each rotation. Accurate records are kept of yield of crop and cost of producing the crop.

ROTATION "A" (FIVE YEARS' DURATION)

First year—Corn.
Second year—Barley.
Third year—Clover.
Fourth year—Timothy.
Fifth year—Oats.

This rotation would be suitable for a stock farmer or where mixed farming is practised. There is plenty of corn and hay and also a good acreage of grain

to provide concentrates to make up a suitable feed ration. Where only a limited number of live stock is kept some of the grain could be sold as a cash crop. This rotation is a good general rotation and suitable for a variety of types. The following table shows the 1928 yield of the different crops and also the average yields over a period of years.

ROTATION "A"

Rotation year	Crop	Yield per acre	
		1928	Average
1	Corn ..... tons	12·77	12·85 (7 years)
2	Barley ..... bush.	25·00	30·30 (6 years)
3	Clover ..... tons	2·96	2·65 (5 years)
4	Timothy ..... tons	2·63	2·29 (7 years)
5	Oats ..... bush.	34·50	41·00 (6 years)

ROTATION " B " (FOUR YEARS' DURATION)

First year—Corn.
Second year—Oats.
Third year—Clover.
Fourth year—Timothy.

Such a rotation as this four-year rotation would be suitable where considerable stock is being pastured or carried over a maintenance ration. It does not supply enough concentrates to carry a herd on high production unless considerable grain is bought to balance up the grain ration. The 1928 yield and average yields of the various crops are as follows:—

ROTATION "B"

Rotation year	Crop	Yields per acre	
		1928	Average
1	Corn ..... tons	12·98	10·96 (7 years)
2	Oats ..... bush.	48·20	55·50 (5 years)
3	Clover ..... tons	2·35	2·25 (5 years)
4	Timothy ..... tons	2·29	2·37 (7 years)

ROTATION " C " (THREE YEARS' DURATION)

First year—Corn.
Second year—Oats.
Third year—Clover.

The one place where such a rotation would be adaptable would be on a more or less run down farm. With manure applied every three years, and clover as a legume to add nitrogen to the soil once in three years and the cultivation necessary for the corn and grain crops, the fertility of the soil should be increased quite considerably. The high cost of seed and the fact that one seeding will produce two good crops of hay does not warrant the practice of

cutting only one crop of hay from each seeding except under very special conditions. The following table shows the yields of crops in this three year rotation.

ROTATION "C"

Rotation year	Crop	Yields per acre	
		1928	Average
1	Corn..... tons	10·53	10·98 (7 years)
2	Oats.....bush.	42·60	51·80 (5 years)
3	Clover..... tons	2·90	2·17 (5 years)

ROTATION "D" (SIX YEARS' DURATION)

First year—Corn.
Second year——Barley.
Third year—Clover.
Fourth year—Timothy.
Fifth year—Timothy.
Sixth year—Oats.

In many ways this rotation is the most suitable and one which could be more generally used than any of the other rotations under test. A farming system including this rotation would be very economical of labour which is an important factor in these days of farm labour shortage. Hay, which is a low labour crop, has a fairly prominent place, while corn, a high labour crop, occupies only one-sixth of the crop area. On the other hand it affords little opportunity for cultivation and a good deal of attention would have to be given to control couch grass and other weeds.

The yields are as follows:—

ROTATION "D"

Rotation year	Crop	Yields per acre	
		1928	Average
1	Corn..... tons	10·65	9·68 (7 years)
2	Barley..... bush.	20·50	30·10 (6 years)
3	Clover..... tons	3·02	2·73 (7 years)
4	Timothy..... tons	3·09	2·90 (7 years)
5	Timothy..... tons	3·04	2·53 (7 years)
6	Oats..... bush.	24·40	48·20 (6 years)

ROTATION "E" (FOUR YEARS' DURATION)

First year—Oats.
Second year—Clover.
Third year—Timothy.
Fourth year—Timothy.

This rotation could be used where it is necessary to work with a very great scarcity of labour. It might be used where a large area is devoted to pasture. The yields are recorded as follows:—

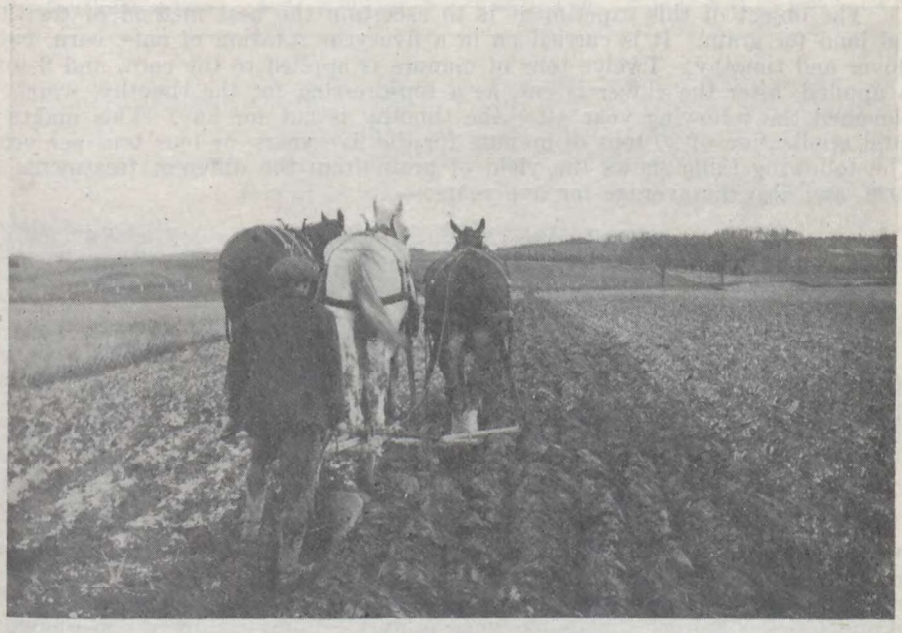
ROTATION "E"

Rotation year	Crop	Yields per acre	
		1928	Average
1	Oats..... bush.	31·80	42·80 (5 years)
2	Clover..... tons	2·09	2·47 (6 years)
3	Timothy..... tons	2·87	2·84 (6 years)
4	Timothy..... tons	2·60	2·37 (6 years)

CULTURAL PRACTICES

PREPARING SOD LAND FOR CORN

This experiment is carried on in a rotation of corn, oats, clover and timothy, and each series is tested in duplicate on one-twentieth acre plots. Four treatments are under observation. On one series the timothy sod is manured in the



The two-furrow gang plough, a practical implement for fall ploughing.

late fall at the rate of 16 tons per acre, and the land fall ploughed. The second treatment consists of manuring the land at 16 tons per acre in the winter or early spring, and spring ploughing. On the third series the timothy sod is ploughed in August, manured in the winter or early spring and re-ploughed in the spring. The fourth plot is ploughed in late fall. Manure is applied in winter or early spring, and disked in when the land is being prepared for seeding. Of the four methods of preparing sod land for corn, spring ploughing has given the highest yields during the six years which the project has been in progress at this Station. The following table shows the yield of corn from the different treatments in 1928, and also the average yield for six years.

PREPARING SOD LAND FOR CORN

Treatment	1928	Six-year average
	tons	tons
Manure and fall plough for corn	8·73	10·87
Manure in winter and spring plough for corn	13·31	13·58
Plough August, manure and plough again in spring	5·87	9·16
Plough in fall, manure in winter and disk in spring	11·97	10·83

Of the four methods practised in preparing land for corn, the one in which manure is applied to sod in winter or early spring and spring ploughed has shown an average yield for six years of 2.71 tons over any other treatment in the test. It might be mentioned that where there is couch grass or other noxious weeds that might interfere with the growth of the corn, that it is preferable to plough as soon as the hay is harvested, and summer-fallow and plough again in spring.

PREPARING SOD LAND FOR GRAIN

The object of this experiment is to ascertain the best method of treating sod land for grain. It is carried on in a five-year rotation of oats, corn, oats, clover and timothy. Twelve tons of manure is applied to the corn, and 8 tons is applied, after the clover is cut, as a top-dressing for the timothy, which is ploughed the following year after the timothy is cut for hay. This makes a total application of 20 tons of manure for the five years, or four tons per year. The following table shows the yield of grain from the different treatments in 1928, and also the average for five years:—

PREPARING SOD LAND FOR GRAIN

Treatment	1928	Five-year average
	bush.	bush.
Plough late fall for oats	19·2	37·2
Plough in spring for oats	26·3	37·0
Plough July, top work, rib in late fall	26·8	40·8
Plough July, top work, do not rib	39·1	43·1
Plough July, top work, plough again in October	29·1	40·6

Of the five different series of tests that are carried on in duplicate on one-twentieth acre plots, the treatment that has worked out the most satisfactorily for 1928, as well as for the average of five years, is the one that is ploughed in July, as soon as the hay is cut, and summer-fallowed during the fall. The second series is the one that is ploughed in July, summer-fallowed and ploughed again in October. It is very noticeable that the two systems mentioned above are the most practical not only in regard to yield, but also in regard to the cleaning of the land of couch grass or other noxious weeds by summer-fallowing.

FERTILIZERS

USE AND VALUE OF LIME IN A FOUR-YEAR ROTATION

Object of Experiment.—To ascertain the value of lime in a four-year rotation consisting of corn, oats, clover and timothy.

Plan of Experiment.—Duplicate plots of one-twentieth acre are used in this experiment. Manure is applied for the corn crop at the rate of 16 tons per acre. Ground limestone is broadcast on the land before seeding oats in

the second year of the rotation, at the rate of 2 tons per acre. The following table gives the yields and value of different crops in the rotations with and without lime.

USE AND VALUE OF LIME IN A FOUR-YEAR ROTATION

	Corn		Oats		Clover		Timothy	
	1928	Six-year average	1928	Six-year average	1928	Six-year average	1928	Six-year average
Yields of Crops	tons	tons	bush.	bush.	tons	tons	tons	tons
Lime, 2 tons per acre	14·51	14·11	39·0	51·3	1·74	1·39	1·60	1·61
No lime	11·38	11·61	33·2	40·2	0·71	0·77	0·62	0·87
Increase from lime	3·13	2·50	5·8	11·1	1·03	0·62	0·98	0·74
Value of Crops								
Lime, 2 tons per acre (cost of lime deducted) $	29 49	35 69	27 69	33 88	14 25	11 29	12 85	13 28
No lime $	25 60	31 57	26 74	29 08	7 10	7 84	6 20	8 90
Increase from lime $	3 89	4 12	0 95	4 80	7 15	3 45	6 65	4 38

On the left, no lime. On the right, two tons of ground limestone per acre.

The above table shows a striking increase in yields of all crops in the rotation where lime was used. The table also gives the values of increase in crops after deducting cost of lime, which was $12.60 for the complete rotation or $3.15 per acre per year. The profit in favour of lime was $16.75 for the rotation, or $4.17 per acre per year for the four years.

FERTILIZING POTATOES

Object of Experiment.—To ascertain the most economical method of fertilizing potatoes in a four-year rotation of potatoes, oats, clover and timothy.

Plan of Experiment.—Two duplicate sets of six one-twentieth acre plots were used for this experiment. The following table gives the different applications of commercial fertilizers and manure, as well as the check and also the yield per acre.

RESULTS FROM FERTILIZING POTATOES

Treatment	1928	Six-year average
	bush.	bush.
Heavy application, 400 pounds nitrate, 1,200 pounds superphosphate, 200 pounds muriate	198·5	232·9
Medium application, 200 pounds nitrate, 600 pounds superphosphate, 100 pounds muriate	171·5	193·1
Light application, 100 pounds nitrate, 300 pounds superphosphate, 50 pounds muriate	124·0	152·9
Ten tons of manure, 100 pounds nitrate, 300 pounds superphosphate, 50 pounds muriate	178·8	213·5
Sixteen tons of manure	177·3	213·0
No manure no fertilizer	102·3	114·1

It will be noted by the above table that the heavy application of commercial fertilizers, which consisted of 400 pounds of nitrate, 1,200 pounds superphosphate and 200 pounds of muriate of potash, gave an increased yield of 19·7 bushels in 1928, and an average increase for six years of 19·4 bushels over the next highest-yielding treatment which consisted of 10 tons of manure, 100 pounds of nitrate, 300 pounds of superphosphate and 50 pounds of muriate, also an increase of 96·2 bushels for 1928, and an average increase of 118·8 bushels for six years over the check area which received no fertilizer or manure.

RETURN VALUES FROM FERTILIZING POTATOES

The return value of the crop after deducting the value of fertilizers in the different treatments is contained in the following table:—

RETURN VALUES FROM FERTILIZING POTATOES

Treatment	1928			Six-year average		
	Total return	Cost of fertilizer	Value after deducting cost of fertilizer	Total return	Cost of fertilizer	Value after deducting cost of fertilizer
	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
Heavy application	178 65	15 08	163 57	232 73	15 69	210 47
Medium application	154 35	7 54	146 81	194 86	7 84	183 50
Light application	111 60	3 77	107 83	153 14	3 92	145 99
Manure and fertilizer	160 92	7 77	153 15	213 41	7 92	204 56
Manure 16 tons	159 57	6 40	153 17	191 17	6 40	185 84
No manure no fertilizer	92 07	.....	92 07	116 55	.....	.....

The above table shows that the heavy treatment of commercial fertilizer gave a yield value, after deducting the price of the fertilizer, of $10.40 in 1928, and $5.91 for the six-year average, over the treatment that got 10 tons of manure, 100 pounds of nitrate, 300 pounds superphosphate and 50 pounds of muriate of potash, and a yield value of $71.50 for 1928 and $93.92 for the six-year average over the check plot which received no manure or fertilizer. This experiment is always conducted in duplicate and an average of the two sets of plots taken.

QUANTITIES OF MANURE FOR CORN AND PLACE IN A FOUR YEAR ROTATION OF APPLYING IT

Object of Experiment.—To ascertain the effect on the yield of reducing manure from 16 tons to 10 tons in a four-year rotation, also the difference of applying 16 tons of manure for corn versus applying 10 tons to corn and 6 tons to top-dress clover sod after haying, which makes four tons per year for the four-year rotation.

Plan of Experiment.—A four-year rotation consisting of corn, oats seeded to clover and timothy, and two years in hay, is used for this experiment in duplicate plots of one-twentieth acre. Three different treatments are being tried out as follows:—

No. 1. Sixteen tons of manure applied in spring on timothy sod that had been ploughed the previous fall for corn.

No. 2. Six tons of manure is used as a top-dressing on clover sod after the first crop of hay is cut, and 10 tons are applied in the spring on timothy sod that had been ploughed the previous fall for corn.

No. 3. Ten tons of manure is applied in spring on timothy sod which had been ploughed the previous fall for corn.

The following table gives the comparative yields and values of the different treatments throughout the four years.

QUANTITIES OF MANURE AND PLACE IN ROTATION OF APPLYING IT

—	Corn		Oats		Clover		Timothy		Total	
	1928	Six-year average	1928	Six-year average	1928	Six-year average	1928	Six-year average	1928	Six-year average
	tons	tons	bush.	bush.	tons	tons	tons	tons	tons	tons
No. 1. 16 tons of manure applied for corn...	12·81	11·78	38·3	48·5	1·11	1·13	1·54	1·32	.....	.....
No. 2. 10 tons of manure applied for corn....	10·69	11·80	30·7	38·2	1·09	0·92	1·46	1·60	.....	.....
6 tons top-dressed for timothy.....										
No. 3. 10 tons of manure applied for corn....	7·26	8·63	31·1	35·3	0·69	0·71	0·78	0·88	.....	.....
Value of crops per acre in the rotation after deducting cost of manure—										
No. 1..... $	16 02	19 71	20 77	23 23	4 70	5 29	12 20	10 23	53 69	58 46
No. 2..... $	12 45	21 39	16 26	16 63	5 70	4 23	7 80	9 32	42 21	51 57
No. 3..... $	8 33	14 97	18 71	17 34	2 90	3 64	5 80	6 89	35 74	42 84

The above table of values shows that, after deducting the value of the manure applied to each treatment, that treatment No. 1 gave a total value for all crops for the four years of $56.46, No. 2, $51.57 and No. 3, $42.89, or a difference of $6.89 in favour of No. 1 over No. 2 and a difference of $15.57 of No. 1 over No. 3.

FORAGE CROPS

ENSILAGE CROPS

Owing to the comparatively cool climate of the eastern portion of the district served by this Station, ensilage corn cannot be recommended generally. On particularly favourable sites, however, where the soil fertility is high, and when suitable varieties are used, good crops are usually obtained. In the western portion of the district climatic conditions are more favourable and ensilage corn may be grown to advantage on practically all farms.

Eighteen varieties were included in the test of varieties of corn for ensilage in 1928. Each variety was grown in quadruplicate plots consisting of three rows each, the weight for comparison being taken from the centre row. Following is a statement showing the results obtained:—

ENSILAGE CORN—TEST OF VARIETIES, 1928

In the following table the average results obtained during the past six years with nine well-known varieties is shown:—

ENSILAGE CORN—AVERAGE OF RESULTS, 1923 TO 1928

Variety	Height		Yield per acre	
			Green weight	Dry matter
	ft	in.	tons	tons
Twitchell's Pride	6	6	18·17	3·42
Compton's Early	7	7	23·51	3·42
Northwestern Dent, M.C.	7	11	19·06	3·36
Wisconsin No. 7	9	1	20·71	3·32
Golden Glow	8	6	21·08	3·30
Longfellow	8	2	22·25	3·26
North Dakota	7	7	20·47	3·13
White Cap Yellow Dent	7	11	19·05	3·08
Quebec 28	6	7	17·26	3·00

ENSILAGE CORN—TEST OF VARIETIES, 1928

Variety	Source	Height of plant		Stage of maturity	Yield per acre	
					Green weight	Dry weight
		ft.	in.		tons	tons
Iroquois Hybrid	Macdonald College	7	10	Early dough	21·17	3·46
North Dakota	Steele-Briggs	8	4	Kernels formed	24·22	3·44
White Cap Yellow Dent	Steele-Briggs	8	3	Silked	20·12	3·43
Burr Leaming	Geo. S. Carter	9	2	Silked	22·27	3·37
Golden Glow	J. O. Duke	8	5	Kernels formed	20·05	3·36
Longfellow	J. O. Duke	8	3	Kernels formed	19·77	3·19
Bailey	J. O. Duke	8	4	Kernels formed	17·22	3·14
Red Cob	Steele-Briggs	8	6	Kernels formed	21·95	3·13
Hybrid	Wimple	9	5	Tasselled	18·65	3·10
Compton's Early	J. O. Duke	6	5	Early dough	21·75	2·95
Twitchell's Pride	Exp. Sta., Fredericton	7	10	Kernels formed	15·97	2·81
Wisconsin No. 7	J. O. Duke	9	1	Silked	18·30	2·79
Northwestern Dent	Macdonald College	7	6	Early dough	17·30	2·77
Quebec 28	Macdonald College	6	4	Late dough	14·42	2·74
Yellow Dent	Wimple	6	7	Silked	16·65	2·70
Northwestern Dent	Exp. Farm, Brandon	6	1	Late dough	11·35	2·57
Gehu	Dak. Imp. Seed Co	5	2	Glazed	10·32	2·17
Amber Flint	Wimple	6	7	Late milk	10·82	1·75

In the foregoing tables it will be noted that although comparatively high yields of green material are obtained, the yields of dry matter are correspondingly low. This is probably due in part to lack of maturity of the crop, and the excess of moisture, usually present in the soil, from frequent rains during late summer and early fall. With large quantities of soil moisture available, and the plants in a green and growing condition, there is naturally a high moisture content in the crop. Ensilage produced in this district is, therefore, usually lower in dry matter, or actual feeding value, than that produced from the same varieties grown in districts where the climate is more favourable for the crop.

Of the varieties which have been tested for six years, the best results have been obtained with the earlier-maturing, tall-growing kinds. Of these Twichell's

Pride and Northwestern Dent have produced yields of dry matter which vary little from that of Compton's Early. They have, however, been more mature at harvest time, and contained less actual water. Accordingly, the ensilage produced has been of higher feeding value, although the bulk of the crop was less. Either variety should prove suitable for the eastern portion of the district. For the western counties such varieties as Wisconsin No. 7 and Golden Glow are more satisfactory.

Of the varieties which have been tested for one year only, excellent results have been obtained with Iroquois Hybrid. This is a first generation hybrid produced at Macdonald College by crossing Quebec 28 and Stowells Evergreen. The crop from this variety was very uniform, matured well and contained a relatively high percentage of dry matter.

GRAIN MIXTURES FOR ENSILAGE

Excellent results were again obtained in 1928 with mixtures of grain as an ensilage crop. Such mixtures are now grown quite generally throughout the district, and, on the main farm at this Station, have now practically replaced corn. The mixture usually grown is composed of peas, oats and vetch in varying proportions, the most common being a seeding of 15 pounds of vetch, 45 pounds of peas and 2 bushels of oats per acre.

For the past four years a series of tests have been conducted to determine the most suitable varieties of grain to combine in forming such mixtures. In all 22 different combinations have been tested.

Following is a statement showing a four-year average of results obtained with the ten most satisfactory mixtures that have been tested during that period:—

GRAIN MIXTURES FOR ENSILAGE—AVERAGE OF RESULTS, 1925 TO 1928

Mixture of seed per acre			Yield per acre	
			Green weight	Dry matter
			tons	tons
Gold Rain	Oat	2 bush.	9·94	3·392
Chancellor	Pea	½ bush.		
Vetch		¼ bush.		
Laurel	Oat	2 bush.	8·95	3·178
Chancellor	Pea	½ bush.		
Vetch		¼ bush.		
Victory	Oat	2 bush.	9·97	3·035
Chancellor	Pea	½ bush.		
Vetch		¼ bush.		
Banner	Oat	1½ bush.	8·62	3·043
Spring Rye		½ bush.		
Chancellor	Pea	½ bush.		
Vetch		¼ bush.		
Banner	Oat	2 bush.	9·55	2·934
Golden Vine	Pea	1 bush.		
Banner	Oat	2 bush.	8·71	2·760
Chancellor	Pea	1 bush.		
Banner	Oat	2 bush.	9·75	2·698
Mackay	Pea	1 bush.		
Banner	Oat	2 bush.	8·95	2·669
Arthur	Pea	1 bush.		
Banner	Oat	2 bush.	9·27	2·625
Chancellor	Pea	½ bush.		
Vetch		¼ bush.		
Spring rye		1½ bush.	7·31	2·556
Chancellor	Pea	½ bush.		
Vetch		¼ bush.		

From the foregoing table it may be noted that the heaviest yields of dry matter, or actual material of feeding value, have been obtained with the mixture of Gold Rain oats, Chancellor peas and vetch. Also, that the substitution, in this mixture, of Banner for Gold Rain oats has resulted in a decrease in yield of over three-quarters of a ton of dry matter per acre. This has been due apparently to the inability of the Banner oats plants to hold up the pea and vetch vines until satisfactory maturity has been reached. Mixtures containing Gold Rain oats have seldom lodged before the grain reached the dough stage. Where it is necessary to use Banner oats, in such mixtures, good results will be obtained by replacing one-half bushel of the oats in the seeding per acre with a similar quantity of spring rye. This species is very stiff-strawed and helps materially in holding up the crop thus permitting more growth and maturity.

Of mixtures which have been tested for shorter periods excellent results have been obtained with one composed of an awnless barley, Feeder, Ottawa 61 and Alaska peas. This mixture has been sown at the rate of one and a half bushels of barley and one bushel of peas per acre. Both varieties being very early, the crop has been ready for ensiling from ten days to two weeks earlier than that from mixtures containing Gold Rain or Banner oats. For the past three years the yields obtained have been very satisfactory and the crop has remained standing until ready to cut.

SUNFLOWERS

During the nine years that sunflowers have been grown at this Station as a regular farm crop, profitable yields have been consistently obtained. In the cost of production determinations, conducted annually by the Division of Field Husbandry, sunflowers, or sunflowers and corn, have so far produced the largest and cheapest yields of dry matter of the various succulent roughage crops grown. Also good crops are almost invariably obtained throughout the district. It is, however, a more difficult crop to handle than corn or grain mixtures and the ensilage is less palatable. Following are the results obtained, in 1928, with six varieties tested in quadruplicate plots.

SUNFLOWERS—TEST OF VARIETIES, 1928

Variety	Source	Height		Stage of maturity	Yield per acre	
					Green matter	Dry matter
		ft.	in.		tons	tons
Mammoth Russian	Macdonald	9	11	40 per cent bloom	25·77	3·528
Mammoth Russian	Union Grains Limited	9	10	40 per cent bloom	25·74	3·526
Mammoth Russian	Dakota Imp. Seed Co.	10	3	30 per cent bloom	23·17	3·337
Manchurian	McKenzie	6	5	40 per cent ripe	10·04	2·212
Ottawa 76	Exp. Farm, Ottawa	6	0	75 per cent ripe	16·85	1·982
Mennonite	Experimental Farm, Rosthern, Sask.	4	11	Ripe	10·03	1·673
Average					18·60	2·710

SUNFLOWERS—AVERAGE OF RESULTS, 1923 TO 1928

Under the conditions of soil and climate, prevalent in the Eastern Townships, tall, strong-growing, comparatively late varieties are the most satisfactory. The crop as a rule is not injured by light early fall frosts and late varieties usually reach the desirable state for ensilage, which is when about two-thirds of the plants are in bloom, before heavy frosts occur. Of such varieties Mammoth Russian is the highest-yielding that has been tested. The seed of this variety is also readily obtainable commercially.

SUNFLOWERS—AVERAGE OF RESULTS, 1923 TO 1928

Variety	Source	Height		Yield per acre	
				Green weight	Dry matter
		ft.	in.	tons	tons
Mammoth Russian	Union Grains Limited	9	4	25·76	3·743
Mammoth Russian	Dakota Imp. Seed Co.	9	5	23·26	3·579
Ottawa 76	Exp. Farm, Ottawa	6	8	14·52	2·260

ROOT CROPS

MANGELS

During the thirteen years that mangels have been tested at this Station, yields of dry matter slightly in excess of those produced by swede turnips have been obtained. The tests, however, have been conducted on land in a comparatively high state of fertility, and the best cultural methods have been employed in growing the crops. Under unfavourable conditions better results are usually obtained, throughout this district, with swede turnips. Accordingly, insofar as the results at this Station have indicated both crops will, under average conditions, prove about equally productive. Following are the results obtained with the varieties of mangels tested in quadruplicate plots in 1928.

MANGELS—TEST OF VARIETIES, 1928

Variety	Source	General type and colour	Yield per acre	
			Green weight	Dry matter
			tons	tons
Rosted Barres	N. Hartman	Orange, Intermediate	32·71	3·049
Yellow Intermediate	Ottawa	Orange, Intermediate	29·33	2·976
Barres Half Long	General Swedish	Yellow, Intermediate	29·78	2·946
Danish Sludstrup	Macdonald	Orange, Intermediate	32·00	2·932
Giant Rose	Ewing	Rose Pink, Intermediate	25·33	2·905
Danish Sludstrup	Ewing	Orange, Intermediate	28·98	2·851
Barres Oval	General Swedish	Yellow, Intermediate	29·69	2·839
Giant White Half Sugar	Ewing	White Half Long	27·28	2·835
Sludstrup	Steves	Yellow, Intermediate	25·04	2·742
Green Top Half Sugar	H. Hartman	White, Intermediate	26·45	2·619
Red Eckendorffer	General Swedish	Red, Tankard	28·20	2·573
Sludstrup Barres	H. Hartman	Yellow, Intermediate	27·66	2·559
Stryno Barres	H. Hartman	Yellow, Intermediate	27·29	2·521
Red Globe	Ewing	Red, Globe	22·32	2·514
Red Globe	Bruce	Red, Globe	25·02	2·504
Fjerritslev Barres	H. Hartman	Yellow, Intermediate	30·32	2·478
Long Red Mammoth	Ewing	Red, Long	30·05	2·367
Eckendorffer Red	H. Hartman	Red, Tankard	29·53	2·360
Yellow Eckendorffer	General Swedish	Orange, Tankard	31·02	2·352
Eckendorffer Yellow	H. Hartman	Orange, Tankard	28·60	2·347
Eclipse	McKenzie	Yellow, Tankard	25·78	2·344
Elvetham Mammoth	H. Hartman	Red, Long	29·58	2·360
Yellow Vauriac	Vilmorin	Orange, Intermediate	23·49	2·129
Golden Tankard	Bruce	Orange, Tankard	22·01	2·066
Giant Yellow Intermediate	Ewing	Orange, Intermediate	21·50	1·915
Giant White Half Sugar	Moore	White Half Long	18·12	1·906
Red Top Half Sugar	H. Hartman	Rose Pink Half Long	18·72	1·865
Giant Yellow Globe	Ewing	Yellow, Globe	22·94	1·824
Average			26·47	2·478

MANGELS—AVERAGE OF RESULTS, 1923 TO 1928

In general it has been found that good strains of either Yellow Intermediate or Sludstrup are the most satisfactory. Of these the strain of Yellow Intermediate developed at the Central Experimental Farm, Ottawa, is the highest-yielding in dry matter. There is, however, as may be noted, a great difference in the productiveness of strains of the same variety, and for this reason growers are advised to determine the source of the seed before purchasing.

Excellent results have also been obtained with the variety Giant Rose Intermediate, one of the so-called half sugar mangels. The roots of this variety are very uniform in all respects and quite high in dry matter.

It has also been observed during recent years that much of the seed supplied by seed houses is of poor quality. In many instances the germination has been very low, and, even with exceptionally heavy seedings, weak irregular stands have been obtained. Of the 28 varieties and strains tested in 1928, in every instance where the seed had been obtained from seed houses, germination proved unsatisfactory. With three strains, however, the seed of which was grown in Canada, and obtained from the grower, germination was strong and strong uniform stands were obtained.

MANGELS—AVERAGE OF RESULTS, 1923 TO 1928

Variety	Source	General type and colour	Yield per acre	
			Green weight	Dry matter
			tons	tons
Yellow Intermediate	Ottawa	Orange, Intermediate	31·08	3·572
Giant Rose Intermediate	Ewing	Rose Pink, Intermediate	27·05	3·378
Danish Sludstrup	Macdonald	Orange, Intermediate	33·95	3·220
Danish Sludstrup	Ewing	Orange, Intermediate	28·04	2·948
Long Red Mammoth	Ewing	Long, Red	27·71	2·793
Red Globe	Ewing	Red, Globe	25·66	2·499
Golden Tankard	Ewing	Orange, Tankard	22·31	2·202
Giant Yellow Globe	Ewing	Yellow, Globe	26·45	2·199
Giant Yellow Intermediate	Ewing	Orange, Intermediate	22·09	2·190

FIELD CARROTS

Although field carrots are not grown generally throughout the Eastern Townships, small areas may be found on many farms. For the past thirteen years variety tests with this crop have been conducted at this Station, and, in general, it has been observed that as a crop they are lower-yielding, and more expensive to grow, than either mangels or swede turnips.

FIELD CARROTS—AVERAGE OF RESULTS, 1923 TO 1928

Variety	Source	General type and colour	Yield per acre	
			Green weight	Dry matter
			tons	tons
White Belgian	Bruce	White, Long	19·91	2·214
Improved Intermediate White	Ewing	White, Intermediate	22·62	2·194
Mammoth Intermediate White	Bruce	White, Intermediate	20·08	2·092
White Belgian	Ewing	White, Long	19·47	1·875
Yellow Intermediate	Ewing	Yellow, Intermediate	19·53	1·833
Danish Champion	Exp. Farm, Ottawa	Yellow, Intermediate	17·86	1·827
Long Orange Belgian	Bruce	Long, Orange	16·58	1·808
White Belgian	Dupuy & Ferguson	White, Long	17·52	1·725
Long, Orange	Bruce	Orange, Long	14·27	1·372

Although the strain of White Belgian, obtained from Bruce, has given the highest yield of dry matter, it is not the most satisfactory variety to grow. The roots produced by this strain are very long, comparatively slim and more or less crooked in shape. As a result they are hard to handle and break easily. Varieties of the intermediate type are in general more satisfactory, and, of these, Improved Intermediate White and Mammoth Intermediate White are recommended.

FACTORY SUGAR BEETS

In co-operation with the Division of Chemistry of the Central Experimental Farm, Ottawa, tests of factory sugar beets have been conducted at this Station for the past 13 years. In general the yields obtained have been very satisfactory for this crop, and the Dominion Chemist has reported that the beets produced were of fair to good quality for sugar making purposes. Following are the results obtained in 1928 with three varieties:—

FACTORY SUGAR BEETS—TEST OF VARIETIES, 1928

Variety	Yield per acre	Sugar in juice	Co-efficient of purity
	tons	p.c.	p.c.
Dippe	12·00	17·06	85·41
Buszczynski	10·30	17·39	87·06
Fredericksen	10·30	17·16	84·39

HAY CROPS

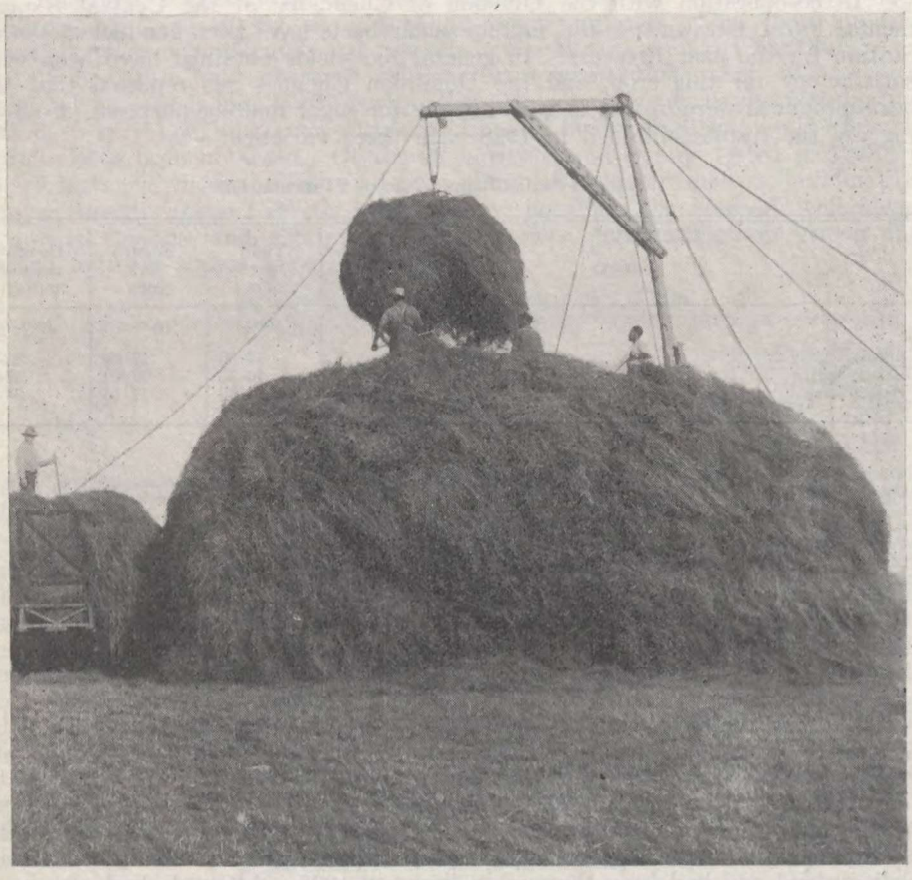
ALFALFA

The results obtained during the past year with alfalfa were again conflicting. In one instance Ontario Variegated alfalfa was sown in 1927 on light, permeable soil in a high state of fertility and alkaline in reaction to litmus. The crop made a good start and entered the winter in apparently good condition. Although the winter was on the whole very unfavourable for clovers and alfalfa the site, on which this particular seeding was made, was well sheltered and remained covered with snow throughout most of the winter. The alfalfa, however, was almost completely winter-killed. Seed of the same variety was also sown the same year on another area that was fully exposed to the sweep of west and northwest winds, and on which snow could lie for short periods only during the winter. The soil on this area was very heavy clay with a very hard subsoil. It was, however, in a high state of fertility, naturally well drained and had been thoroughly limed in 1925. Attempts had also been made to grow alfalfa on this site in 1926, 1923 and 1925. The seeding in 1927 germinated well and made a very rank growth during the season. This was clipped, during early August, and a second growth, about eight inches long, developed by the close of the season. Wintering on this site was very satisfactory and a total crop of 3·77 tons of hay per acre was obtained in two cuttings in 1928.

In general results obtained with alfalfa at this Station have been unsatisfactory, the crops seldom surviving the first winter. Occasionally, however, it has proven exceptionally hardy, and has wintered satisfactorily under the most trying conditions. Accordingly, it would seem that, under average farm conditions throughout this district, consistent, satisfactory results cannot be reasonably expected.

SWEET CLOVER

Results similar to those obtained with alfalfa have also been obtained with sweet clover. So far the crop has proven decidedly unreliable, not more than three trials out of five being successful. In 1928 three plots each, of the varieties Arctic and Common White, which had been seeded in the spring of 1927 without a nurse crop, came through the winter of 1927-28 without apparent injury. A large number of varieties of red clover, a few of which were con-



A practical method of stacking hay.

sidered the hardiest available, growing in plots in the same field, were completely winter-killed. In previous years it has been found that a stand of sweet clover, if well established the first year, will usually winter satisfactorily.

It has, however, proved difficult to obtain a good stand even where no nurse crop is used. Also, a satisfactory stand has so far never been obtained at this Station when a nurse crop of grain has been used. In general, therefore, it may be stated that results with this crop have been more negative than otherwise, and farmers throughout the district are not advised to try to grow it, except on small areas as an experiment.

CEREALS

Although the price of feed concentrates has remained at a high level for the past two years, the amount of grain produced on Eastern Townships farms has not been materially increased during the same period. The impression seems to persist that the district is not suitable for the growing of grain, and it is more economical to purchase this expensive part of live stock rations than to grow it. From the results obtained at this Station, during the past six years, such would not seem to be the case. In general it has been found that when correct cultural methods are employed and suitable varieties used, excellent yields of grain may be obtained. It is, therefore, only reasonable to assume that such experience can be duplicated on the majority of farms in the Eastern Townships and a much larger portion of the concentrates consumed by live stock be produced at home. Usually grain which may be profitably produced in the Eastern Townships is not of itself suitable to form the entire grain ration for most animals, but, by mixing such home grown feed as ground barley and oats with relatively small quantities of cotton seed, gluten meal or other concentrates, a well balanced ration may be obtained.

In the following portion of this report dealing with cereals, the yields tabulated under the several headings are computed from duplicate, triplicate or quadruplicate plots. On such a small scale great care is exercised to secure a full stand of plants on each plot. Furthermore weeds are kept in check and the land used is, as a rule, in a uniformly high state of fertility. Under such conditions fairly accurate comparisons of varieties are possible, but, the yields obtained are somewhat higher than should be expected under ordinary farm conditions throughout the district.

During the past six years over one hundred so-called varieties and strains of oats have been grown in small plots or rod-row tests at this Station. Of these the most promising have been tested in duplicate one hundred and twentieth-acre plots. Following is a statement showing three-year average results obtained with the sixteen leading varieties in this test:—

OATS—AVERAGE OF RESULTS, 1926 TO 1928

Variety	Number of days maturing	Strength of straw on scale of 10 points	Length of straw	Total yield of grain per acre	Yield of kernel per acre
			inches	bush.	lb.
Legacy, Ottawa 678	98·0	8·7	43·7	92·66	2,324
Bannsr, Langille	106·6	6·0	49·6	88·92	2,114
Banner, Ottawa 49	108·7	7·6	49·3	82·77	2,044
Longfellow, Ottawa 478	99·7	6·6	46·5	84·57	2,020
Banner, Griffin	105·0	6·8	47·1	79·79	2,011
Gold Rain	101·0	8·3	48·0	79·47	1,961
Victory	106·3	8·1	49·2	81·73	1,956
Banner, Lennoxville	107·7	8·3	48·1	78·72	1,896
O 1512, Macdonald College	109·0	8·5	50·3	72·27	1,852
O.A.C. No. 3	92·0	8·0	42·1	72·45	1,831
Banner 44, Macdonald College	106·6	8·0	48·0	74·69	1,793
Alaska	93·3	7·8	39·7	66·20	1,765
Daubeny, Ott. 47	93·3	8·0	41·5	66·46	1,747
Banner, Cap Rouge 31	107·0	7·7	48·1	71·18	1,683
Laurel, Ottawa 478	106·3	9·3	42·7	66·46	1,658
O.A.C. 144	108·3	8·4	51·5	66·33	1,648

As was stated in the report from this Station for the year 1927, Legacy, Ottawa 478 has given decidedly promising results and would seem to be an excellent variety for this district. Owing to its comparatively short, rather stiff

straw, it is particularly suitable for fertile low-lying land where it will not lodge as easily as taller varieties. It has also proven fairly thin-hulled, and, as indicated in the foregoing table, has produced very heavy yields of kernel in proportion to total grain.

BARLEY

Each year from 1923, when variety tests of cereals were first started at this Station, to 1927, barley has given higher yields of grain than other kinds of cereals tested. In 1928 varieties of barley also produced a heavier crop than other cereals, but as a result of continued wet weather after seeding, germination was uneven and the stand on individual plots patchy. Fair comparison, therefore, was impossible and no results of experimental value were obtained with this crop.

In preceding years, the highest yields have been obtained with the tall six-rowed varieties. Of these Mensury, Macdonald College 3207, has produced the largest crop on an average of five years, from 1923 to 1927. Chinese, Ottawa 60, has also given high yields over the same period, the difference between it and Mensury, Macdonald College 3207, being very slight. O.A.C. 21, a variety very similar to the preceding two, has proven significantly inferior to Mensury, Macdonald College 3207, and slightly inferior to Chinese, Ottawa 60.

In the six-rowed group, the highest yields have been obtained with Charlottetown 80. This is a comparatively short-strawed variety slightly earlier than varieties of the Duckbill type and less inclined to lodge than varieties of the Chevalier type.

Of the hulless varieties, Himalayan, Ottawa 59, has slightly heavier yields than Guymayle.

SPRING WHEAT

Although spring wheat, as a crop in the Eastern Townships, is of relatively small importance in comparison to oats or barley, small areas are grown annually by many farmers. Previous to 1923, the principal varieties grown were Red Fife and Marquis. Owing, however, to its very apparent superiority for the district the variety Huron has rapidly replaced both Red Fife and Marquis until at present most of the spring wheat produced in this district is of that variety.

In the following statement a four-year average of results obtained with eight of the leading varieties of spring wheat, tested during that period, is shown:—

WHEAT—AVERAGE OF RESULTS, 1925 TO 1928

Variety	Number of days maturing	Height	Strength of straw on scale of 10 points	Yield per acre
		inches		bush.
Huron, Ottawa 3	108·2	43·3	9·1	34·81
Huron, Cap Rouge 7	108·2	44·0	9·2	34·23
Pringle's Champlain, Macdonald College 307	113·1	44·9	9·6	33·53
Red Fife, Ottawa 17	111·0	47·9	9·5	31·61
Garnet, Ottawa 625	101·2	40·8	9·7	31·25
Marquis, Ottawa 15	106·5	44·7	10·0	30·31
Early Red Fife, Ottawa 16	110·2	45·5	10·0	28·46
White Russian	113·2	47·5	9·0	27·90

From the foregoing statement it may be noted that Huron, Ottawa 3, Huron, Cap Rouge 7, and Pringle's Champlain, Macdonald College 307 have produced yields of grain which are not significantly different. In general there

is little apparent difference between these varieties, all three being tall, bearded varieties which do not lodge easily and produce grain of somewhat similar appearance and quality. Pringle's Champlain, however, is somewhat later than either strain of Huron and for that reason is less suitable for much of the district served by this Station.

FALL WHEAT

In general the yields obtained with fall wheat at Lennoxville have compared favourably with those of spring wheat. When sown in comparatively light soil, in a fair state of fertility, early in September, the seed germinates quickly and the plants usually attain a height of six or seven inches before cold weather sets in. If the situation is not directly exposed to the sweep of the prevailing winds, and snow lies on the ground throughout most of the winter, the wheat plants winter well and begin growth early in the spring. Usually the crop is ready for harvest early in August, or eight to ten days earlier than the earliest varieties of oats.

For the four years from 1924 to 1927, practically all varieties of fall wheat tested wintered satisfactorily and produced average yields of from twenty-two to thirty-seven bushels per acre. For the 1928 crop, however, the only land available was decidedly unfavourable, the soil being a heavy clay loam and the site fully exposed to the sweep of the west wind. The crop made a splendid start in the fall of 1927, but, owing to the comparatively open winter, with alternate freezing and thawing, considerable winter-killing resulted and the yields obtained were of little or no experimental value.

Previous to 1928 sufficient hardiness and the highest yield has been obtained with Kharkov 1312, Macdonald College. Excellent results have also been obtained with Kanred.

FALL RYE

Although sown on the same site as fall wheat and under almost identical conditions, fall rye wintered satisfactorily and produced a splendid crop of grain. The only variety grown was Dakold, which produced a crop of 51.21 bushels per acre. The five-year average yield of this variety is 48.05 bushels per acre.

From the experience gained with fall rye in the past five years, it would seem to be a fairly sure crop in this district, and one that could be grown to advantage on many farms.

FIELD PEAS

Although the variety test of field peas was conducted on land immediately adjoining, and, similar to that used for experiments with barley, the various varieties withstood the continued wet weather much better than barley and produced normal yields. In the following table the average results obtained for the past four years with six of the leading varieties tested during that period are shown:—

FIELD PEAS—AVERAGE OF RESULTS, 1925 TO 1928

Variety	Number of days maturing	Length of vine	Yield per acre
		inches	bush.
O.A.C. 181	104·0	56·7	32·50
Arthur, Ottawa 18	105·7	46·2	30·05
Cartier, Ottawa 19	109·5	49·7	28·69
Mackay, Ottawa 25	116·5	60·9	28·67
Chancellor, Ottawa 26	102·2	54·5	26·65
Prussian Blue	117·5	56·7	25·41

As stated in previous reports from this Station, O.A.C. 181, has proved to be a very satisfactory variety for this district. Owing to its earliness it can, if sown reasonably early in the spring, be harvested early in August. At this time the weather throughout the Eastern Townships is usually quite favourable and very little trouble may be expected in drying the bunched crop.

FIELD BEANS

Although the yields obtained with field beans in 1928 were slightly below the average for the previous three years, the crop, as a whole, was very satisfactory and an excellent comparison of varieties, included in the test of varieties, was obtained. For the past three years the yields of beans obtained at this Station have been unusually high, due, in part, to particularly favourable seasons and freedom from disease. Also the land used has been in a fairly high state of fertility. Accordingly, conditions having been very favourable for growth, the yields listed in the following table may be considered as unusually high for the district.

FIELD BEANS—AVERAGE OF RESULTS, 1925 TO 1928

Variety	Number of days maturing	Height of plant	Yield per acre
		inches	bush.
Red Kidney	112·4	15·9	43·37
Navy, Ottawa 711	105·0	12·5	34·98
Selected White, Lennoxville	112·2	16·0	34·25
Improved Yellow Eye	110·7	14·8	30·16
Robust	116·7	18·2	28·56
Large White, Ottawa 713	110·2	12·0	15·12

Of the varieties tested the best for commercial purposes is without doubt Navy, Ottawa 711. It produces a medium-sized, white bean of the navy type that possesses excellent cooking qualities. It is also sufficiently early to fully mature in an average season if sown reasonably early. Improved Yellow Eye, a very popular variety in this district, is somewhat later, and, in two years out of the past five, the vines have been damaged by frost before the beans were sufficiently mature to permit pulling. Red Kidney is a large, reddish-coloured bean of the kidney type, that, although a little late, almost invariably produces an excellent crop. The variety, however, is not well known throughout the district and, although the beans are of excellent cooking quality, a surplus may prove hard to dispose of. For home use, however, it is an excellent variety.

HORTICULTURE

VEGETABLES

POTATOES

Although the potato crop in the district was well up to the average as regards total yield, the yield of marketable potatoes was materially reduced as a result of late blight. Owing to frequent showers followed by dull warm weather, blight spread rapidly, and, where spraying or dusting for its control was inefficient, loss in rotten potatoes was heavy. At this Station where all potatoes were thoroughly sprayed or dusted at least five times during the growing season, the loss in rotten potatoes at digging was approximately two per cent.

SPRAYING VS. DUSTING.—For the past six years, one home-made and two commercial dusts have been compared with the Bordeaux calcium arsenate spray, as a means of controlling blights and the Colorado potato beetle. The first applications are made when the young plants are about four inches high and are followed by further applications at intervals of approximately two weeks. As a rule at least five applications have been made each year. In the following statement the average results obtained for the past six years are shown:—

SPRAYING VS. DUSTING—AVERAGE OF RESULTS, 1923 TO 1928

Spray or dust used	Average per cent of beetles and slugs killed by five applications	Yield of potatoes per acre			
		Marketable		Unmarketable	
		bush.	lb.	bush.	lb.
Green potato arsenate (dust)	88·2	401	16	93	52
Hydrated lime 8 lb., calcium arsenate 1 lb. (dust)	94·3	412	27	61	37
Bordeaux arsenate (dust)	83·1	392	2	81	35
Bordeaux 5–12–40, calcium arsenate 1 lb. (spray)	92·1	387	19	92	6

From the foregoing statement it may be noted that the mixture of hydrated lime and calcium arsenate, applied as a dust, has given the most satisfactory control of beetles and largest crop of potatoes. For the first four years that this project has been conducted, the crop on all plots was remarkably free from disease of any kind. As a result the more complete control of beetles, effected by the hydrated lime and calcium arsenate, was apparently responsible for the substantial increase in yield on the plot treated with this dust over all other plots. In 1927 and 1928, however, blight was more common, and, in each of these seasons, approximately 10 per cent of the potatoes from the plot treated with hydrated lime and calcium arsenate were rotten when dug. On the other plots where the spray or dusts used contained an effective fungicide, rotten potatoes amounted to less than 2 per cent of the total crop. Accordingly, it would seem that had the spray and dusts containing a fungicide also contained more poison, different results would have been obtained over the six-year period. For the past three years excellent results have been obtained, on other areas of potatoes, by mixing one pound of calcium arsenate with ten pounds of green potato arsenate. This mixture is comparatively cheap and apparently contains sufficient poison to control beetles satisfactorily. It is also quite satisfactory as a fungicide.

As regards spraying and dusting, the latter has proven slightly better. It has been observed, however, that good results with a dust are impossible if the material is applied to dry foliage or if rain follows soon after an application is made. If applied to wet foliage early in the morning or immediately after a shower, the dust mixes with the drops of water and forms a coating that, if dried, will stick about as well as that sprayed on. Owing, however, to the mechanical fineness of the dust it can be better distributed than a spray, and, under the best conditions, will form a more complete coating. Accordingly, when it is possible to apply a dust, containing sufficient fungicide and poison, to wet foliage followed by a few hours of drying weather, dusting will apparently give results equal to spraying.

SPROUTING SEED POTATOES.—In this experiment dormant seed potatoes are compared with sprouted seed of the same variety. The dormant potatoes are kept in the best available storage, and in as dormant a condition as possible

until planting time. The potatoes for sprouting are placed in a single layer in trays early in April, and kept in subdued light at a temperature of about 50 degrees F. until sprouts develop. When these sprouts are growing nicely the trays are moved to a position where the light is stronger. As further development of sprouts takes place, the trays are occasionally moved into stronger light until about the first week in May, when they are placed in an open shed or close to an open window in an unheated room. During the second or third week in May all seed is planted, the dormant in the usual manner, and the sprouted in the bottom of shallow trenches. The sprouts on the sprouted seed usually appear above the ground in a few days after planting. Should there be danger of frost the shallow trench is filled in, with a cultivator or hoe, sufficiently to cover the young plants. Care throughout the remainder of the season is the same for both lots. Shortly after blossoming one or two hills are dug from each plot at regular intervals to determine the date at which potatoes of marketable size are formed. All plots are dug, and the potatoes graded and weighed, shortly after the vines are killed by frost in the early fall. Following is a statement showing a five-year average of results:—

POTATO—SPROUTING EXPERIMENT—AVERAGE OF RESULTS, 1923, 1924 AND 1926 TO 1928

Variety and method	Average number of days earlier due to sprouting	Date ready for use, 1928	Yield per acre	
			Marketable	Unmarketable
			bush. lb.	bush. lb.
Green Mountains—				
Small whole, dormant	.....	Aug. 20	274 16	57 53
Small whole, sprouted	14·0	" 4	306 59	63 36
Large whole, dormant	.....	" 20	366 46	52 38
Large whole, sprouted	14·2	" 2	400 21	69 24
Cut set, dormant	.....	" 20	294 48	75 22
Cut set, sprouted	11·0	" 8	389 37	74 58
Irish Cobblers—				
Small whole, dormant	.....	Aug. 14	316 20	75 25
Small whole, sprouted	18·8	July 25	311 11	82 55
Large whole, dormant	.....	Aug. 15	300 46	91 58
Large whole, sprouted	18·9	July 21	271 19	104 3
Cut set, dormant	.....	Aug. 15	290 48	66 1
Cut set, sprouted	17·4	" 3	313 30	60 10

AVERAGE YIELD PER ACRE

——	Dormant		Sprouted	
	Marketable	Unmarketable	Marketable	Unmarketable
	bush. lb.	bush. lb.	bush. lb.	bush. lb.
Green Mountain	311 57	61 58	365 39	69 19
Irish Cobbler	302 38	77 24	298 40	82 23

From the foregoing statement it may be noted that with the variety Green Mountain, sprouting caused a fairly significant increase in yield, while with Irish Cobbler no increase was obtained. It has also been observed during this experiment that the vines of Irish Cobbler on all plots usually ripen down before fall frost occurs. The vines of Green Mountain, however, usually remain green and in a growing condition on all plots until killed by frost.

Accordingly, the earlier start given the later variety by sprouting the seed permits a longer growing season and the production of a larger crop. With Irish Cobbler the earlier start has not proven beneficial in the matter of yield at this Station, since, with reasonably early planting of dormant seed, the season is sufficiently long for the crop to reach normal development before frost.

Sprouted seed has, however, given an earlier crop, and, where prices for very early potatoes are sufficiently high to compensate for the necessary additional expense, the practice may be recommended with Irish Cobbler. With Green Mountain it is apparent that little advantage is to be obtained from sprouting, as the increase in yield, that may be expected under average conditions, would rarely be sufficient to meet the cost of sprouting and extra cost of planting.

GARDEN PEAS

TEST OF VARIETIES.—Nineteen varieties were included in the variety test of garden peas in 1928. Of these a few have been grown each year for the past twelve years, while others have been grown for periods of from one to eleven years. Among the varieties which have been grown for the full period of twelve years, Telephone has consistently produced the largest crop of peas. It is, however, a very tall variety frequently growing to a height of eight or nine feet, and must be brushed if the best results are to be obtained. For the commercial grower the expense of brushing will, as a rule, cut deeply into the profits from the crop, and for that reason Telephone is not a popular variety among market gardeners. For the home or kitchen garden, however, where labour and reasonable expense are not deciding factors, it is the best tall late variety available.

The earliest variety thus far tested is Alaska, but owing to the small pods which it produces, picking is expensive. It, therefore, is not suitable for commercial growing, but may be used to advantage in the kitchen garden. Of varieties tested at this Station for at least five years, the following have been found most satisfactory for commercial purposes: Blue Bantam (early), Gradus (medium early) and Stratagem (late). Each of these produce large well-filled pods, and, under average conditions, do not require brushing.

Among the varieties tested for shorter periods, the largest yield ever obtained at this Station was produced by a cross-bred variety, recently originated at the Central Experimental Farm, Ottawa, from a cross between Gregory Surprise and English Wonder. This variety produced a crop of 38½ pounds of unshelled peas from one thirty-foot row in 1928. The pods were of medium size and tightly filled with medium to large-sized peas. The variety may be classed as about mid-season, as the first picking was available on July 16, in 1928. Excellent results have also been obtained with a strain each of Telephone and Gradus, developed at this Station. Both strains have been grown in the variety test for four years and have produced crops about thirty per cent greater than with seed of the same varieties obtained from commercial sources.

TOMATOES

TEST OF VARIETIES.—Although the first frost was recorded at this Station on September 10, it was very light and did not harm tomatoes. Accordingly, the vines remained in a growing condition until September 24, when the first real killing frost occurred, a date fourteen days later than the average for the past twelve years. As a result an excellent crop of tomatoes was obtained and many late varieties, which, under ordinary conditions, are almost non-productive of ripe fruit at this Station had sufficient time for development and produced light to average crops. With early varieties, on the other hand, the season was practically ideal and excellent yields were obtained.

Of varieties which have been tested for five years or more, the most satisfactory results have been obtained with the variety Alacrity, originated at the Central Experimental Farm, Ottawa. Usually this variety produces the first ripe fruit early in August and by the middle of the month is in full bearing. The fruit is of medium size, bright red in colour, and, although a little rough, is of excellent quality.

Among the varieties which have been tested for shorter periods a selection of Bonny Best, made at this Station in 1924, is outstanding. It is about equal in earliness and yield to Alacrity, but is slightly superior in that the fruit is smoother, more uniform and less inclined to crack.

Of the varieties tested for the first time in 1928, a novelty known as Canadian, obtained from The Harris Seed Company, produced a very large crop of medium-sized, smooth tomatoes. The first ripe fruit was obtained several days later than with Alacrity and Bonny Best, but, for the first three pickings the yield of ripe fruit was much greater than any other variety included in the test.

Two new varieties, Fargo and Viking, obtained from the North Dakota Agricultural College, were also tested. Fargo proved to be a high-yielding early variety, producing smooth uniform fruit of good quality. Viking is a little later, but is apparently very productive and the fruit is of excellent quality and appearance.

BEANS

VARIETY TEST.—Although beans almost invariably make excellent growth and produce large strong plants at Lennoxville, pod-spot or anthracnose is very prevalent, and, many otherwise excellent varieties have proven unsatisfactory, owing to their susceptibility to the disease. Out of a total of thirty-two varieties tested during the past six years, Hodson Long Pod has shown the greatest resistance to anthracnose of the yellow-podded varieties. It is a mid-season variety, fairly high-yielding and the pods are of average quality. Round Pod Kidney Wax and Pencil Pod Black Wax, varieties which are very similar in all respects, are earlier than Hodson Long Pod and the crop is of much better quality. Both are quite susceptible to infection by anthracnose, but, usually this infection is not evident until the later part of the cropping period. Accordingly, under average conditions three or four pickings of clean marketable pods may be obtained. By planting Hodson Long Pod and either Round Pod Kidney Wax or Pencil Pod Black Wax, it should be possible to secure a clean marketable crop over a fairly long period.

Of green-podded varieties, Refugee 1,000—1 and Stringless Green Pod have given excellent results. Either variety may be recommended.

RHUBARB

FORCING IN CELLAR.—With very little trouble crisp tender rhubarb may be obtained during the winter months by forcing mature plants in an ordinary cellar. For the past four years a small quantity of rhubarb has been grown, each winter, in the cellar beneath the office building at this Station. Without exception excellent results have been obtained, the average yield of good stalks for the four years being 6·3 pounds per root. A description of the method followed is given in the report of the Superintendent of this Station, for the year 1927.

LETTUCE

TEST OF VARIETIES.—Thirteen varieties of lettuce were tested in 1928. Of these a number have been grown for at least five years, while others have been included in the experiment more recently. Of the cabbage head varieties tested

for five years or more, the finest and largest heads have been produced by Big Boston. It is, however, inclined to scald if the heads are formed during hot weather. Also, on account of its smooth leaf, it will not sell as readily on the local market as varieties of the Iceberg type. If grown for home use, however, the variety should prove very satisfactory, if sown very early in order that the crop may mature before hot weather, and again late so the heads would form during early fall.

The variety Iceberg has produced compact, uniform heads of excellent quality but rather small in size. As a market variety it is apparently the best available.

Salamander is in many respects similar to Iceberg, but is somewhat earlier and the heads, although larger, are not as compact.

Excellent results have been obtained with New York, but owing to the dark green colour of the outside leaves, it is not easily saleable on local markets. For home use, however, it is very satisfactory.

Hardhead, a novelty obtained from Burpee and tested for the first time in 1928, produced heads of excellent quality and size.

Grand Rapids and Black Seeded Simpson are the most satisfactory leaf or open-head varieties that have been tested.

DATE OF SEEDING CABBAGE HEAD LETTUCE.—This project was begun in 1928 to determine the influence of time of seeding on the development and quality of the cabbage head lettuce. Three varieties are used: Big Boston, Iceberg and New York. The first seeding is made in April in the hotbed and the plants transplanted to the open when about one inch high. The next seeding is made two weeks later in a cold frame and the plants transplanted to the garden when about the same size as with the first seeding. Successive seedings are then made in rows in the garden, at intervals of two weeks, until the middle of July. With the seedings made in the open, the plants are thinned, when about one inch high, to six inches apart.

Although definite conclusions cannot be drawn from the results of a single season, this experiment proved very interesting. With each of the three varieties all of the plants in the first seeding either bolted to seed stalks, or formed small loose heads. With the second seeding about eighty per cent of the plants in each variety formed average heads, although the best were produced by New York and Big Boston. In the third and fourth seedings, practically all plants formed heads, although those of Big Boston scalded. With the fifth seeding, Iceberg and Big Boston formed good heads but it proved too late for New York which formed very small unmatured heads.

CABBAGE

In general the climate of the Eastern Townships is very favourable for cabbage and among gardeners in this district, it is an important crop. As a rule the demand for cabbage is good and a crop can be disposed of at profitable prices. The chief difficulty in the production of this crop, throughout the district, seems to be in the control of the cabbage root maggot, usually from ten to fifteen per cent of the plants, in most areas, being either killed or badly damaged by this insect. At this Station excellent control has been obtained by watering the plants several times with a solution made up of four ounces of corrosive sublimate to forty gallons of water. This solution is first used when the plants are about one inch high in the seed-bed. Again, shortly after transplanting to the field, and usually again after an interval of about three weeks. For the last two waterings, five pounds of nitrate of soda are added to the forty gallons of solution. This, although not aiding directly in insect control, promotes growth and keeps the plants in a vigorous condition. The green cabbage worm is readily controlled by dusting while the foliage is wet, with a dust composed of one pound of

calcium arsenate and ten pounds of hydrated lime. This dust is applied thoroughly when necessary to the young plants, and the insect has so far not proven troublesome after the plants have formed heads.

TEST OF VARIETIES.—Of the many varieties tested, the best results among the early varieties have been obtained with Golden Acre. In earliness it is equal to Copenhagen Market, but superior in quality, uniformity and compactness of head. In size it is slightly smaller, but sufficiently large for sale or home use. For the past three years the average weight of five representative heads of Golden Acre was 22 pounds and of Copenhagen Market 25 pounds, 5 ounces. A late seeding of Golden Acre is also very useful for the production of mid-season cabbage, as it develops well during hot weather and seems to withstand drought better than most varieties.

For a purely mid-season variety, however, Succession has given excellent results. When the seed is planted in early May or late April, the cabbages are ready for cutting during the last week in July and throughout the month of August. The heads are of large size, fairly firm and of good quality.

As a late variety Ex Amager Danish Ballhead is decidedly superior to all other varieties tested. The heads are of medium size, exceptionally firm and of good quality. It has also been observed that they are less inclined to split than those of other late varieties, and their keeping quality is excellent.

DIFFERENT DATES OF SEEDING.—For the past five years seed of Copenhagen Market and Danish Ballhead has been sown at different dates, beginning about the first of May, and continuing at intervals of two weeks until the third week in July. With the exception of 1927, when conditions were unusually favourable, heads of good marketable size and quality have been obtained from all seedings of both varieties up until the middle of June. With Copenhagen Market, seedings as late as the first week in July have given satisfactory results.

ONIONS

TEST OF VARIETIES.—A total of twenty-one varieties of onions were tested in 1928. Of these a number have been included in the experiment each year since 1922. Following is a statement showing the average results obtained with the outstanding varieties tested during that period:—

ONIONS—SIX YEARS' AVERAGE OF RESULTS

Variety	Colour	Shape	Yield from two thirty-foot rows	
			lb.	oz.
Extra Early Flat Red	Red	Flat	28	8
Red Wethersfield	Red	Slightly flat	27	0
Giant Prize Taker	Yellow	Oval	26	5
Ailsa Craig	Yellow	Oval	25	15
Yellow Globe Danvers	Yellow	Oval	24	14

Although Extra Early Flat Red has proven to be slightly more productive than Red Wethersfield, it is not as well known to the trade and is more difficult to dispose of. Local markets seem to prefer a medium-sized, oval onion of red colour, and the most productive of this type and colour is Red Wethersfield. Of varieties tested for a shorter period, a strain of Prize Taker, known as Prize Taker Large Yellow, secured from Graham Bros., Ottawa, has for the past two years outyielded all other varieties tested. The onions of this variety are very

large, light-yellow in colour and oval in shape. For the home or kitchen garden, the variety should prove very satisfactory, but owing to its colour it would not be as suitable for commercial purposes in this district as a red variety.

TRANSPLANTING ONIONS.—For the past ten years, seed of a number of the principal varieties of onions has been started in the hotbed, early in the spring, and the plants transplanted to the open late in May. In each season larger yields have been obtained by transplanting than by seeding in the open, and the onions produced have been of more uniform size and better quality. For the past three years four of the varieties listed in the preceding table on test of varieties were used in this experiment. Following is a statement showing the results obtained from seeding in the open and from seeding in the hotbed and transplanting the plants to the open:—

TRANSPLANTED ONIONS VS. SEEDED IN THE OPEN—AVERAGE OF RESULTS 1926 TO 1928

Variety	Yield from two thirty-foot rows			
	Transplanted		Seeded in open	
	lb.	oz.	lb.	oz.
Large Red Wethersfield	43	5	32	11
Yellow Globe Danvers	42	11	27	11
Ailsa Craig	42	5	29	0
Giant Prize Taker	41	0	25	10

CAULIFLOWER

TEST OF VARIETIES.—As a rule little difficulty is experienced at Lennoxville in producing cauliflower, for, owing to fairly frequent rainfall and the absence of extreme heat, the season is usually particularly favourable to this crop.

The season of 1927 was in no way an exception in this respect, and a fair crop of good quality was obtained from each of the six varieties tested. Of these the best results were obtained from Early Snowball, which has been grown at this Station for the past 13 years. It is an early variety but can be used to advantage in successive plantings over the entire season as the plants seldom bolt or form dwarf heads during hot weather. The heads are medium in size, very compact and usually pure white in colour. Early Dwarf Erfurt has proven somewhat similar in regard to season, but the heads are less compact and the plants are more inclined to bolt after transplanting or during hot, dry weather.

Of the late varieties tested, the best results have been obtained with Danish Giant or Dry Weather. This variety has been grown for only two years, but each year it has produced very large heads of fair quality. Other varieties tested were Large Late Algiers, Danish Perfection and Extra Early Eckenford.

DIFFERENT DATES OF SEEDING.—For the past four years seed of Early Snowball and Dwarf Erfurt has been sown at different dates throughout the season. The first seeding is made early in April in the hotbed and the next about two weeks later in the first cold frame. Further seedings are made in the open garden, at intervals of two weeks, until the middle of July. So far good marketable heads have been obtained each season from all seedings up until the middle of June. In two unusually favourable seasons, 1925 and 1927, fair results were obtained with Early Snowball from seedings made on the second day of July. With Dwarf Erfurt, however, the heads produced from seedings later than the middle of June were of poor quality and very small size.

GARDEN BEETS

TEST OF VARIETIES.—Although a large number of varieties of garden beets have been tested at this Station since 1915, the heaviest yields have been almost invariably obtained with Detroit Dark Red, and beets of the finest quality with Crosby Egyptian. Both of these varieties have been grown for fourteen years. Of varieties which have been included in the tests for shorter periods, Black Red Ball and Cardinal Globe have given promising results.

DIFFERENT DATES OF SEEDING.—In this project seed of Detroit Dark Red is sown as early as the season will permit, and, at intervals of about two weeks, until the middle of July. In each of the five years that this project has been conducted, beets of bunching size have been obtained from all seedings up to the last of June.

GARDEN CARROTS

TEST OF VARIETIES.—Nine varieties of carrots were again tested in 1928, and of these, the best results were obtained with Chantenay and Nantes Half Long. Chantenay is a high-yielding variety suitable for early bunching or winter storage. Nantes Half Long is later and lower-yielding than Chantenay, but is of excellent quality. It is most suitable for mid-season bunching and home use.

DIFFERENT DATES OF SEEDING.—For the past six years seed of the variety Chantenay has been sown as early as the season will permit in the open garden, and, from then on, at intervals of two weeks, until the middle of July. So far it has been found that carrots of bunching size develop in from 90 to 95 days after seedings made as late as the end of May. From then on growth is apparently slower, one hundred or more days being required. Accordingly, carrots of bunching size have rarely been obtained from seedings made later than the middle of June.

SPINACH

TEST OF VARIETIES.—Ten varieties of spinach were grown in 1928. These include Victoria and Long Standing, which have been grown each year since 1922, and eight other varieties which have been grown for shorter periods. Both of the aforementioned varieties are apparently quite suitable for this district and are recommended to growers. King of Denmark, which has been grown for two years, has also given excellent results. It produces very large plants with large slightly crinkled leaves. It is slightly later in maturing than Victoria but earlier than Long Standing.

EGG PLANT

TEST OF VARIETIES.—Although, as a rule, the season at Lennoxville has been found unsuitable for egg plants, a fairly good crop of well-grown eggs was produced in 1928. The varieties tested were New York Purple, Black Beauty and Extra Early Dwarf. Of these Extra Early Dwarf produced the most mature crop.

PEPPERS

TEST OF VARIETIES.—For the past thirteen years, fairly good results have been obtained at this Station with the earliest varieties of peppers. The seed is usually started in the hotbed early in April, and the plants pricked off into shallow flats when about one inch high. When danger of late spring frost is past, usually about June 8 or 9, they are transplanted to the open. As a rule

peppers are available by about the middle of August, and the plants bear well until the first fall frost. If this frost is not unduely severe, it will only harm the leaves and the fully grown unripe peppers will not be injured. These may be readily sold, in this district, or used at home. So far Neopolitan is the most satisfactory variety tested. Squash or Tomato is slightly earlier and will ripen more crop, but the peppers are of smaller size Bullnose and Harris Early have proven both late and low-yielding.

SQUASH

TEST OF VARIETIES.—Although many varieties of squash have been tested at this Station, no variety has proven superior to either Golden or Green Hubbard. There are apparently many strains of these varieties at present available from seedsmen under various names. The difference among such strains, however, has proven to be slight, and apparently the best advice to a grower is, to secure seed of Golden Hubbard, or Green Hubbard, under its generally recognized name.

During the past five years a number of the so called summer squash have been tried. These, although growing to a very large size, are, as a rule, of poor quality and unsatisfactory for table use.

Of the crookneck varieties, Giant Summer Crookneck is fairly satisfactory.

In the vegetable marrow group, excellent results have been obtained with Large White Bush.

MUSKMELON

TEST OF VARIETIES.—Twelve varieties of muskmelon were grown in 1928 in frames used earlier in the season for growing tomato and celery plants. This practice, although bringing the crop of melons rather late in the season, has proven quite satisfactory as a means of testing varieties. It is also economical of frames and sash, in that they are kept in use from early spring until late in July. Of varieties which have been tested for five or more years, Milwaukee Market has given the best results as a large melon. The melons of this variety are usually from four to six pounds in weight and of excellent quality. Montreal Market produces larger melons, but of inferior quality. Among the small melons Emerald Gem is outstanding. The variety is very productive, the melons being of good quality and weighing about one pound each.

SWEET CORN

TEST OF VARIETIES.—Owing to the comparatively cool season, sweet corn develops slowly at Lennoxville and only the earliest varieties may be depended upon to produce a crop before the plants are killed by frost in the fall.

Of the large number of varieties that have been tested, for at least five years, Golden Bantam produces ears of the best quality and size of the yellow varieties. In average seasons, and on favourable sites, it will usually produce a full crop before fall frosts occur. Of the white varieties, Early Malcolm has proven very satisfactory. It is about five days earlier than Golden Bantam and the ears are of similar size and quality. Pickaninny, a variety the kernels of which, when ready for use, are purple to nearly black in colour, is about two weeks earlier than Early Malcolm. Owing to its colour and a comparatively small cob, it has not proven readily saleable on local markets. For home use, however, it is very satisfactory as the kernels are of good depth, quite sweet and of good quality.

Banting, a variety recently introduced by the Dominion Horticulturist, has been grown with excellent results for the past three years. In season, quality and depth of kernel it is very similar to Pickaninny. The colour, however, is

yellow and the ears are nearly as large as those of Golden Bantam. As a variety for early market or home use, it should prove very satisfactory.

CUCUMBER

TEST OF VARIETIES.—Of the many varieties of ordinary cucumbers, that have been tried during the past 13 years, Early Russian and Davis Perfect are the most dependable and satisfactory. Both varieties produce nicely shaped, medium-sized cucumbers of good quality. Early Russian is about 10 days earlier than Davis Perfect, and, by seeding both varieties at the same time in the spring, a good continuation of crop will be obtained.

For the past five years a frame cucumber Rollins Telegraph has been grown in the hotbed with good results. The method of growing this variety is the same as that followed with muskmelon. Attempts to grow this variety in the open garden have not been successful.

Another variety known as " Cut and Come Again," which produces cucumbers similar in size, shape and colour to Rollins Telegraph, was started in pots in the hotbed and transplanted to the open garden in June. All of the plants grew well and a crop of dark green cucumbers, averaging about 16 inches long, was obtained.

Of the pickling varieties, West Indian Gherkin has given the best results.

TREE FRUITS

APPLES

VARIETY ORCHARD.—As a result of the very heavy precipitation accompanied by mild warm weather during the fall of 1927, the wood of apple trees ripened slowly. When winter set in, a great many trees in the variety orchard had not shed their leaves, indicating that the wood was in a soft and comparatively unripe condition. The winter months, however, were comparatively mild and the spring of 1928, on the whole, favourable. Accordingly, very little winter injury occurred and most of the trees began the season of 1928 in a strong healthy condition.

For the past six years nitrogenous fertilizers have been regularly applied each spring, and, no doubt due to this, a number of varieties are now bearing regularly. The variety Honora, mentioned in the report from this Station for 1927, again bore a heavy crop in 1928. It is quite possible that this McIntosh seedling may become a valuable variety for districts where hardiness is essential, and it is also possible that it may prove of value to commercial growers in other sections. The fruit is very similar in size and colour to McIntosh, and the flesh white, very juicy and pleasantly sweet in flavour. At Lennoxville it has ripened during early September, and the apples in ordinary storage have retained their crispness until late in October.

Gilda, another McIntosh seedling, originated by the Dominion Horticulturist, fruited at Lennoxville in 1928. The apple is medium in size, of good flavour and of fair keeping quality. The ground colour of the skin is yellow, but is overlaid with splashes and streaks of crimson to such an extent that it has the appearance of a crimson apple. The trees of this variety are quite hardy and it should prove very useful for the cooler portions of the province.

Other hardy varieties, originated by the Dominion Horticulturist and recommended in previous reports, are in order of season as follows:—Galetta, Melba, Joyce, Lobo, Winton and Donald.

A number of newer hardy varieties, which are at present unobtainable commercially, are being propagated at this Station and it is expected to sell the trees, thus obtained, at the prevailing rates at the time of sale. A limited quantity of scions are also distributed each year.

SMALL FRUITS

STRAWBERRIES

Owing to light snowfall during the winter of 1927-28, and changeable weather during the early spring of 1928, winter-killing of strawberry plants was quite severe throughout the Eastern Townships. The growing season, however, was very favourable and the yields obtained throughout the district were, as a rule, very little below average. At this Station, where a mulch of straw is applied each fall, as soon as the ground is frozen to a depth of two or three inches, and not removed until the plants begin to grow the following spring, no serious winter-killing occurred. Accordingly, with a full stand of plants and very favourable weather, exceptionally high yields were obtained.

TEST OF VARIETIES.—A total of nineteen varieties was tested in 1928, each variety being grown in one and two-year-old plots. Of varieties which have been grown for a period of five years or more, Senator Dunlap and Parson Beauty are probably the most satisfactory for commercial plantings. Both varieties are comparatively high-yielding and plants are easily obtainable commercially. Senator Dunlap is very early but on fertile land, will usually bear well for about three weeks. Parson Beauty is about one week later and will, as a rule, continue to bear for a week to ten days after Senator Dunlap has finished.

Portia, a variety originated by the Dominion Horticulturist, has also proven to be a splendid late variety. The berries are of large size, deep red in colour and very firm. As the seeds, which are yellow in colour, are partly exposed on the outer surface of the berry when ripe, it has a very attractive appearance. It is also excellent for canning or preserving. As the flowers of this variety are pistillate, or imperfect, an entire plantation of it will not fruit satisfactorily. Perfect pollination and setting of fruit will, however, be obtained if a few rows of a perfect flowered variety, such as Senator Dunlap, are included in the plantation.

For home use Cassandra, another variety originated by the Dominion Horticulturist, has proven very satisfactory. The fruit is a little soft for commercial purposes, but is large in size, of excellent flavour and good appearance. The variety also yields well and the plants have proven exceptionally hardy at Lennoxville. Excellent results have also been obtained with a late seedling of the variety Wm. Belt, developed at this Station. For the past four years it has proven to be the heaviest-yielding variety tested. The plants are quite hardy and very productive of runners. The fruit is medium to large in size, evenly conical in shape and of good flavour. It is, however, somewhat soft, and for that reason cannot be recommended for commercial planting. As a late variety for home use, it should prove very satisfactory.

RASPBERRIES

The work with raspberries which has in the past consisted of the testing of varieties, was reorganized in 1928 and will consist of a modified test of varieties and an experiment comparing several different fertilizers, applied at different times in the season, with manure. It is also intended to compare a straw mulch with clean cultivation.

CURRANTS AND GOOSEBERRIES

Owing to the persistent and regular infection of currants and gooseberries by European Currant Rust, a stage of the destructive White Pine Blister Rust, it was decided to discontinue all work with these fruits at this Station, for a few years at least. As has been stated in previous reports, white and red cur-

rants and gooseberries have not been seriously injured by this disease and have produced practically normal crops of fruit. The probability, however, of infection to white pines, of which there are a number growing in the vicinity, and thus becoming a means of establishing this destructive disease in the district is obviously of more economic importance than the variety testing of currants. Accordingly, the entire plantation of currants and gooseberries was torn up and the plants destroyed.

ORNAMENTAL GARDENING

PERENNIALS AND SHRUBS

Owing to the comparatively low-lying situation of most of the ornamental grounds at this Station, a large portion of the area occupied by shrubs and perennials is usually flooded at least once each year by the rising of the water in the St. Francis river. In general such flooding has been of comparatively short duration and the resulting damage rarely serious. In the fall of 1927, however, when 4·69 inches of rain fell in less than 48 hours on November 3 and 4, the river rose to such an extent that all of the lower ornamental section of the grounds remained under water for practically three days. Again on April 6, 1928, when the ice in the St. Francis river broke up, a jam was formed which diverted the course of the river temporarily so that it ran, for a few minutes, over a portion of the grounds. When the water fell the entire lower portion of the ornamental grounds was covered with thick river ice. As a result of continued warm weather, the river again rose the next day and remained in flood condition for three days. During this period considerable damage was done to shrubs by drifting ice, and the continued flooding killed a great many herbaceous perennials. Accordingly, no results of experimental value were obtained from the main plantings of herbaceous perennials and ornamental shrubs in 1928. It is, however, interesting to note that certain species were apparently little injured by continued flooding, and made good growth with normal bloom in 1928. Such species were: *Phlox paniculata, Phlox suffruticosa, Lychnis chalcedonica (Jerusalem Cross)*, Delphinium (Larkspur), *Aquilegia* (Columbine), Iris (German), *Iris Laevigata, Papaver orientale* (Orientale poppy), *Dianthus barbatus* (Sweet William), *Primula farinosa* (Polyanthus) and *Helenium autumnale.*

Species which were wholly or partially killed were: *Althaea rosea* (Hollyhock), *Anchusa Barrelieri, Bellis perennis* (English daisy), *Chrysanthemum coccineum* (Pyrethrum), *Dianthus plumarius* (Garden pink), *Gaillardia aristata* and all varieties of pansy. A number of varieties of paeony were also flooded, but were injured only in that bloom was retarded or reduced.

With shrubs the damage consisted almost entirely in the breaking off of branches or entire plants. This resulted in little actual killing but necessitated very heavy pruning. With the exception of named varieties of lilacs which were completely killed, all other species in the shrub border made good growth in 1928, and entered the winter in a vigorous condition.

ANNUALS

A large number of varieties of various annuals were grown in 1928, and, although most of the tender varieties were killed by frost on September 10, the amount and continuation of bloom was very satisfactory.

CANNA.—Excellent results were again obtained with several varieties of cannas. One large circular bed, planted with the variety Bronze King Humbert and edged with *Perilla nankinensis*, was particularly pleasing. In this the

cannas reached a height of about five feet, each plant being surmounted with a spike of large red flowers. The purplish bronze foliage of the cannas also blended nicely with the deeper bronze of the Perilla border. Other varieties of canna grown were: Olympic, Firey Cross, Rosea Gigantea and Yellow King Humbert.

DAHLIA.—A total of one hundred and twenty-six varieties were grown in 1928. The majority of the plants were raised from tubers, started in the hotbed and transplanted to the open in early June. A small number of plants were also raised from cuttings but the results obtained were unsatisfactory. Practically all plants raised from tubers produced a large quantity of excellent bloom. The most satisfactory varieties tested in 1928 were:—

Decorative: Jersey Beacon, Jersey Beauty, Alexander, Waldie and Mr. Crowley.

Paeony flowering: Billionaire, Frank Walker, Gorgeous and Mariposa.

Cactus: Skakerack and Pierrot.

Hybrid Cactus: Miss New York and Jersey Mammoth.

Pompon: Pride of Berlin and Vivid.

GLADIOLI.—Of fifty-seven varieties that were grown in 1928, the most satisfactory results were obtained with the following:—

Blue and Purple: Baron V. Hulot and Purple Glory.

Red: War, Red Emperor and Scarlet Princess.

Pink: America, Marshal Foch and Evelyn Kirkland.

Yellow: Schwaben, Loveliness and Flora.

White: Mrs. Dr. Norton, White Giant and Mary Pickford.

SWEET PEAS.—Two collections of sweet peas were grown, one being obtained from an American seed house and the other composed of the same, or similar, varieties, the seed of which was grown in British Columbia. In general the best results were obtained from the seed raised in British Columbia. Almost without exception the vines were more vigorous and the bloom of better quality. Germination of seed was also much stronger.

Of the twenty-two varieties tested the following ten were the most satisfactory:

Grenadier, Giant White, Daffodil, Supreme, Floradale Purple, Blue Bird, Felton Cream, Unwin, Charity Crimson, King Mauve.

MISCELLANEOUS ANNUALS.—A large number of common annuals were grown in 1928 from seedings made in the hotbed and in the open. In general excellent results were obtained and a good continuation of bloom was maintained from late in June until the end of September.

POULTRY

During the summer months of 1928, a number of improvements were made to the buildings of the Poultry Division of this Station. A new farmers' house, 16 by 32 feet, of the straw loft type, was built just across the roadway from the Administration Building, to accomodate 100 laying pullets. The two former permanent laying houses, 16 by 32 feet each, were joined together by building in the twenty foot space which was between the two houses, making one continuous house. This was divided into pens of approximately six and one-half feet wide by 16 feet in depth, which will make very good breeding and experimental pens, and should be a great help in the individual mating and pedigree work during the coming spring. This house will take the place of the colony

houses which had to serve the purpose of special breeding pens during each spring, and then be cleared up in time to use as brooder houses for the chicks. The four special pens during the spring of 1928, consisted of 17 to 20 Barred Rock hens which had been retained chiefly for their value as reproducers of better stock, and mated to males of as good breeding as were available. The females used in the special pens are given with their winter egg-record, and their yearly record in their pullet year as follows:—

EGG-RECORDS, PEN A

Hen No.	Winter	Year	Hen No.	Winter	Year
	eggs	eggs		eggs	eggs
C.H. 183	76	269	I 508	86	242
C.H. 185	31	236	I 511	52	253
C.G. 113	51	203	I 562	38	262
C.G. 116	84	226	H 275	39	242
C.G. 127	60	214	H 296	62	227
C.G. 131	91	223	H 308	46	241
C.F. 173	90	249	H 309	68	263
C.F. 175	57	243	H 332	79	249
C.E. 163	43	209	H 353	72	275
			J 688	71	237

The 19 hens used as breeders in this pen A, had an average winter egg-record of 63 eggs each, and an average year's record of 240 eggs each in their pullet year, with an average egg-size of $24\frac{3}{4}$ ounces per dozen. These hens were mated to a young male, No. G 470, which was from a registered hen with an official record of 223 eggs, and an average egg-size of 25 ounces per dozen. This young male had 25 ancestors with egg-records of over 200 eggs each, and is a full-brother to the pullet which made the best record during 1928, and is mentioned later in this report. His paternal granddam had an egg-record of 821 eggs in four years, an average of 205 eggs per year, and was only broody once for a very short time. His paternal great granddam was D 13, which was pre-

Poultry breeding house at the Dominion Experimental Station, Lennoxville, P.Q.

viously mentioned in reports as being a long distance layer, 816 eggs in six years, and was also noted for a very high per cent fertility and hatchability when used for hatching purposes. Also among his ancestors are E 12, with a record of 301 eggs in her pullet year, and E 48, with a record of 290 eggs. These two hens have 18 grand-daughters which produced records in 1924 from 241 to 275 eggs each.

The total eggs set from this mating proved 93·4 per cent fertile, and 61·4 per cent of the fertile eggs hatched.

EGG-RECORDS, PEN B

Hen No.	Winter	Year	Hen No.	Winter	Year
	eggs	eggs		eggs	eggs
C.H. 188	70	305	I 510	107	277
J 640	80	209	I 553	70	226
J 642	89	240	I 571	49	231
J 685	79	211	H 270	54	207
J 697	78	230	H 319	63	222
J 705	69	217	H 389	52	206
J 761	71	241	H 419	50	254
J 781	85	241	H 435	72	242
J 810	67	227	H 440	51	216
J 819	79	214			

The 19 hens used as breeders in this pen had an average winter record of 70 eggs each, and an average year's record of 232 eggs each in their pullet year, with an average egg-size of 25¾ ounces per dozen. These hens were mated to a large, vigorous young male, No. 365, which was eligible for registration, being from a hen which had qualified in the 1925-26 Nappan Contest with 222 eggs, and she in turn was from a hen which qualified in the 1923-24 Nappan Contest with 237 eggs. The total eggs set from this mating proved 87·1 per cent fertile, and 56·3 per cent of the fertile eggs hatched.

EGG-RECORDS, PEN C

Hen No.	Winter	Year	Hen No.	Winter	Year
	eggs	eggs		eggs	eggs
K 851	52	200	K 954	77	197
K 854	65	201	K 959	56	203
K 861	71	216	K 969	87	226
K 867	31	207	J 606	62	180
K 879	66	204	J 663	68	194
K 899	20	199	J 693	53	188
K 904	81	226	J 787	52	180
K 905	60	196	I 529	67	214
K 913	72	207	H 310	49	205
K 952	77	207	H 404	92	207

The 20 hens used as breeders in this pen had an average winter record of 62 eggs each, and an average year's record of 203 eggs each in their pullet year. These hens were mated to a half-brother of the young male used in pen A, No. L 5, being sired by the male from the hen that qualified in the 1925-26 Quebec West Laying Contest with an official record of 226 eggs, and his maternal granddam made a record at this Station of 240 eggs in her pullet year. The total eggs set from this mating proved 93·7 per cent fertile, and 66·4 per cent of the fertile eggs hatched.

EGG-RECORDS, PEN D

Hen No.	Winter	Year	Hen No.	Winter	Year
	eggs	eggs		eggs	eggs
K 850	89	179	K 1048	33	180
K 856	26	190	J 658	47	201
K 860	46	171	J 704	52	223
K 887	12	174	J 746	93	223
K 915	27	181	J 766	52	234
K 935	50	179	J 775	97	205
K 960	44	211	J 783	71	240
K 964	61	181	I 501	78	217
K 991	46	211			

The 17 hens used as breeders in this pen had an average winter record of 54 eggs each, and an average year's record of 200 eggs each in their pullet year. These hens were mated to a vigorous young male, No. L 9, which was from a hen which had qualified in the 1923-24 Quebec West Laying Contest with an official record of 209 eggs, and he was sired by the same sire as the males in pens A and C. The total eggs set from this mating proved 94·6 per cent fertile and 62 per cent of the fertile eggs hatched.

PEDIGREE BREEDING FOR EGG PRODUCTION

In order to find out the influence which certain male birds have upon their progeny regarding type, egg-production, and egg-size, all the chicks from the above-mentioned pens are pedigree-banded before being removed from the incubators to the brooders. These chicks are observed throughout the growing season, and especially at the times of selection for laying hens. It has been noted that certain males will transmit the powers of high egg-production to a large percentage of their female progeny in spite of a variety of records among the females to which they have been mated, and the same is true of other characters such as body-type, body-size, size of eggs, and constitution.

BEST DATE FOR INCUBATION

To determine the best date for incubation with regard to fertility and hatchability, eggs are set during March, April and May, and records kept of the results of fertility and hatchability by each month. This project has been conducted for nine years and a summary of results are given here:—

BEST DATE FOR INCUBATION

Year	March		April		May	
	Per cent fertility	Per cent hatch	Per cent fertility	Per cent hatch	Per cent fertility	Per cent hatch
1920	84·7	32·6	88·7	53·5	91·3	64·6
1921	88·3	48·6	93·9	64·6	none set	none set
1922	89·6	31·8	86·9	57·8	92·1	63·6
1923	86·5	14·5	87·2	26·2	88·4	53·5
1924	89·2	37·2	86·4	47·4	87·7	55·7
1925	86·1	39·8	86·3	66·3	86·7	75·7
1926	77·1	34·3	82·3	50·2	86·6	66·7
1927	79·9	50·5	90·4	63·7	none set	none set
1928	84·7	53·2	89·5	57·9	none set	none set
Average	85·1	38·0	87·9	54·2	88·8	63·3

NOTE.—It would be well to mention that the use of pullet eggs as well as hen eggs for hatching in this summary reduced the average to quite an extent. The difference between hen eggs and pullet eggs for incubation may be noted in the section below on breeding for fertility, hatchability and livability.

BEST HATCHING DATE FOR EGG-PRODUCTION

From a number of tests conducted at this Station as a means of demonstrating the necessity of having pullets well-matured before the cold weather sets in, the results prove that the pullets must be hatched early enough to become fully matured before the short days and colder weather, if the most profitable production is to be expected during the winter months when eggs are selling at high prices.

From the results of four different tests of four winter months' duration, the average profit per bird over cost of feed during the four months' test from April-hatched pullets was $2.37, while the average profit over cost of feed during the same periods from May-hatched pullets was $1.48. It has been observed from the various results that the best month for the hatching of any of the general purpose breeds raised in the Eastern Townships for the production of eggs in the winter months is the month of April.

HATCHING RESULTS OF REGISTERED HENS

The term "Registered hens" applies to birds which have qualified for registration in the Canadian National Poultry Records by producing at least 200 eggs in any Canadian Egg-Laying Contest, and producing eggs which will average at least 24 ounces per dozen. These hens are then used as breeders on the owners' premises, are mated to an approved male, and each individual hen's chicks are hatched in a separate compartment so that the chicks may be wing-banded with a special band issued by the Canadian National Poultry Record Association. The hatching results of the registered hens which are owned by this Station are as follows for the past five years:—

HATCHING RESULTS OF REGISTERED HENS

Year	Per cent fertile	Per cent hatch	Year	Per cent fertile	Per cent hatch
1924	98·8	73·8	1927	94·2	59·6
1925	86·3	62·7	1928	90·6	54·0
1926	62·2	53·9			

Average for five years, 86·4 per cent fertile and 60·8 per cent hatched.

BREEDING FOR FERTILITY, HATCHABILITY AND LIVABILITY

In order to determine the advantage of using eggs from hens for hatching instead of eggs from pullets during their first year's production, a number of eggs from each source have been used and a record kept of the different results noted each year since this Station started in poultry work. The following summary should prove interesting to those who are anxious to reduce the cost of renewing the poultry on their farms:—

HATCHING RESULTS OF HENS VS. PULLETS

Year	Hens			Pullets		
	Per cent fertile	Per cent hatch	Per cent alive at 6 weeks	Per cent fertile	Per cent hatch	Per cent alive at 6 weeks
1920	No hens on this Station			89·5	54·8	96·4
1921	95·1	58·9	93·0	86·9	54·0	79·0
1922	84·4	54·2	94·9	92·6	50·2	92·3
1923	87·2	36·3	90·1	87·5	24·8	69·2
1924	84·8	53·7	95·0	92·9	35·5	85·0
1925	86·9	60·8	96·2	72·1	13·8	52·6
1926	79·9	60·2	97·0	83·5	34·7	87·0
1927	90·3	59·7	97·5	76·3	55·0	80·1
1928	90·7	59·5	99·0	75·6	40·7	91·8
Average	87·4	55·4	95·3	84·1	40·4	81·5

NOTE.—The most noticeable feature was the absence of small stunted chicks among those hatched from hens.

BROODING

Of the 1,841 chicks hatched during the spring of 1928, at this Station, 695 were sold as day-old chicks in lots of 50 or less to those anxious to secure a start in bred-to-lay stock, and the others were brooded in colony houses with coal-burning brooder stoves installed to supply the necessary heat. In order to determine the average cost of brooding chicks, a record has been kept of fuel costs to operate brooders as long as chicks required heat.

BROODING COSTS

An average has been taken of nine years' costs for fuel to operate the brooder stoves used at this Station, and the average cost per chick was 2¾ cents when brooded in lots of an average of 250 chicks under one brooder.

COST OF REARING CHICKS

Many are desirous of knowing just what it would cost for feed to raise pullets for the laying pens, from the time they are day-old chicks until they are matured. With this aim in mind an account has been kept of the feed used each month, and charged at the actual prevailing market prices of the district. The average number of chicks fed during each month is the basis of calculating the cost per chick per month. This test has been continued during 1928, and the following table gives the average feed cost per chick for the past ten years:

COST OF REARING CHICKS

Year	April	May	June	July	Aug.	Sept.	Oct.	Total
	cts.	cts.	cts.	cts.	cts.	cts.	cts.	cts.
1919	.....	3½	6¼	14½	18½	20½	23¼	87
1920	2½	6½	7	13½	17½	20¼	27½	94½
1921	1½	5½	7¾	12½	15½	15	16¼	74½
1922	1½	3¾	5½	9¾	9½	10¼	11	51¼
1923	2	5½	7½	11	12½	14½	14¼	67¾
1924	2¼	5	8¾	10½	13	14½	15¾	69½
1925	2¾	6¼	8	10¼	14½	15	17	73¾
1926	2½	5¼	7½	11¾	13	16½	19½	76
1927	3	6	9¾	12	14	16	18	78¾
1928	3½	7	10½	13	16¼	18	18¾	87

The average cost for feed to raise a pullet to maturity was 76 cents. It might also be mentioned that during the ten year's test, that a few pullets commenced laying in September, and a good number were laying during October, but the approximate average time of maturity would be the end of October.

COST OF FEEDING LAYERS

An account has been kept of all feed consumed by the pullets during each month of each year. All feed has been charged at the prices which are being paid in the locality, and are summarized from the past nine years' tests, giving the average cost per bird for a year.

Cost of Feeding Layers

1920	1921	1922	1923	1924	1925	1926	1927	1928
$	$	$	$	$	$	$	$	$
3 12	2 50	1 83¼	2 05¾	2 13	2 51¼	2 43½	2 53	2 86¾

Taking an average of the nine years' cost would give $2.44 as the average cost of feed per bird for a year.

COMMERCIAL VERSUS HOME-MIXED RATIONS

As the result of a great deal of discussion arising from the question as to whether commercial feeds are as economical and will give as good results in the winter months as home-mixed feeds, provided that the proper ingredients for the mixing of home-mixed feeds can be secured and intelligently used, two tests have been conducted which are included in the above summary of nine years' costs of feeding layers. Each test was of four months' duration (November, December, January and February) and was conducted as follows: One hundred pullets of uniform size, maturity and breeding were divided into two pens of 50 birds each. In each test one pen was fed on recommended commercial feeds, while the other pen was fed on home-mixed feeds, all being housed alike and given the same care and attention. The results were as follows:—

Results with Commercial and Home-mixed Feeds

		First Test		Second Test	
		Commercial feeds	Home-mixed feeds	Commercial feeds	Home-mixed feeds
Total cost of feed Nov. 1 to Feb. 28	$	45 58	39 37	41 77	32 35
Eggs laid during test	No.	2148	24 0	2157	2281
Value of eggs produced	$	106 48	120 60	112 34	118 80
Profit over cost of feed	$	60 90	81 23	70 57	86 45
Average profit per bird (4 months)	$	1 22	1 62	1 41	1 73

EGGS REQUIRED TO PAY FOR FEED

At prevailing market prices of eggs each year it requires a certain number of eggs laid in order to pay cost of feed before interest on investment or profit can be figured. The following gives the average number of eggs required during the four winter months each year by a laying pullet to pay the cost of her feed, and also the average number of eggs required each year to pay cost of feed.

EGGS REQUIRED TO PAY COST OF FEED PER BIRD (4 WINTER MONTHS)

1920	1921	1922	1923	1924	1925	1926	1927	1928
16	16	13	16	14	16	16	14	17

EGGS REQUIRED TO PAY COST OF FEED PER BIRD FOR YEAR

1920	1921	1922	1923	1924	1925	1926	1927	1928
53	54	50	54	57	63	58	59	69

NOTE.—In almost every case where feed was more expensive, the eggs were also higher in value.

COST OF FEEDING BREEDING BIRDS

While all stock birds which are kept over, after their first laying year, are kept primarily for their value as breeders, yet an accurate account is kept of their feed costs and their production, in order to know whether they will pay their way, even when the eggs are valued only as market eggs. The average cost of feed per breeder during the past eight years is as follows:—

COST OF FEEDING BREEDING BIRDS

1921	1922	1923	1924	1925	1926	1927	1928
$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
2 56	1 87	1 70¾	1 79	2 52¼	2 23½	2 24	2 28¼

Average cost of feed per hen per year, $2.15.

PULLETS VS. HENS FOR EGG-PRODUCTION

To determine the comparative values of pullets and hens for egg-production, a record of eggs laid, value and profits, has been conducted over a period of years, and a summary prepared from the results.

PULLETS (Average of 9 years)

Average number of pullets used in pens each year	No.	135
Average cost of feed consumed per bird each year	$	2 44
Average number of eggs produced per bird each year	No.	168
Average price of eggs per dozen each year	cts.	50
Average per cent production per day each year	%	44·7
Average profit over cost of feed per bird each year	$	4 56

HENS (Average of 8 years)

Average number of hens used in pens each year	No.	82
Average cost of feed consumed per bird each year	$	2 15
Average number of eggs produced per bird each year	No.	112
Average price of eggs per dozen each year	cts.	50
Average per cent production per day each year	%	30·5
Average profit over cost of feed per bird each year	$	2 51

NOTE.—A considerable number of the eggs produced by the hens were used for hatching purposes, and if those had been figured even at reasonable prices for hatching instead of the regular market price, there would have been considerably more profit over cost of feed to add.

YEARLY PRODUCTION OF HEN No. C.I. 141

Pen No. Hatched April 17, 1927. Chick Band No. F. 27940. Wing label, F. 2674.
Variety B.P.R. Out of Mating H.7 ♂F. 148 ♀C.F. 179 Adult Band No. Contest I. 141.

Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Totals
November.....	1		1	1	1	1		1	1	1	1		1		1	1		1		1	1	1		1								17
December.....		1	1	1		1	1	1	1	1	1		1	1		1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	26
January.....		1	1	1	1	1	1	1		1	1	1	1		1	1	1	1	1	1	1	1		1	1	1		1	1	1	1		26
February.....		1	1	1	1	1	1	1	1		1	1	1	1		1	1	1	1	1	1	1	1	1		1	1	1	1			25
March.....	1	1	1	1	1		1	1	1	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	29
April.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	29
May.....	1	1		1	1	1	1	1		1	1	1	1	1	1		1	1	1	1	1		1		1	1	1	1	1	1		25
June.....	1		1				1	1				1	1	1	1	1	1	1	1	1	1		1	1	1	1		1	1	1		21
July.....	1		1	1	1		1	1	1	1	1	1	1				1	1	1	1	1	1		1		1	1		1	1	1	23
August.....	1		1	1		1	1	1		1	1	1	1	1		1	1	1	1	1	1	1	1	1	1		1	1	1	1	1	26
September.....	1		1	1		1	1	1	1	1	1	1	1		1	1	1			1	1	1	1	1	1	1		1	1	1		24
October.....	1	1		1	1		1		1		1	1	1	1		1	1		1		1	1	1		1	1		1		1		20
																																291

Age at first egg, 228 days.
Pullet body weight, 5. Egg colour, brown. Egg shape, oval. Egg weight, 25 ozs.
Adult body weight, 5·5. Egg colour, brown. Egg shape, oval. Egg weight, 26 ozs.

VALUE OF BREEDING AND RECORD WORK

The first step in the breeding of poultry is the selection of the best available birds to make up the breeding pen, and the higher the ideal of the breeder, the fewer will be the individual birds that are considered suitable for the breeding pens. Another essential in the breeding up of a successful bred-to-lay strain is the selection of individuals having the power to transmit desirable qualities to their progeny and it is in all this work that records are of value to the breeder. As a result of trapnesting at this Station, almost 300 birds have been found to have produced over 200 eggs in their pullet year, and a number of these birds have produced over 200 eggs in their second year. An outstanding record might be mentioned in the production of No. H 419, which is the paternal granddam of the bird whose record is shown as the highest bird for the year 1928, and which produced 254 eggs in her pullet year, 206 eggs in her second year, 192 eggs in her third year, and 169 eggs in her fourth year. This makes an average of over 205 eggs per year for four consecutive years, in spite of the fact that this hen was put on to lighter rations as a breeding hen during her second, third and fourth years. Another feature which is noted in some birds and their progeny is the lack of inclination towards broodiness. No. C. I. 141, whose yearly egg-record is shown previously in this report, has not been broody once yet, nor has her dam or granddam been reported broody. She is a full-sister to the young male which was used in pen A during the spring of 1928, and made this very good record of 291 eggs without the aid of electric lights to lengthen the days, or any special feed outside of the home-mixed rations which the rest of the pullets were receiving. Another interesting branch of record work is the hatching records, some hens having the desirable characteristics of not only being a good producer in numbers and size of eggs, but also having the ability to produce eggs that will hatch a large percentage of progeny having the desired characteristics. For instance, a striking example might be taken of an individual at one time in the flock at this Station, to which most of the present flock can trace their breeding. She produced over 200 eggs in her pullet year, was noted for the high per cent of fertile and hatchable eggs each year, the lack of broodiness in her or her progeny, the likeness of type in her progeny and the excellent egg-records of her daughters. Individuals having the qualities of good producers and also as reproducers of those qualities, are invaluable and should be kept as long as they will give good results.

IMPROVING QUALITY OF POULTRY IN THE DISTRICT

In order to help to improve the poultry flocks of the district, it has been the policy of this Station to sell at reasonable prices to farmers any stock over the requirements of the work of the Station that would be considered fit for improved breeding work, and to sell those in small lots so that as many as possible might benefit by the distribution. During nine years there has been distributed approximately 8,100 day-old chicks, 1,000 pullets, 500 breeding hens and 600 male birds from this Station. An improvement has been noted in the uniformity of type and increased production of the farm flocks throughout the districts where this bred-to-lay stock has been distributed, pure bred birds have replaced the mixed breeds, and a great deal more attention is being given to feeding, housing and more intelligent care of the flock. Much keener interest is being taken by the farmers in attempting to secure males from a high producing strain, and it is encouraging to have farmers, who were somewhat indifferent as to the value of a good strain in the past, coming back inquiring for a male bird from a good strain, as they had noticed an improvement in the progeny from a previous purchase. The actual results of tests are bringing the farmers to realize more fully each year the importance of securing good stock.

THE VALUE OF A GOOD SIRE IN POULTRY WORK

Whatever the ideal of the poultry breeder, all agree that a good male is the main essential to success. While it is very important to have vigour and active health in each individual of the breeding pen, it is even more important that the male be exceptionally strong in vigour and constitution. It is necessary that the breeder should bear in mind that the various characters of a male may be transmitted to its progeny separately. Certain males may have the ability to transmit several desirable characteristics, and may likewise transmit one or more very undesirable characteristics. Therefore, it is plain that the first essential is the selection of males having the characteristics wanted, and the next step is to test their ability to transmit those characteristics. To illustrate the value of progeny-testing records in poultry work, we will take the progeny of four males used in some of the pens in the spring of 1924, at this Station. No. H 332 was the sire of pullets which averaged 168 eggs in their pullet year. H. 233, sired pullets which averaged 210 eggs each. G 7 sired pullets which averaged 216 eggs each and G 8 sired pullets which averaged 136 eggs each in their pullet year. By the use of males that had the power to transmit higher production to their progeny, the average production at this Station has been raised from 121 eggs to 179 eggs per hen.

Another character which is highly important is the size of egg produced, and in the transmitting of this desirable character to the female progeny, the male may be either a help or a hindrance. An outstanding example might be taken from the experience of a contestant who had a pen of birds entered in the third Quebec West Egg-Laying Contest, which were producing undersized eggs throughout the year. By the purchase and use of a male which had the power to transmit the ability of his ancestors to the progeny of this pen of birds this contestant has been able to build up a flock noted for egg-size as well as for production. The saying that "the sire is half the flock" is very true, and especially is this so when the sire is a tested bird possessing a number of desirable characteristics.

EGG-LAYING CONTEST

The contest completed in 1928 was the sixth Quebec Western Egg-Laying Contest to be conducted at the Lennoxville Station. This contest commenced on November 1, 1927, and was carried on for 51 weeks, completing on October 22, 1928. The breeds of poultry represented were 12 pens of White Leghorns, 4 pens of Barred Plymouth Rocks, 2 pens of White Wyandottes, and one pen

of Chanticleers. The following comparison of eggs and points awarded in the last three contests will give some idea of the advantage of better breeding both for quantity and size of eggs.

—	Fourth contest	Fifth contest	Sixth contest
Total eggs produced	32,221	33,868	36,655
Total points awarded	31,203	35,327	38,460·6
Highest pen for eggs	2,059	2,147	2,228
Highest pen for points	2,080·3	2,342·7	2,295·3
Highest hen for eggs	255	279	274
Highest hen for points	278·2	312·5	317·0

Following is the score upon which points are awarded:—

Eggs averaging	27	ozs. per dozen	receive	1·3	per egg
" "	26	" "		1·2	"
" "	25	" "		1·1	"
" "	24	" "		1·0	"
" "	23	" "		0·9	"
" "	22	" "		0·8	"
" "	21	" "		0·7	"
" "	20	" "		0·6	"

Eggs averaging under 20 ounces are disqualified.

It will be interesting to note that when the ruling of scoring eggs for size was started about four years ago, there was a number of pens that were producing large numbers of eggs but of very small size and quite a number of birds that produced the 200 eggs required for registration, could not be registered on account of undersized eggs, but that more total eggs were produced in the sixth contest than had been the case of any previous contest at this Station, and that there were as many individuals registered as has been the case in any of the contests held previous to this ruling at this Station. The tendency had been to retain as breeders birds laying large numbers of eggs even if very much undersize, but since the eggs produced in contests have been scored by points, more care and thought has been given to the improvement of that character in the breeding stock used. The ten highest pens according to points are given as follows:—

HIGHEST PENS ACCORDING TO POINTS

Pen 14 B.R. Experimental Station, Lennoxville, P.Q.	2295·3 points
Pen 15 B.R. H. R. Drew, North Hatley, P.Q.	2,285·0 "
Pen 16 B.R. Mrs. Alex. Mackay, Tomifobia, P.Q.	2,275·0 "
Pen 13 B.R. Rosemary Poultry Farm, Frost Village, P.Q.	2,264·1 "
Pen 4 W.L. C. D. Calder, Cowansville, P.Q.	2,173·6 "
Pen 17 B.R. L. A. Gnaedinger, Valleyfield, P.Q.	2,087·5 "
Pen 7 W.L. W. M. Parsons, Barnston, P.Q.	2,038·7 "
Pen 19 W.W. Bond Little, North Hatley, P.Q.	1,997·4 "
Pen 2 W.L. Montreal Poultry Farm, Montreal West, P.Q.	1,988·1 "
Pen 10 W.L. J. E. Burnet, Cowansville, P.Q.	1,984·0 "

The ten highest individuals according to points are given as follows:—

HIGHEST INDIVIDUALS ACCORDING TO POINTS

No. I-173 B.R. L. A. Gnaedinger, Valleyfield, P.Q.	317·0 points
No. I-141 B.R. Experimental Station, Lennoxville, P.Q.	314·7 "
No. I-134 B.R. Rosemary Poultry Farm, Frost Village, P.Q.	306·7 "
No. I-150 B.R. Experimental Station, Lennoxville, P.Q.	291·9 "
No. I- 88 W.L. Macdonald College, Macdonald College, P.Q.	280·7 "
No. I-154 B.R. H. R. Drew, North Hatley, P.Q.	278·4 "
No. I- 49 W.L. C. D. Calder, Cowansville, P.Q.	277·2 "
No. I-168 B.R. Mrs. Alex. Mackay, Tomifobia, P.Q.	276·6 "
No. I-157 B.R. H. R. Drew, North Hatley, P.Q.	272·8 "
No. I-160 B.R. H. R. Drew, North Hatley, P.Q.	269·0 "

The individuals which qualified for registration and had no disqualifications were tattooed before being returned to the owners to be used as breeding birds with official records.

SIXTH QUEBEC WEST EGG-LAYING CONTEST, LENNOXVILLE, P.Q., 1927-28

Breed	Number of birds entered	Per cent laid less than 100 eggs	Per cent laid less than 150 eggs	Per cent laid over 150 eggs	Per cent laid over 200 eggs	Per cent laid over 225 eggs	Per cent birds registered	Average egg-size of birds registered	Average egg-size of total birds	Average weight of birds when entered	Average weight of birds when leaving	Average cost per bird for feed	Average profit per bird over feed	Average eggs per registered bird	Average eggs per bird in contest
	No.	p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	oz.	oz.	lb.	lb.	$	$	No.	No.
S.C. White Leghorns	144	8·3	13·8	77·7	25·0	11·1	13·8	24½	24·1	3¾	3½	2 28	3 51	227	172¾
White Wyandottes	24	8·3	20·8	70·8	25·0	8·3	20·8	24¾	24·6	4¾	5¼	2 30	3 67	221	167
Barred Plymouth Rocks	60	6·6	11·6	80·2	63·3	35·0	36·6	25¾	24·3	5¼	5½	2 58	4·46	235¾	198¾
Chanticlers	12	100	None	.....	.....	.....	.....	.....	.....	3¾	.....	.....	.....	.....	.....
Totals	240	p.c. 12·5	p.c. 18·3	p.c. 74·2	p.c. 32·4	p.c. 16·2	p.c. 19·6	.....	.....	.....	.....	.....	.....	230½	

NOTE.—Chanticlers were withdrawn during the 30th week.

SUMMARY OF SIX CONTESTS CONDUCTED AT LENNOXVILLE, P.Q.

Breed	Number of birds entered in 6 years	Number of 2nd generation birds entered in 6 years	Number of birds that laid less than 100 eggs	Number of birds that laid over 150 eggs	Number of birds that laid over 200 eggs	Number of birds that laid over 255 eggs	Number of birds registered	Per cent birds registered in 6 years	Average eggs per registered bird	Average eggs per bird per year in 6 contests	Average cost of feed per bird per year	Average profit over feed per bird per year
	No.	No.	No.	No.	No.	No.	No.	p.c.	eggs	eggs	$	$
S.C.W. Leghorns	534	77	60	368	128	52	68	12·7	222⅓	166	2 13	3 93
White Wyandottes	264	56	23	169	62	24	40	15·1	220	167	2 29	4 02
Barred Rocks	376	94	44	229	110	53	54	14·3	231¼	168	2 32	3 51
Rhode Island Reds	52	0	20	23	4	2	2	3·8	232	124	2 07	2 03
Chanticlers	34	10	27	2	2	0	2	5·8	210½	68	2 00	1 25
Silver Wyandottes	20	0	7	2	0	0	0	0	0	107	2 01	1 57

INSPECTION OF REGISTERED BIRDS

The work of inspection of all registered birds in this district which has been handled during the past five years by this Station, was conducted during 1928, by visiting the plant of each breeder of registered birds at least three times, to approve a male bird to be used with the registered hens, to inspect the chick and hatching records, and to inspect and wing-label the progeny. A later visit had to be made to a few of the breeders who had males eligible for tattooing and registration, and which were not matured enough when inspected in September. There were during 1928 fourteen breeders in this district owning registered hens and altogether 56 registered females were used in their special pens. From these hens 587 chicks were pedigreed and 168 of these were pullets that were fit to be qualified in September and to be wing-labelled by the inspector with the Canadian National Poultry record wing-label. There are 65 of these pullets entered in the present Quebec Western Egg-Laying Contest, also nine in the Quebec Eastern Contest, and 12 in the Canadian Contest from this district. This work is increasing each year, there being enough qualified in contests in 1928 to bring the registered birds owned in this district up to about 100 birds.

BEES

Although beekeepers throughout the district found the season of 1928 disappointing, the colonies kept at this Station produced a fair surplus of honey and the results were, on the whole, satisfactory.

The colonies wintered in the cellar were placed outside on April 6, and those wintered outside were unpacked on May 23. Wintering was normal and no colonies were lost.

Up until the middle of June the weather was favourable and the strength of the colonies increased rapidly. From June 10 to June 20 conditions were decidedly unfavourable, for, although the weather was fair and warm, very little nectar was available and stores dwindled rapidly. Owing to the exceptional strength of colonies at this time, and the comparatively large amount of brood in the hives, it was necessary to feed sugar to a number of colonies in amounts ranging from two to nine pounds each. This feeding kept brood-rearing in progress, and thus maintained the strength of the colonies, so that when nectar was again available the colonies were in good shape to gather a crop.

July again proved to be the best month of the season, the hive on the scales showing a net gain of 150·75 pounds for the month. During the first part of August small gains were made, but throughout the latter part of the month and September no gains were recorded.

For the past five years an average colony has been kept on a set of scales, and the gain or loss determined each day throughout the season. Following is a statement showing the gain or loss for each month during the season of 1928:—

HONEY FLOW 1928, AND AVERAGE 1924 TO 1928 FOR THE HIVE ON THE SCALES

—	May	June	July	August	September	Total gain over loss
	lb.	lb.	lb.	lb.	lb.	lb.
Net gain in 1928	9·50	35·75	150·75	2·50	.....	183·25
Net loss in 1928	.....	.....	.....	.....	15·25	.....
Average net gain 1924 to 1928	.....	25·35	104·95	.....	.....	119·55
Average net loss 1924 to 1928	.....	.....	.....	2·75	8·00	

SOURCE OF NECTAR

Although clover is the main source of nectar, and the one from which practically all surplus honey is obtained in this district, other species of plants are important in building up and maintaining colony strength.

In the following statement the dates and duration of the various sources of nectar are shown, together with gains recorded during each period. As weather conditions govern the activities of bees to a large extent, a few particulars as to sunshine, temperature and precipitation are included.

SOURCE AND DURATION OF HONEY FLOWS, AND GAINS DURING 1928

Source	Begun	Ended	Duration	Means of extreme temperature		Total hours of sunshine	Precipitation	Net gain over loss during time of honeyflow
				Maximum	Minimum			
			days	°	°	hours	inches	lb.
Willows	May 11	May 24	13	62·76	40·30	62·4	1·72	0·50
Dandelion	May 21	June 23	23	63·56	45·91	105·5	4·18	19·25
Fruit bloom	May 17	June 13	26	64·62	45·62	118·2	5·15	28·50
Clovers	June 23	Aug. 2	40	77·55	56·40	281·4	6·53	169·25
Raspberry	June 25	July 15	20	80·00	57·85	139·3	4·62	118·75
Golden-rod	Aug. 13	Sept. 2	20	79·90	55·75	139·9	1·06	6·25

COMPARISON OF TYPES OF HIVES

In this project a comparison is made of the Jumbo hive and the twelve-frame, ten-frame and eight-frame Langstroth hives. All colonies wintered well and were at good average strength when the main honey flow began.

The colony in the Jumbo hive swarmed unexpectedly at the beginning of the honey flow, and this swarm was hived and placed on the old stand where it made a surplus of 77·75 pounds. This, although satisfactory from the standpoint of production, is not comparable with the performance of the colonies in the other types of hives which did not swarm, for had the colony in the Jumbo hive not swarmed the crop would probably have been much larger. Following is a statement of the results obtained with three types of hives in 1928:—

COMPARISON OF TYPES OF HIVES, 1928

Type of hive	Number of colonies in experiment	Number of frames covered by bees, May 4	Average pounds stimulative feeding given	Average net production of honey
			lb.	lb.
8-frame Langstroth	2	5·5	4·5	53·50
10-frame Langstroth	3	7·33	10·66	88·58
12-frame Langstroth	2	9·0	11·75	69·875

WINTERING

The winter of 1927-28 proved favourable for the wintering of bees, as all colonies at this Station wintered successfully, and the consumption of stores was about normal. The colonies for cellar wintering were placed in the cellar on November 14, a few days after a good cleansing flight, and were removed on April 6. Those wintered outside had their last fall flight on November 15, and

their first spring flight on March 23. They were unpacked on May 23. Following is a comparison of the results obtained with the colonies wintered in the cellar and those wintered outside in quadruplicate wintering cases:—

CELLAR VS. OUTSIDE WINTERING

Kind of wintering	Kind of hive	Number of hives in experiment	Food chamber	Average number of combs covered by bees at last examination	Average number of combs covered by brood at last examination	Average number of combs covered by bees at first examination
	Langs.					
Cellar	10-frame	3		15·0	6·33	7·33
Outside	10-frame	4		13·25	4·75	6·5
Outside	10-frame	4	S.S.	18·75	6·0	7·75

S.S. signifies shallow super used as food-chamber.

Kind of wintering	Average number of combs covered by brood at first examination	Average net production of extracted honey by parent colony	Natural swarm issue	Artificial swarm or nuceli made	Average net production of extracted honey by swarm	Average net production of extracted honey produced by swarm and colony	Sections produced
					lb.	lb.	
Cellar	2·33	88·58				88·58	
Outside	15·0	59·93		1	26·0	66·43	6
Outside	3·5	48·81	1		177·75	93·25	

FALL FEEDING

As a result of good colony strength, during the fall months, and the absence of nectar during late August and September, fairly heavy feeding was necessary to bring the colonies up to the necessary weight for satisfactory wintering.

YIELD AND INCREASE

After weak or queenless colonies were united in the spring, the total colonies numbered seventeen. The total net production of honey amounted to 1,243·5 pounds, or an average of 73·14 pounds per colony. The apiary was increased to nineteen, but owing to trouble caused by skunks, two colonies were weakened and were placed in a double hive for wintering. All other colonies were in good condition at the close of the season.

GENERAL NOTES

NEW BUILDINGS.—A new farmers' poultry house, 16 by 32 feet, was built to accommodate one hundred layers. The two former permanent laying houses were connected with a twenty-foot construction making a building 16 by 84 feet, which has been converted into a breeding house.

CLEARING LAND, ROADS, FENCES.—Twelve acres of old rough permanent pasture land, that was covered with considerable scrub brush, was cleared of stones and brush and ploughed. There were 380 rods of new fence erected

during the summer. A certain amount of gravel is drawn every winter and piled for repairing the roads during the summer.

EXCURSIONS.—The three-day Short Course which is held at Lennoxville the first week in January each year has proven very successful. Fifty boys and thirty-five girls took part in the various classes and judging competitions.

This course is made possible by the united efforts of the various local organizations and individuals with the support of the Federal and Provincial Departments and Macdonald College, which supply the technical men for this work. The Experimental Station always takes an active part in the course by supplying live stock and helping in various ways.

The annual Field Day of the St. Francis Holstein Breeders Club was held at this Station on June 23, with an attendance of 300 people.

A Poultry Field Day was held on June 26, when over 100 people were present.

The June Jersey Jubilee Field Day was held at this Station on June 28, with a good attendance. Twelve calves, contributed by the Jersey breeders to the Club, were sold by auction. The proceeds were used for special prizes at the Sherbrooke Exhibition and other extension work for the breed.

The St. Francis Ayrshire Club held their annual meeting and Field Day on July 5, and there was a very good attendance. The Club received a nice amount to add to their treasury from the proceeds of a raffle on an Ayrshire calf presented to the Club by some of its members.

On July 10, twenty-five girls and boys, members of the 4-H Club from White River Junction, Vt., paid the farm a visit. These clubs are very active in the rural districts in the United States in training their young people in agriculture and home economics.

The Cercle de Fermiere of the counties of Stanstead, Sherbrooke and Compton, held their annual picnic at the farm on July 11. Eighty ladies attended and they took much interest in horticulture, floriculture, bees and poultry.

The annual Field Day of the Station was held on August 9, when over 1,500 people were present. A number of prominent men attended and addressed the gathering.

On August 20, a delegation of 125 farmers and their wives from Franklin county, Vermont, accompanied by Mr. McWilliams, County Agricultural Agent, visited the farm and spent four hours looking over the different lines of work. This delegation was from near St. Albans, Vt., over 100 miles from Lennoxville.

EXHIBITIONS.—Educational exhibits were displayed at Cookshire, Ayer's Cliff, Sherbrooke and Brome, as well as at the Floricultural exhibition at Lennoxville and the Poultry Show at Sherbrooke. Members of the staff acted as judges at various exhibitions, and also attended and delivered addresses at various meetings in the district.

A number of articles were written for the press, during the year, dealing with the farm problems of the Eastern Townships.

Judging from the number of visitors received and the volume of correspondence and demand for reports and bulletins, it is quite evident that the farmers in the district are taking a greater interest in the work at this Station and relying more and more on the advice given by the members of the staff.

The Experimental Station appreciates to the fullest extent what the press has done in keeping the work and activities of the farm before the public.

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