DOMINION OF CANADA

DEPARTMENT OF AGRICULTURE

DOMINION EXPERIMENTAL FARMS

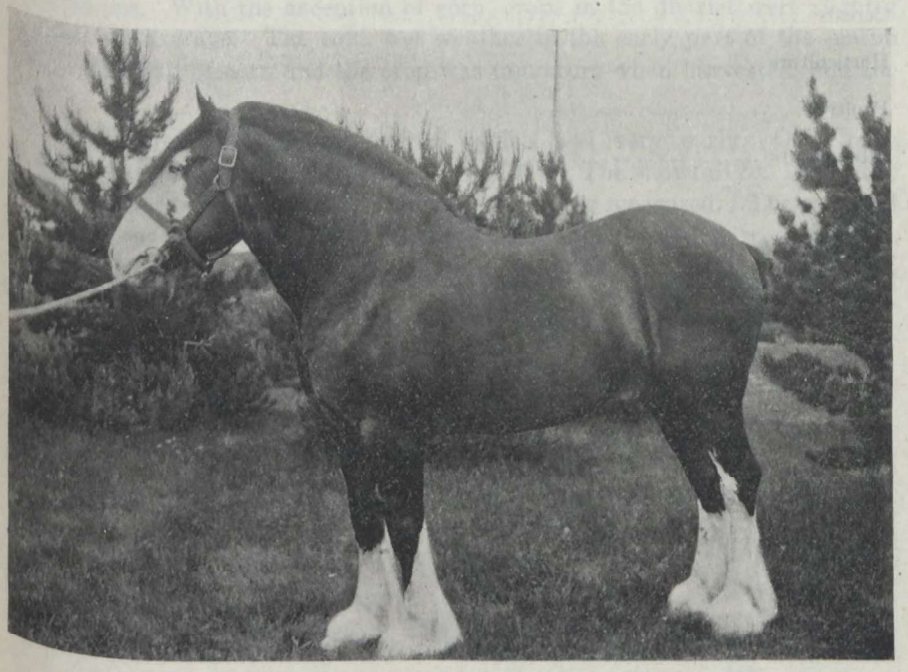
EXPERIMENTAL STATION

LENNOXVILLE, QUE.

REPORT OF THE SUPERINTENDENT

J. A. McCLARY

FOR THE YEAR 1929



Clydesdale stallion, Sandy Mac (imp.) 24318 (20816).

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DOMINION EXPERIMENTAL STATION, LENNOXVILLE, QUE.

REPORT OF THE SUPERINTENDENT, J. A. McCLARY

THE SEASON

The year 1929 was characterized by rather cool, damp weather in the early part of the growing season, while the latter part of the season was very dry. The ice went out of the St. Francis river on March 31, which was the latest in 15 years. Work on the land started fairly early, however, the first seeding being done on April 24. Red clover wintered exceptionally well and the hay crop was one of the best in the history of the farm. Due to persistent rains in the latter part of June and the first of July, the first haying was done with difficulty, dry weather later on, however, made it possible to harvest most of the hay under ideal conditions. With the exception of corn, crops in the district were slightly better than the average. The cold, wet weather in the early part of the season checked the growth of corn and the crop was immature when harvested, and the yield light.

The river froze over November 26, which was very early. Only once has it frozen earlier, namely, November 17, in 1924. The snowfall for December set a new high record for the district, 49·5 inches being measured. The snowfall for the year was also the highest on record, 121·4 inches being recorded.

The following table shows a summary of records for the year with the 15-year average:—

METEOROLOGICAL RECORDS AT LENNOXVILLE, P.Q., 1929

Month	Temperature °F						Precipitation				Sunshine	
	Mean		Maximum		Minimum		Rain	Snow	Total precipitation			
	1929	Average 15 years	Highest	Mean Maximum	Lowest	Mean Minimum			1929	Average 15 years	1929	Average 15 years
							inch.	inch.	inch.	inch.	hours	hours
January	12·40	11·72	48	22·58	−20	2·22	1·44	27·0	4·14	3·05	89·7	77·7
February	14·44	12·90	43	25·53	−22	3·36	.....	20·5	2·05	1·94	79·7	94·4
March	29·04	25·38	54	38·35	−26	19·74	3·03	10·2	4·05	2·71	113·1	142·2
April	39·89	39·50	68	49·36	15	30·43	3·37	10·0	4·37	2·65	116·1	158·0
May	51·92	50·33	87	64·00	25	39·84	4·27	.....	4·27	2·61	225·6	196·9
June	62·28	59·88	86	73·80	35	62·28	3·59	.....	3·59	3·87	179·4	204·4
July	64·48	65·80	90	77·87	35	51·10	2·44	.....	2·44	3·84	285·8	235·4
August	60·83	63·50	83	73·19	36	48·48	3·78	.....	3·78	4·11	199·7	213·9
September	57·84	55·46	85	69·96	22	45·73	2·32	.....	2·32	3·90	158·2	159·2
October	45·15	45·02	74	56·09	21	34·42	2·94	.....	2·94	4·21	126·6	123·1
November	34·26	32·37	61	41·20	2	27·33	2·04	4·2	2·46	3·34	74·2	68·7
December	14·85	17·95	38	23·19	−29	6·52	0·60	49·5	5·55	2·71	36·9	52·2
Total or average	40·61	39·98	90	51·26	−29	30·95	29·82	121·4	41·96	38·93	1,685·0	1,726·1

In order to make possible a comparison of the seasons from 1915 to 1929 inclusive, the table below shows some of the meteorological data as recorded annually throughout the period. In addition figures are tabulated showing the average for the 15 years and also averages for each of 3 five-year cycles in the period. From the same table may also be observed extremes in temperature, annual precipitation, and sunshine for the time records have been taken at this station.

METEOROLOGICAL RECORDS IN 5 YEAR CYCLES AND AVERAGE FOR 15 YEARS

Year	Temperatures °F.					Precipitation			Sunshine
	Highest	Month	Lowest	Month	Mean	Rain	Snow	Total	
						inch.	inch.	inch.	hours
1915									
1916	89	Sept.	−46	Jan.	41·39	27·57	48·3	32·40	1,722·2
1917	91	Aug.	−35	Feb.	40·03	34·51	72·3	41·74	1,759·4
1918	92	Aug.	−45	Dec.	36·73	32·21	77·5	39·96	1,599·2
1919	90	July	−45	Jan.	38·73	32·50	73·0	39·80	1,632·4
5-year average	93	June	−27	Jan.	40·29	27·80	78·9	35·71	1,657·7
	.....	.....	.....	.....	39·43	30·92	70·0	38·12	1,674·2
1920									
1921	88	Aug.	−47	Feb.	39·90	33·24	93·0	42·54	1,744·2
1922	99	July	−29	Dec.	41·90	19·47	66·2	26·09	1,947·1
1923	88	Sept.	−37	Feb.	40·28	29·78	65·1	36·29	1,915·3
1924	89	June	−43	Feb.	38·02	27·03	97·9	36·82	1,831·4
5-year average	88	July	−31	Dec.	40·01	34·33	80·0	42·33	1,826·4
	.....	.....	.....	.....	36·02	28·77	80·4	36·81	1,852·9
1925									
1926	87	Aug.	−48	Jan.	41·23	32·31	98·8	42·19	1,638·5
1927	87	July	−29	Feb.	38·02	26·90	111·6	38·06	1,684·4
1928	88	June	−33	Feb.	41·73	36·05	70·5	43·10	1,630·3
1929	89	July	−30	Jan.	41·16	35·69	92·3	44·92	1,617·1
5-year average	90	July	−29	Dec.	40·61	29·28	121·5	41·96	1,685·6
	.....	.....	.....	.....	40·53	32·05	98·9	42·05	1,651·2
15 year average	.....	.....	.....	.....	38·67	30·58	83·13	38·83	1,726·1

ANIMAL HUSBANDRY

BEEF CATTLE

WINTER FEEDING OF BEEF CATTLE

Each year since the Experimental Station was established in 1914, it has been the custom to purchase steers locally to conduct experiments in the comparison of different feeds and methods of feeding and to consume the hay and ensilage produced on the farm. For this purpose ninety-five steers were purchased in the fall of 1928, which averaged 798 pounds when tied in the barn November 1.

The following feeding experiments were conducted in 1929, and the results will be found in this report:—

1. Finishing steers in barn vs. pasture.
2. Barley meal vs. meal mixture.
3. Screenings vs. meal mixture.
4. Uniform vs. gradually increased feeding of meal to fattening steers

In estimating the cost of feeds, the following values were used:—

Barley	$ 40 00	per ton
Screenings	34 50	"
Meal mixture	38 95	"
Hay	8 00	"
Ensilage	3 00	
Pasture per head per day	0 03½	

FINISHING STEERS IN BARN VS. PASTURE

OBJECT OF EXPERIMENT.—To ascertain which of the two methods of finishing steers is the most practical and profitable.

PLAN OF EXPERIMENT.—Two lots of twenty-three steers each were used for this experiment. They were tied in the barn on November 1. Lot 1 was fed 10 pounds of hay and 30 pounds of oats, peas and vetch ensilage per steer per day throughout the feeding period. Grain feeding was commenced on January 1 with 3 pounds per steer per day and this was 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 18. The meal mixture consisted of 55 per cent of screenings, 34 per cent of corn and 11 per cent of oil cake. The oil cake was added for the finishing period commencing April 1. Lot 2, which was finished on pasture, was fed 12 pounds of hay and 30 pounds of ensilage per steer per day during the winter, and they were turned to pasture May 18. The following table shows the gains and feed consumption of the two groups:—

FINISHING STEERS IN BARN VS. PASTURE

—		Lot 1	Lot 2
		Steers finished in barn and sold May 18	Steers finished on pasture and sold Aug. 24
Number of steers in each lot	No	23	23
Total initial weight, November 1	lb.	17,864	17,770
Average initial weight	"	776·69	772·6
Total finished weight	"	23,858	24,300
Average finished weight	"	1,037·30	1,056·5
Number of days on test	days	198	206
Total gain per lot to May 18	lb.	5,994	2,198
Average gain per steer to May 18	"	260·60	95·6
Average daily gain per steer to May 18	"	1·32	0·4
Total meal consumed to May 18	"	15,157	
Total hay consumed to May 18	"	45,540	54,648
Total ensilage consumed to May 18	"	136,620	136,620
Meal eaten per pound gain to May 18	"	2·53	
Hay eaten per pound gain to May 18	"	7·60	24·8
Ensilage eaten per pound gain to May 18	"	22·79	62·0
Total cost of feed to May 18	$	682 27	423·8
Cost of feed per head to May 18	$	29 66	18·4
Cost of feed per head per day to May 18	cts.	14·98	9·3
Cost of feed per pound gain to May 18	"	11·38	19·7
Total weight, lot 2, May 18	lb.		19,968
Total weight, lot 2, August 24	"		24,300
Total gain, lot 2, May 18 to August 24	"		4,335
Average gain per steer, May 18 to Aug. 24	"		188·4
Average daily gain per steer, May 18 to Aug. 24	"		1·9
Total cost of pasture 98 days	$		78·8
Cost of pasture per steer	$		3·4
Cost of pasture per pound gain	cts.		1·8
Total cost of feed, lot 2, Nov. 1 to Aug. 24	$		502·2
Cost of feed per head, lot 2, Nov. 1 to Aug. 24	$		21·8
Cost of feed per head per day May 18 to finish	cts.		7·6
Cost of feed per pound gain for total period	"	11·38	7·6

REMARKS.—This is the first year that this experiment has been conducted. As there are districts in the Eastern Townships where there are good pastures available some distances from railway centers where dairying is not very profitable and good help is scarce, it was thought that this experiment would prove interesting and profitable.

DEDUCTIONS

It will be observed from the foregoing table that it cost 11·38 cents to make one pound of beef with lot 1, and that it cost 19·29 cents to produce one pound of gain with lot 2, up to the time they were turned to pasture, but at the end of the pasture period the 23 head on pasture made an average gain per steer of 284 pounds, for the total period, at a cost of 7·69 cents per pound gain, which is 8·69 cents less per pound gain than lot 1. The selling price August 24 was one-half cent less than in May. When this is deducted from lot 2 it will be noted that this lot has an advantage of 3·19 cents per pound gain over lot 1.

BARLEY MEAL VS. MEAL MIXTURE

OBJECT OF EXPERIMENT.—To ascertain the value of barley as a feed for fattening steers by comparing it with a meal mixture of screenings, corn and oil cake.

PLAN OF EXPERIMENT.—Two lots of six steers each were compared. Each lot received 10 pounds of hay and 30 pounds of oats, peas and vetch ensilage per steer per day. Commencing January 1, lot 1 was started on 3 pounds of barley meal and lot 2 on 3 pounds of meal mixture per steer per day and this was increased 1 pound each per day the first of each month, so that at the end of the feeding period they were getting 7 pounds per steer per day. The meal mixture was made up of 55 per cent of screenings, 34 per cent of corn and 11 per cent of oil cake. The oil cake was added for the finishing period commencing April 1. Following is a statement of the results obtained.

BARLEY MEAL VS. MEAL MIXTURE

—		1929		Average for two years	
		Lot 1, barley meal	Lot 2, meal mixture	Lot 1, barley meal	Lot 2, meal mixture
Number of steers in each lot	No.	6	6	6	6
Total initial weight	lb.	4,610	4,600	5,348	5,544
Average initial weight	"	768·33	766·67	891·33	924
Total finished weight	"	6,020	6,088	6,619	6,840
Average finished weight	"	1,003·33	1,014·67	1,103·17	1,140
Number of days on test	days	198	198	191	191
Total gain per lot	lb.	1,410	1,488	1,271	1,296
Average gain per steer	"	235	248	211·83	216
Average daily gain per steer	"	1·19	1·25	1·11	1·13
Total meal consumed	"	3,954	3,954	4,152	4,152
Total hay consumed	"	11,880	11,880	11,460	11,460
Total ensilage consumed	"	35,640	35,640	34,380	34,380
Meal eaten per pound gain	"	2·80	2·66	3·27	3·20
Hay eaten per pound gain	"	8·42	7·98	9·02	8·84
Ensilage eaten per pound gain	"	25·28	23·95	27·05	26·53
Total cost of feed	$	180 06	177 98	171 75	167 83
Cost of feed per head	$	30 01	29 66	28 62	27 97
Cost of feed per head per day	cts.	15·16	14·98	14·98	14·64
Cost of feed per pound gain	"	12·77	11·96	13·51	12·95

DEDUCTIONS.—It will be noted from the above table that the difference in cost of producing beef is very slight between barley and a meal mixture of screenings, corn and oil cake, not only for 1929, but for the two-year average. This shows that a farmer raising barley can market it very profitably by feeding it to steers.

STANDARD ELEVATOR SCREENINGS VS. MEAL MIXTURE

OBJECT OF EXPERIMENT.—To ascertain the value of standard ground re-cleaned elevator screenings compared with a meal mixture as a feed for fattening steers, taking into consideration the gain, cost of feed per pound of gain and the quality of finish.

PLAN OF EXPERIMENT.—Sixteen steers were divided into two lots and were fed 10 pounds of hay and 30 pounds of oats, peas and vetch ensilage per steer per day. Each lot were fed the same number of pounds of meal for the period. Lot 1 was fed clear ground elevator screenings and lot 2 a meal mixture consisting of 55 per cent of screenings, 34 per cent of corn and 11 per cent of oil cake. Grain-feeding was commenced January 1, when they were fed 3 pounds of meal per steer per day and this was increased 1 pound per day the first of each month until May 1, when they were eating 7 pounds each per day, which was continued until they were sold May 18. Following is a seven-year average of the results obtained, also for the year 1929;—

STANDARD ELEVATOR SCREENINGS VS. MEAL MIXTURE

—		1929		Average for seven years	
		Lot 1, Screenings	Lot 2, Meal mixture	Lot 1, screenings	Lot 2, Meal mixture
Number of steers in each lot	No.	8	8	8	8
Total initial weight	lb.	7,487	6,133	7,762	7,664
Average initial weight	"	935·87	766·62	970·25	958
Total finished weight	"	9,400	8,118	9,712	9,619
Average finished weight	"	1,175	1,014·75	1,214	1,202·37
Number of days on test	days	198	198	188	188
Total gain per lot	lb.	1,913	1,985	1,950	1,955
Average gain per steer	"	239·12	248·12	243·75	244·37
Average daily gain per steer	"	1·21	1·25	1·30	1·30
Total meal consumed	"	5,272	5,272	5,903	5,903
Total hay consumed	"	15,840	15,840	15,092	15,092
Total ensilage consumed	"	47,520	47,520	43,419	43,419
Meal eaten per pound gain	"	2·75	2·65	3·03	3·02
Hay eaten per pound gain	"	8·28	7·98	7·74	7·72
Ensilage eaten per pound gain	"	24·84	23·94	22·27	22·21
Total cost of feed	$	222 58	237 31	216 83	235 10
Cost of feed per head	$	28 20	29 66	27 10	29 39
Cost of feed per head per day	cts.	14·24	14·98	14·41	15·63
Cost of feed per pound gain	"	11·79	11·95	11·12	12·02

DEDUCTIONS.—The above table shows that lot 1, fed screenings, cost 11·79 cents to produce a pound of gain, and lot 2, fed the meal mixture, cost 11·95 cents per pound of gain, being very little difference, but for the seven-year average there is nearly one cent per pound in favour of screenings. This is brought about to a large extent by the difference in price of screenings in past years as compared with the price of other feeds.

UNIFORM VS. GRADUALLY INCREASED FEEDING OF MEAL TO FATTENING STEERS

OBJECT OF EXERIMENT.—To determine 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 fed 10 pounds of 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 May 18, consisted of 55 per cent of screenings, 34 per cent of corn and 11 per cent of oil cake. Lot 1 received 5 pounds of meal mixture per head per day throughout the experiment. Lot 2

was started on 3 pounds of meal mixture per head per day on January 1 and increased 1 pound per steer per day the first of each month until they were eating 7 pounds per steer per day when they were sold May 18. Following is a statement of the results obtained in 1929, also the average results for four years:—

UNIFORM VS. GRADUALLY INCREASED FEEDING OF MEAL TO FATTENING STEERS

—		1929		Average for four years	
		Lot 1	Lot 2	Lot 1	Lot 2
		Meal mixture 5 pounds per day from January 1 to May 18	Meal mixture 3 pounds per day January 1 and increased 1 pound the first of each month to May 18	Meal mixture 5 pounds per day 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.	5,855	4,600	5,905	5,289
Average initial weight	lb.	975·83	766·67	984·17	881·50
Total finished weight	lb.	7,505	6,088	7,623	6,916
Average finished weight	lb.	1,250·83	1,014·67	1,270·5	1,152·67
Number of days on test	days	198	198	188	188
Total gain per lot	lb.	1,650	1,488	1,718	1,627
Average gain per steer	lb.	275	248	286·33	271·17
Average daily gain per steer	lb.	1·39	1·25	1·52	1·44
Total meal consumed	lb.	4,110	3,954	4,110	3,945
Total hay consumed	lb.	11,880	11,880	11,295	11,295
Total ensilage consumed	lb.	35,640	35,640	33,885	33,885
Meal eaten per pound gain	lb.	2·49	2·66	2·39	2·42
Hay eaten per pound gain	lb.	7·20	7·98	6·57	6·94
Ensilage eaten per pound gain	lb.	21·60	23·95	19·72	20·83
Total cost of feed	$	181 02	177 98	174 00	170 98
Cost of feed per head	$	30 17	29 66	29 00	28 50
Cost of feed per head per day	cts.	15·24	14·98	15·42	15·16
Cost of feed per pound gain	cts.	10·97	11·96	10·13	10·51

DEDUCTIONS.—In this test lot 1, fed 5 pounds of meal per head per day from January 1 to May 18, made a daily gain of 1·39 pounds, being a gain of 0·14 of a pound more than lot 2, at a cost of 0·99 of a cent less per pound of gain. An average of the results obtained for four years shows that slightly larger and cheaper gains were made by the lot consuming a uniform amount of meal throughout the feeding period.

DUAL-PURPOSE SHORTHORNS

The Shorthorn herd numbered twenty-nine head of registered cattle on December 31, 1929, made up of one herd bull, eleven cows, three two-year-old heifers, six yearling heifers, three heifer calves and five bull calves.

The only addition to the herd by purchase during the year was the Shorthorn bull, "Neralcam Emperor" —191349— purchased from Alexander Maclaren, Buckingham, P.Q. This bull is sired by "Fairy Duke" —169764— Grand Champion Dual Purpose Shorthorn at the Royal Winter Fair, Toronto, also Grand Champion Beef Shorthorn at the Ottawa Winter Fair in 1928. His dam, "Valentine Empress", has an R.O.P. record of 12,057 pounds of milk testing 4·04 per cent fat. He is strong in the blood of the famous sire, "Thanet Marquis", the sire of "White Molly", having an R.O.P. record of 18,346 pounds of milk.

Six Shorthorns qualified in the R.O.P. during the year, two of them in the Honour Roll.: They produced an average of 7,279 pounds of milk and 302 pounds of butter fat. "Village Ruby" —137662— gave 10,329 pounds of milk and 427 pounds of butter fat in 340 days.

The average milk production of the Shorthorn herd, pounds of butter-fat, feed cost to produce one hundred pounds of milk and one pound of butter, and cost of feed of ten cows which finished a lactation period during the year, will be found in the individual milk-record table at the end of the dairy cattle section of the animal husbandry report.

DAIRY CATTLE

JERSEYS

At the close of the year 1929 there were on hand forty-two Jerseys, made up as follows: twenty milk cows, six two-year-old heifers, five yearlings, five heifer calves and five bull calves.

Fifteen calves were born during the year and all of them were sired by "Ottawa Gamboge 5th" —32116— an Advanced Registry, Class AA bull, whose sire was the imported "Castlehill Sybil's Gamboge" —12271—.

The only addition to the herd by purchase was the Jersey bull, "Brampton Poppy's Observer" (imp.) —45654— purchased from B. H. Bull & Son, Brampton, Ont., in March. This is an outstanding bull of the Jersey breed, being of exceptionally good conformation, good length and depth of body close to the ground, with straight top lines, well-quartered and an excellent head. His breeding is of the best, with extra good milk records behind him.

Seventeen Jerseys finished their lactation periods during the year. Nine of them qualified in the R.O.P., seven producing an average of 9,328 pounds of milk and 430 pounds of butter fat in 365 days. Two cows qualified in the 305-day Division, with an average of 7,850 pounds of milk and 399 pounds of butter fat.

CONTAGIOUS ABORTION

As abortion has proven troublesome in many herds throughout the Eastern Townships, the Experimental Farm System, in co-operation with the Health of Animals Branch, inaugurated a policy of segregation and isolation of all reacting animals on some of the Experimental Farms, as it is thought if animals could be kept free of infection the disease could be eradicated from a herd. This important work was started at the Lennoxville Station in June, 1928, when the first of a series of blood tests was made on all cattle in the Shorthorn and Jersey herds regardless of age or sex. As a result of the test all animals were classed either "positive" or "negative" and were divided, the negative ones remaining in the main barn, and all animals which reacted to the blood test were removed to what is known as the Ward farm. All calves from the reacting herd are thoroughly washed and disinfected as soon as they are dropped and moved to isolated quarters from either herd where they remain until they are six months old and have had two blood tests, and if found negative they are then added to the negative herd in the main barn. The calves from the reacting herd are not allowed to have any of their mother's milk at any time, but are fed milk from the negative herd. At first the blood tests were made every three months but beginning in January, 1930, it has been decided to make the tests at monthly intervals. With all reacting cows segregated, with the negative herd subject to periodic tests, and in contact with no other cattle, and with special care in raising calves from reacting cows, a clean herd should result. All this work has seriously interfered with the milk production and R.O.P. work, as well as other experimental work, especially in the rearing of calves.

MILK RECORDS

In the following table will be found a statement of the production of each of the cows ending a lactation period within the calendar year 1929, together with the amount of feed consumed, the cost of milk production, and profit from each cow.

The profit column shows a comparison only between the cost of feed and the value of milk produced. The cost of labour, the interest on the investment and the value of the calf at birth are not included in this statement of production. In estimating the cost of feed the following prices were used:—

Hay	$8 00 per ton
Roots	3 00 "
Ensilage and green feed	3 00 "
Meal mixture	30 00 "
Pasture	1 50 per month

Individual Milk Records Completed During the Year 1929

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 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.	$
Eleanor King of Grayburn	6- 9	Nov.26-28	413	9,735·1	23·57	5·78	563·15	662·53	265 01	22 68	287 69	4,151	9,410	2,652	4·5	93 73	0 963	14·1	25·9	193 96
Marwelton Sultan'sBetty	5- 4	Jan. 26-29	308	9,553·1	31·02	5·35	511·22	601·43	240 57	22 38	262 95	3,264	6,775	1,896	4·5	73 45	0 769	12·2	27·8	189 50
Maplehurst Fox Roxanna	8- 3	Mar. 10-28	380	9,356·0	24·62	4·68	437·51	514·72	205 89	22 10	227 99	3,256	12,510	2,722	5·0	85 99	0 92	16·7	23·3	142 00
Ellen King of Grayburn	5- 8	June 6-28	371	8,966·1	24·17	4·64	416·47	489·96	195 98	21 19	217 17	3,266	8,220	1,946	5·0	76 60	0 85	15·6	24·4	140 57
Ottawa Triumph	5- 3	Mar. 31-28	382	8,577·7	22·45	5·06	434·46	511·13	204 45	20 17	224 62	2,950	12,160	2,544	4·5	79 42	0 93	15·5	24·5	145 20
Sophie Magnet's Corinne	8- 8	Oct. 2-28	386	8,385·6	21·72	5·96	500·00	588·23	235 29	19 49	254 78	3,772	7,735	2,082	6·0	85 51	1 02	14·5	25·5	169 27
Ottawa Burma Lady 4th	4- 5	Apr. 6-28	389	8,179·9	21·03	4·87	398·17	428·43	187 37	19 28	206 66	3,089	10,540	2,432	4·5	78 62	0 96	16·8	23·2	128 04
Lennoxville Roxanna	4- 6	July 11-28	381	7,643·6	20·06	5·69	435·01	511·78	204 71	17 83	222 54	2,633	9,200	2,216	7·5	73 40	0 96	14·3	25·7	149 14
Lennoxville Corinne 2nd	2- 10	Aug. 11-28	372	7,226·9	19·43	6·30	455·29	535·63	214 25	16 73	230 98	2,638	6,960	1,772	7·5	68 35	0 95	12·8	27·2	162 63
Lennoxville Lottie	2- 4	April 14-28	329	6,407·5	19·47	4·83	309·69	364·34	145 74	15 11	160 85	2,861	7,490	1,862	5·0	69 09	1 08	19·0	21·0	91 76
Ottawa Gamboge Bangle	2- 9	Aug. 12-28	385	6,380·6	16·57	4·89	312·04	367·10	146 84	15 03	161 87	2,233	6,960	1,796	6·5	60 86	0 95	16·6	23·4	101 01
Kingsway's Beauty Spot	9- 2	Aug. 8-28	353	6,229·9	17·65	4·96	308·95	363·47	145 39	14 67	160 06	2,745	8,520	2,056	6·5	71 92	1 15	19·8	20·2	88 14
Mascot Mary Belle	5- 0	Sept. 4-28	268	5,230·2	19·51	6·34	331·48	389·98	155 99	12 10	168 09	1,973	6,960	1,834	3·5	52 62	1 01	13·5	26·5	115 47
Ottawa Gamboge Elsinore	2- 6	July 1-28	365	5,147·4	14·10	5·39	277·67	326·67	130 67	12 05	142 72	1,778	8,945	2,042	5·5	56 51	1 10	17·3	22·7	86 21
Petuna's Roxanna 4th	2- 4	Apr. 4-28	271	4,878·6	18·00	5·76	281·24	330·87	132 35	11 37	143 72	1,956	6,000	1,274	5·0	50 94	1 04	15·4	24·6	92 78
Ottawa Gamboge Lady 2nd	2- 6	June 15-28	304	3,604·4	11·86	6·00	216·13	254·27	101 71	8 37	110 08	1,340	7,740	1,731	4·5	45 38	1 26	17·8	22·2	64 70
Ottawa Pride	3- 1	July 30-28	363	3,513·7	9·68	5·56	195·35	229·82	91 93	8 21	100 14	1,652	8,470	2,034	6·5	55 37	1 57	24·1	15·9	44 77
Lennoxville Corinne	3- 10	June 24-28	297	3,378·8	11·38	6·66	225·01	264·72	105 89	7 78	113 66	1,530	5,985	1,469	4·0	43 81	1 30	16·5	23·5	69 85
Total for herd (18 cows)	.....	.....	6,317	122,395·1	.....	.....	6,608·84	7,775·08	3,110 03	286 54	3,396 57	47,087	150,589	36,360	96·0	1,221 57	.....	.....	.....	2,175 00
Average per herd (18 cows)	.....	.....	351	6,799·7	19·37	5·40	367·16	431·95	172 78	15 92	188 70	2,616	8,365	2,020	5·3	67 86	1 00	15·7	24·3	120 83

Shorthorns

Village Ruby	12- 2	Nov.26-28	340	10,328·6	30·38	4·13	427·19	502·57	201 03	24 56	225 59	3,277	9,175	2,244	6·0	80 89	0 78	16·1	23·9	144 70
Lennoxville Ruby 3rd	2- 6	Feb. 13-28	413	8,170·6	19·78	3·80	310·76	365·60	146 24	19 51	165 75	3,278	10,605	2,890	5·0	84 14	1 03	23·0	17·0	81 61
Lennoxville Gem 5th	3- 2	Jan. 11-28	446	7,645·4	17·14	4·33	331·33	389·80	155 92	18 14	174 06	3,374	11,080	3,266	5·0	87 79	1 15	22·5	17·5	86 27
Lady Hope 10th	8- 11	July 25-28	341	6,489·8	19·03	3·98	258·54	304·16	121 66	15 46	137 12	2,632	8,040	2,818	6·0	71 81	1 11	23·6	16·4	65 31
Lennoxville Ruby 2nd	4- 1	Aug. 26-28	338	6,245·8	18·48	4·48	280·11	329·54	131 82	14 79	146 61	2,492	8,880	2,196	4·5	66 23	1 06	20·1	19·9	80 38
Lady Hope 13th	4- 8	June 16-28	282	6,213·4	22·03	4·33	268·98	316·45	126 58	14 74	141 32	2,310	7,010	1,808	4·5	59 14	0 952	18·7	21·3	82 18
Lennoxville Gem 4th	3- 10	Feb. 19-28	332	5,034·6	15·16	4·67	234·95	276·41	110 56	11 89	122 45	2,361	7,325	2,366	5·0	63 36	1 26	22·9	17·1	59 02
Gem of Lennoxville 2nd	5- 0	Mar. 25-28	364	4,671·8	12·83	4·05	189·36	222·78	89 11	11 12	100 23	2,040	10,670	3,328	5·0	67 41	1 44	30·2	9·8	32 82
Lennoxville Ruby	5- 8	Aug. 8-28	266	4,555·0	17·12	4·06	184·96	217·60	87 04	10 84	97 88	1,927	7,810	2,046	4·5	55 54	1 22	25·5	14·5	42 34
Lennoxville Gem 6th	3- 7	Nov. 3-28	271	4,505·7	16·63	4·61	207·88	244·56	97 82	10 65	108 47	1,919	6,960	2,134	2·5	51 51	1 14	21·1	18·9	56 96
Total for herd (10 cows)	.....	.....	3,398	62,860·7	.....	.....	2,694·06	3,169·47	1,267 78	151 70	1,419 48	25,610	87,555	25,096	48·0	687 82	.....	.....	.....	731 66
Aver. for herd (10 cows)	.....	.....	339	6,286·1	18·84	4·22	269·41	316·95	126 78	15 17	141 95	2,561	8,755	2,510	4·8	68 78	1 08	21·7	18·3	73 17

HORSES

At present there are eighteen horses at this Station, namely, thirteen work horses, two three-year-old fillies, broken to harness, one yearling colt, one general purpose horse, used for various purposes throughout the year, and one Clydesdale stallion "Sandy Mac". The thirteen work horses are required during the summer months, but in winter only three teams are used, the remainder are wintered in box stalls, with yards adjoining to provide for exercise. They are fed on a maintenance ration consisting of hay, roots and a small amount of bran.

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 the year 1929:—

Number of work horses	No.	14
Average value of each horse	$	150
Total work done during year by 14 horses	hrs.	19,244
Cost of feed for 14 horses—		
53,935 pounds oats at $2 per cwt	$	1,078 70
1,764 pounds bran at $1.90 per cwt	$	33 52
78,368 pounds hay at $8 per ton	$	313 47
3 months pasture for 2 horses at $1.50 each per month	$	9 00
Total cost of feed for 14 horses for 12 months	$	1,434 69
Average cost of feed per horse for 12 months	$	102 48
Total cost of feed for 14 horses for 12 months	$	1,434 69
Labour (stable attendance) 2,358 hours at 30 cents per hour	$	707 40
Interest (6 p.c. on $2,100; value of horses)	$	126 00
Shelter, $20 per horse	$	280 00
Harness (depreciation, repairs, interest), $10 per horse	$	140 00
Miscellaneous (shoeing, veterinary, brooms, brushes, etc.)	$	160 00
Total cost of 19,244 hours of horse labour	$	2,848 09
Average cost per hour horse labour	cts.	14·82
Average cost per hour horse labour for the past 9 years	cts.	13·34

CLYDESDALE STALLION "SANDY MAC"

The Clydesdale stallion "Sandy Mac" (imp.) 24318 (20816)) was imported in 1924, as a gift to the Dominion Department of Agriculture from Sir James Calder. "Sandy Mac" is exceedingly well bred, by the great horse "Carry On" 24319 (19655), he by the famous sire "Signet." His dam "Annita" (47888) was sired by "Baron's Stamp," a son of "Baron's Pride." In Canada he has had an enviable show ring career repeatedly having won his class and championships at the Royal Winter Fair at Toronto and at the two Ottawa Shows. "Sandy Mac" is an excellent type of Clydesdale, thick, compact, with plenty of body, good feet and clean bone.

Since importation in 1924 he has headed the stud of Clydesdales at Ottawa, where he has proven one of the surest getters within the knowledge of his owners. He now has a number of his get at Ottawa that have demonstrated his ability to sire quality draughters with several of his mares at breeding age. Following the regular policy of transferring sires from one Experimental Farm or Station to another, it was decided to place this horse at the Lennoxville Station, primarily for use in breeding operations at the Station, and also to be available to farmers of the Eastern Townships who may be interested in breeding draught horses.

SHEEP

The sheep at the Station are the Oxford Down breed. On December 31, 1929, there were twenty-two registered ewes, eight registered lambs, one imported ram, twenty-five grade ewes and five grade ewe lambs. The flock is divided into five lots, as the sheep barn contains five pens, with individual yards for each

pen. The ewe lambs are kept separate and are not bred until they are eighteen months old. The ewes are bred to lamb around April 15. The shearing is done before lambing, and the sheep and lambs are dipped before going to pasture. The fleeces averaged 6·02 pounds per sheep, which sold for 23 cents per pound. The wool is graded and marketed by the Canadian Co-operative Wool Growers Limited. Their office, sales room, and grading and shipping warehouse is located at Lennoxville. The flock is treated four times a year for internal parasites, with tablets prepared especially for this purpose. These can be procured from the Canadian Co-operative Wool Growers Limited at Lennoxville, with full directions for use.

FINANCIAL STATEMENT OF FLOCK OF REGISTERED OXFORD DOWN SHEEP

Debit

Number of breeding ewes January 1, 1929	No.	22	
Cost of feed—			
8,578 pounds of hay at $8 per ton	$	34 31	
8,578 pounds of ensilage at $3 per ton	$	12 87	
5,850 pounds of meal at $40 per ton	$	117 00	
*5½ months pasture at 20 cents per head per month	$	22 60	
Total cost of feed for 22 ewes	$		186 78
Value of 22 breeding ewes January 1, 1929 at $20 each	$		440 00
Interest on investment, 6 per cent of $440	$		26 40
Service fees for ram at 50 cents each	$		11 00
Total cost of maintaining 22 breeding ewes for one year	$		664 18
Number of 1928 ewe lambs kept for breeding purposes	No.	8	
Cost of feed—			
2,674 pounds of hay at $8 per ton	$	10 70	
1,337 pounds of ensilage at $3 per ton	$	2 00	
841 pounds of meal at $40 per ton	$	16 82	
**5½ months pasture at 20 cents per month (6 lambs)	$	6 60	
Total cost of feed for 8 ewe lambs	$		36 12
Value of 8 shearling ewes January 1, 1929 at $14 each	$		112 00
Interest on investment; 6 per cent of $112	$		6 72
Total cost of maintaining 8 shearling ewes for one year	$		154 84
Number of lambs raised from 22 breeding ewes	No.	27	
Cost of feed—			
1,342 pounds of hay at $8 per ton	$	5 37	
671 pounds of ensilage at $3 per ton	$	1 01	
480 pounds of meal at $40 per ton	$	9 60	
3 months pasture at 20 cents per head per month	$	16 20	
Total cost of maintaining 27 lambs	$		32 18
Value and cost of maintaining flock for one year	$		851 20

* Two sheep died, one on April 1 and one on August 15.
** Two shearling ewes died, one on January 1 and one on February 1.

The feed from date of death of ewes that died has been deducted from total feed of lots.

Credit

Value of 4 small lambs sold to butcher, 255 pounds at $0·07 per pound	$		17 85
Sale of 1 ram lamb	$	25 00	
Sale of 6 ram lambs at $24 each	$	144 00	
Sale of 1 ram lamb	$	20 00	
Sale of 4 ram lambs at $19 each	$	76 00	
Value of breeding stock sold	$		265 00
Value of 11 ewe lambs kept for breeding purposes at $14 each	$		154 00
Value of 20 breeding ewes at $20 each	$		400 00
Value of 6 shearling ewes at $14 each	$		84 00
Value of wool, 26 fleeces, average weight 6·02 pounds at 23 cents per pound	$		36 00
Value of sales and of flock, December 31, 1929	$		956 85
Value and maintenance of flock for one year	$		851 20
Profit on flock for one year	$		105 65

The foregoing table gives the cost of maintaining a registered flock of Oxford Down ewes, and the revenue derived from the flock.

The twenty-two breeding ewes were fed for six and one-half months and were pastured five and one-half months. They were fed, while in the barn, 2 pounds of hay, 2 pounds of ensilage and 2 pounds of grain from January 1 to May 15, per head per day. The shearlings received 2 pounds of hay and 1 pound of ensilage per head per day for the six and one-half months, and 1 pound of grain from January 1 until they went to pasture on May 15.

SWINE

The Yorkshire is the only breed kept at this Station. The herd totalled thirty-one head December 31, 1929, and included one boar, four brood sows and twenty-six experimental feeders. The herd sire, "Earncliffe Masterpiece 5128" —134950— which the Ottawa Farm loaned the Lennoxville Station, was returned to Ottawa the first of October and replaced by the young boar, "Ottawa Beau 63" —139384—.

Fifteen pigs were fed in connection with the advanced registry project and in addition 10,360 pounds of pork were sold.

FARROWING RECORDS

The farrowing records for the year 1929 are not as good as last year. Three brood sows farrowed seventy pigs, an average of 23·3 pigs each, and the average number of pigs raised per sow was 12·25.

FARROWING RECORDS

Sow number	Farrowing date	Number of pigs in litter	Number of pigs reared	Date weaned	Average weight when weaned
					lb.
521	March 12, 1929	15	7	May 1	27
539	March 15, 1929	17	12	May 1	18
86	March 15, 1929	13	9	May 1	22
521	August 2, 1929	3	3	Oct. 1	42
539	August 10, 1929	8	7	Oct. 1	34
86	August 8, 1929	14	11	Oct. 1	31

Average number of pigs farrowed per spring litter	15·0
Average number of pigs reared per spring litter	9·33
Average number of pigs farrowed per fall litter	8·33
Average number of pigs reared per fall litter	7·0

COST OF RAISING PIGS TO WEANING AGE

As young pigs for breeding purposes are usually sold when six or eight weeks old, it is useful to know what it costs to raise them to that age. When calculating the cost it is necessary to consider all charges against the sow for one year. The feed consumed by the sows during the year and the feed the young pigs ate until they were weaned is charged against the sows. The young pigs from three to six weeks of age receive ground oats fed in a hopper and sweet skim-milk in addition to the mother's milk. The meal mixture consisted of 16 per cent of oats, 59 per cent of screenings, 17 per cent of bran and 8 per cent of middlings.

VALUATION OF FEEDS

Screenings	$1 72½	per cwt.
Bran	1 75	"
Ground oats	2 15	"
Middlings	2 35	"
Meal mixture	1 85	"
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)	No.	49
Average number of pigs saved per sow	No.	16·33
Cost of feed—		
4,750 pounds meal at $1.85 per cwt.	$	87 87
12,216 pounds skim-milk at $0.25 per cwt.	$	30 54
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	$	127 41
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 49 pigs to weaning age	$	152 61
Cost to raise 1 pig to weaning age	$	3 11
Average cost to raise pigs to weaning age for the past nine years	$	3 21

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

To ascertain the cost of feeding pigs from weaning to finishing, ten pigs were selected and fed until marketed. During the first month they received 7 pounds of skim-milk each per day and for the next six weeks 5 pounds of skim-milk each per day.

First 45 days—		*Second 45 days—*	
Ground oats	100 pounds	Ground oats	100 pounds
Ground wheat	100 pounds	Ground wheat	100 "
Oil meal	4 per cent	Bran	40 "
		Corn meal	60 "

After 90 days to finish

Ground oats	50	pounds
Ground wheat	200	"
Corn meal	100	"
Oil meal	12	"
Tankage	12	"

Valuation of Feeds

Ground oats	43 00	per ton
Ground wheat	38 00	" "
Corn meal	40 50	" "
Bran	38 00	" "
Oil meal	58 00	" "
Tankage	65 00	" "
Meal mixture	2·05	" cwt.
Skim-milk	0 25	" "

COST OF FEEDING PIGS FROM WEANING TO FINISHING

Number of pigs fed	No.	10
Initial weight, gross	lb.	320
Initial weight, average	lb.	32
Finished weight, gross	lb.	1,950
Finished weight, average	lb.	195
Total gain	lb.	1,630
Average gain per hog	lb.	163
Number of days on test	days	123
Average daily gain per hog	lb.	1·32
Meal consumed	lb.	4,600
Skim-milk consumed	lb.	4,420
Meal eaten per pound gain	lb.	2·82
Skim-milk eaten per pound gain	lb.	2·71
Total cost of feed	$	105 35
Feed cost per head	$	10 53
Feed cost per pound gain	cts.	6·46

Summary—Cost of Pork Production

Average feed cost per pig at weaning	$ 3 11
Average feed cost per hog weaning to 195 pounds	10 53
Average feed cost per hog when finished	13 64
Feed cost per hundred pounds of pork produced	6 99

COST OF PORK PRODUCTION

Object of Experiment.—To determine the cost of producing pork during different feeding periods as well as the cost for the total period.

Plan of Experiment.—Fifteen pigs, five from three different sows, were used for this experiment. These pigs were forty-five days old when weaned and they averaged 23·87 pounds each. The feeding period was divided into five periods. The following table gives the results of these different periods as well as the cost of pork production,

COST OF PORK PRODUCTION—RESULTS OF EXPERIMENT

Lot	Number of pigs	Days on test	Meal ration	lb.	Other feeds
1	5	148	*First 60 days—*		
			Middlings	200	Green feed.
			Ground oats	100	Skim-milk.
			Ground barley	50	
			Shorts	50	
			Bran	25	
			Linseed oil meal	14	
			Tankage, 45 per cent protein	14	
			Bone charcoal	4½	
			Salt	2¼	
			60 to 90 days—		
			Middlings	100	Green feed.
			Ground oats	150	Skim-milk.
			Ground barley	100	
			Shorts	50	
			Bran	25	
			Linseed oil meal	14	
			Tankage, 45 per cent protein	14	
			Bone charcoal	4½	
			Salt	2¼	
			90 days to finish—		
			Ground oats	150	Green feed.
			Ground barley	200	Skim-milk.
			Shorts	100	
			Linseed oil meal	14	
			Tankage, 45 per cent protein	14	
			Bone charcoal	4½	
			Salt	2¼	
2	5	148	Same as lot 1.		
3	5	148	Same as lot 1.		

Valuation of Feeds

Meal mixture (first 60 days)	$2 24	per cwt.
Meal mixture (60 to 90 days)	2 18	"
Meal mixture (90 days to finish)	2 11	"
Green feed	0 15	"
Skim-milk	0 25	"

—		First 30 days from weaning	31 to 60 days	61 to 90 days	91 to 120 days	121 to 148 days	Total period
Number of pigs in experiment	No.	15	15	15	15	15	15
Initial weight, gross	lb.	358	745	1,257	1,964	2,656	358
Initial weight, average	lb.	23·87	49·67	83·80	130·93	177·07	23·87
Final weight, gross	lb.	745	1,257	1,964	2,656	3,149	3,149
Final weight, average	lb.	49·67	83·80	130·93	177·07	209·93	209·93
Number of days fed	days	30	30	30	30	28	148
Total gains for period	lb.	387	512	707	692	493	2,791
Average gain per hog	lb.	25·80	34·13	47·13	46·13	32·87	186·06
Average daily gain per hog	lb.	0·86	1·14	1·57	1·54	1·17	1·26
Meal consumed	lb.	594	1,110	1,910	2,383	2,319	8,316
Skim-milk consumed	lb.	1,845	2,880	4,065	4,320	2,385	15,495
Green feed consumed	lb.	.....	675	696	696	606	2,673
Meal eaten per pound gain	lb.	1·53	2·17	2·70	3·44	4·70	2·98
Skim-milk eaten per pound gain	lb.	4·77	5·62	5·75	6·24	4·84	5·55
Green feed eaten per pound gain	lb.	.....	1·32	0·10	1·00	1·23	0·96
Total cost of feed	$	17 91	33 07	52 84	62 12	55 80	221 74
Cost of feed per head	$	1 19	2 20	3 52	4 14	3 72	14 78
Cost of feed per head per day	cts.	3·97	7·33	11·73	13·60	13·28	9·99
Cost of feed per pound gain	cts.	4·63	6·46	7·47	8·98	11·32	7·94

Statement of Returns

Cost of 15 pigs at weaning at $3.11 per head	$ 46 65
Total cost of feed for 148 days	221 74
Cost of pigs when finished	268 39
Value of 3,149 pounds of pork at $11.50 per cwt.	362 13
Profit over cost of feed for 15 pigs	93 74
Average profit per pig	6 25

DEDUCTIONS.—It will be noted from the foregoing table that it only cost 4·63 cents per pound gain for the first thirty days, for the second thirty days 6·46 cents, the third 7·47 cents, the fourth 8·98 cents and the fifth 11·32 cents, the cost for the total period being 7·94 cents. This shows that the cheapest gains are made in the first periods of feeding. With pork selling at $11.50 per hundred, there was a profit of $6.25 per pig.

ADVANCED REGISTRY POLICY FOR SWINE

The aim and object of the Advanced Registry policy for pure-bred swine, which is being promoted by the Department of Agriculture and handled by the Live Stock Branch, is a basis whereby standards of qualification can be established covering points as individuality, prolificacy, uniformity in litters and the production of ideal market hogs. It is practically the same as that adopted and put in force in the advanced registry of bulls of certain breeds of cattle, and also the classification of rams in registered flocks of sheep. This policy gives prospective buyers production data and information on the type and individuality of the sires and dams of individuals they may wish to purchase.

During the year 1929, three litters of pigs were fed at this Station and data collected on five pigs from each litter from birth to slaughter, as preliminary information on this policy.

TESTING SWINE UNDER THE ADVANCED REGISTRY POLICY

PROCEDURE.—Five pigs each were selected from three litters for this test. They were weighed at birth and again at weaning (this weight constituted the initial weight for the feeding period), also every thirty days during the feeding period and again at the end of the feeding period. A record was kept of the feed consumption for each sow and litter from farrowing to weaning, also

of the amount of feed consumed by each group of pigs during the feeding period from weaning to slaughter. Changes in rations were made at the end of sixty- and thirty-day periods, and the amount of feed consumed during each period was recorded. Samples were taken of all feeds used each period and forwarded to Ottawa for analysis.

The following rations were used during the feeding period:—

First 60 days—	lb.
Middlings	200
Ground oats	100
Ground barley	50
Shorts	50
Bran	25
Linseed oil meal	14
Tankage, 45% protein	14
Bone charcoal	4½
Salt	2¼
Skim-milk	hand fed

60 to 90 days—	lb.
Middlings	100
Ground oats	150
Ground barley	100
Shorts	50
Bran	25
Linseed oil meal	14
Tankage, 45% protein	14
Bone charcoal	4½
Salt	2¼
Skim-milk	hand fed

90 days to finish

	lb.
Ground oats	150
Ground barley	200
Shorts	100
Linseed oil meal	14
Tankage, 45% protein	14
Bone charcoal	4½
Salt	2¼
Skim-milk	hand fed

Cost of Feeds.—The meal rations for the full period were charged at $2.15 per hundred pounds, the clover at $0.15 per hundred pounds and the skim-milk at $0.25 per hundred pounds.

Advanced Registry Policy for Swine

—		Lot 1	Lot 2	Lot 3
		Pigs from sow No. 86	Pigs from sow No. 216	Pigs from sow No. 223
Number of pigs in experiment	No.	5	5	5
Initial weight, gross	lb.	116	139	103
Initial weight, average	lb.	23·2	27·8	20·6
Final weight, gross	lb.	933	1,132	1,084
Final weight, average	lb.	186·6	226·4	216·8
Total gain for period	lb.	817	993	981
Average gain per hog	lb.	163·4	198·6	196·2
Number of days fed	days	148	148	148
Average daily gain per hog	lb.	1·10	1·34	1·32
Meal consumed	lb.	2,680	2,977	2,659
Skim-milk consumed	lb.	5,165	5,165	5,165
Green feed consumed	lb.	891	891	891
Meal eaten per pound gain	lb.	3·28	3·00	2·71
Skim-milk eaten per pound gain	lb.	6·32	5·20	5·26
Green feed eaten per pound gain	lb.	1·09	0·90	0·91
Total cost of feed	$	71 87	78 25	71 42
Cost of feed per head	$	14 37	15 65	14 28
Cost of feed per head per day	cts.	9·71	10·57	9·65
Cost of feed per pound gain	cts.	8·80	7·88	7·28

Deductions.—In this test lot 1, from sow No. 86, made a gain of 1·10 pounds per day, lot 2 an average gain of 1·34 pounds per day, and lot 3 a gain of 1·32 pounds. It will be noted that lot 1 cost 8·80 cents to make one pound of gain, lot 2 cost 7·88 cents and lot 3 only 7·28 cents per pound of gain. Although lot 2 made slightly the largest gains, lot 3 made the cheapest, and therefore more profitable gains.

FIELD HUSBANDRY

COST OF PRODUCTION

In view of the fact that under present conditions, individual farmers are apparently not in a position to fix a price on the materials which they produce, it would seem logical for them to centre their attention on a phase of agricultural economics over which they have at least partial control. The profit or loss in producing crops is governed in general by two factors, namely: cost of production, and the return value of the crop. While the latter factor is determined almost wholly by the law of supply and demand or some other outside influence, the cost of production can be regulated in a large measure by the producer. That is to say the difference between profit and loss may be determined by the efficiency with which labour and machinery are handled, as well as by the care in selection of land, seed and fertilizers and the cultural methods used.

For the past eight years, records have been kept at this Station, in regard to the cost of producing most of the farm crops, generally grown in the Eastern Townships of Quebec. This has been done with the object in view of determining the actual cost per bushel or per ton of each crop, and getting some idea as to the gain or loss to be expected from various crops under different systems of management. This report includes the cost of production for corn, oats and hay, together with a comparison of yield and cost of producing several silage and root crops.

The cost charges and the return values used this year are as follows:—

COST VALUES

Rent of land—interest on investment and taxes	$ 4 86 per acre
Manure	1 50 per ton
Fertilizer—	
Nitrate of soda	57 00 "
Superphosphate	17 50 "
Muriate of potash	43 00 "
Lime	4 60 "
Seed—	
Oats	1 35 per bushel
Peas	3 40 "
Vetches	3 60 "
Corn	3 35 "
Barley	1 45 "
Sunflowers	0 12½ per pound
Red clover	0 31 "
Alsike	0 32½ "
Timothy	0 10½ "
Swedes	0 65 "
Twine	0 15 "
Threshing	0 05 per bushel
Manual labour	0 21 per hour
Horse labour	0 10 "
Tractor labour	0 60 "

RETURN VALUES

Hay	$11 30 per ton
Oats	0 72 per bushel
Barley	0 84 "
Corn (silage)	Containing 25 per cent
Sunflowers (silage)	dry matter, 300 pounds
O.P.V. (silage)	silage = 100 pounds hay
Turnips	Containing 10 per cent dry matter, 600 pounds = 100 pounds hay

The cost of manure is set at $1.50, one dollar being the value of the manure itself and fifty cents for applying it. Manual labour, horse labour and tractor labour, includes preparing and seeding the land and harvesting the crop, but does not take care of threshing the grain crop. In the case of tractor labour, threshing grain and ensiling corn is not included. These charges are entered under the head of threshing and machinery.

Return values for silage and roots are based on their dry matter content and their calculated value in comparison with hay. Other charges are based on actual market prices either local or average for the province of Quebec, the latter as obtained from estimates of the Dominion Bureau of Statistics.

COST OF PRODUCING CORN

About 25 acres of corn were grown at the Station in 1929. The yield was about average. Wet and cool weather in the spring and early summer retarded the growth of corn considerably and early frosts made it necessary to harvest the corn before the crop had reached the most desirable stage of maturity. The yield of both green corn and dry matter, therefore, was considerably lowered. The average yield was 9·90 tons of green corn per acre. The yield and cost of production are based on an average of four different areas. The eight-year average is also shown.

COST OF PRODUCING AN ACRE OF CORN AT LENNOXVILLE IN 1929

Item	Statement	Amount 1929	Eight-year average
		$	$
Rent of land	Interest and taxes	4 86	4 86
Manure	6·4 tons at $1.50 per ton	9 60	9 60
Seed	½ bushel at $3.35 per bushel	1 67	1 22
Twine	3¾ pounds at 15 cents per pound	0 56	0 57
Machinery (including ensiling outfit)		5 85	5 85
Manual labour	49·8 hours at 21 cents per hour	10 46	11 46
Horse labour	45·8 hours at 10 cents per hour	4 58	6 21
Tractor labour	1·6 hours at 60 cents per hour	0 96	0 25
Total cost per acre		38 54	40 02
Yield per acre	tons	9 90	11 47
Cost per ton	$	3 89	3 81
Value per acre	9·90 tons at $2.24 per ton $	22 18	23 97
Loss per acre	$	16 36	16 05

COST OF PRODUCING OATS

Forty acres of oats were grown on a field scale this year. Although the season was fairly favourable for oats, the stand in these fields was low, although the quality of grain was fair. The following table shows a statement of costs for oats, and are average figures of four different areas. The eight-year average is also shown.

COST OF PRODUCING AN ACRE OF OATS AT LENNOXVILLE IN 1929

Item	Statement	Amount 1929	Eight-year average
		$	$
Rent of land	Interest and taxes	4 86	4 86
Manure	4·8 tons at $1.50 per ton	7 20	7 20
Seed	2½ bushels at $1.35 per bushel	3 37	2 61
Twine	3 pounds at 15 cents per pound	0 45	0 51
Machinery		2 85	2 85
Manual labour	18·1 hours at 21 cents per hour	3 80	4 24
Horse labour	26·1 hours at 10 cents per hour	2 61	* 3 44
Tractor labour	1·2 hours at 60 cents per hour	0 72	0 23
Threshing charges	42·1 bushels at 5 cents per bush	2 10	3 09
Total cost per acre		27 96	29 09
Yield per acre	Grain bush.	42·10	44·50
	Straw tons	0·94	0·99
Value per acre	Grain 42·1 bushels at 72 cents	30 31	28 56
	Straw 0·94 ton at $4.00	3 76	3 68
	Total	34 07	32 24
Profit per acre		6 01	3 15
Cost per bushel (considering value of straw)	cts.	60·0	60·7

* Six-year average.

COST OF PRODUCING HAY

Hay was harvested from 100 acres and the crop was exceptionally good. Clover wintered probably better than any year in the history of the station. Very favourable weather in the early summer insured splendid growth and ideal harvesting conditions made it possible to make a good quality of hay. The costs and returns are shown in the following table:—

COST OF PRODUCING AN ACRE OF HAY AT LENNOXVILLE IN 1929

Item	Statement		Amount 1929	Eight-year average
			$	$
Rent of land	Interest and taxes		4 86	4 86
Manure	2·4 tons at $1.50 per ton		3 60	3 60
Seed	½ of 10 pounds timothy at 10½ cents		0 52	0 54
	8 pounds clover at 31 cents		2 48	2 59
	2 pounds alsike at 32½ cents		0 65	0 49
Machinery			2 85	2 85
Manual labour	11·1 hours at 21 cents		2 33	2 98
Horse labour	7·7 hours at 10 cents		0 77	0 98
Total cost per acre		$	18 06	18 89
Yield per acre		tons	2·14	2·45
Cost per ton		$	8 44	7 71
Value per acre	2·14 tons at $11.30 per ton	$	24 18	26 88
Profit per acre		$	6 12	7 99

YIELD AND COST OF ROOTS AND SILAGE CROPS

Records have been kept for six years in regard to yield and cost of producing turnips, corn, sunflowers and oats, peas and vetches. In 1927 a mixture of corn and sunflowers was included as a part of the project. Two years' results are now available for this crop also. Due to unfavourable conditions in 1928, none of the above crops produced sufficient yield to be included in the results, so the records for the year have been excluded from the averages. The following table shows the yield and cost for 1929 and the six-year average:—

YIELD AND COST OF PRODUCING ROOTS AND SILAGE CROPS

Item	Corn		Sunflowers		Oats, peas and vetches		Swedes		Corn and sunflowers	
	1929	Six-year average	1929	Six-year average	1929	Six-year average	1929	Six-year average	1929	Two-year average
	$	$	$	$	$	$	$	$	$	$
Rent of land, interest and taxes	4 86	4 86	4 86	4 86	4 86	4 86	4 86	4 86	4 86	4 86
Manure	9 60	9 60	9 60	9 60	9 60	9 60	9 60	9 60	9 60	9 60
Seed	1 67	1 24	1 20	0 97	6 45	5 47	1 95	1 95	1 87	1 62
Twine	0 56	0 58	0 56	0 62	.....	.....	.....	.....	0 56	0 60
Machinery (including ensiling outfit)	5 85	5 85	5 85	5 85	5 85	5 85	2 85	2 85	5 85	5 85
Manual labour	16 09	11 24	18 19	13 46	10 58	7 61	32 21	25 63	19 21	17 30
Horse labour	4 73	7 15	4 73	7 82	3 46	5 55	7 81	8 63	4 73	4 87
Tractor labour	0 84	0 36	0 84	0 36	0 84	0 36	0 84	0 36	0 84	1 11
Total cost	44 20	40 88	45 83	43 54	41 34	39 25	60 12	53 88	47 52	45 81
Yield per acre green weight..tons	10·14	9·32	11·03	14·80	8·82	7·73	27·75	22·37	8·98	14·44
Cost per ton green weight	4 36	4 39	4 16	2 94	4 69	5 08	2 17	2 41	5 29	3 17
Yield per acre dry weight*..tons	1·53	1·25	1·29	1·86	2·37	1·98	2·44	2·32	1·44	1·96
Cost per ton dry weight*	28 89	34 13	35 53	24 56	17 57	21 36	24 64	30 30	33 00	26 11

* Four-year average.

The results indicate that corn is decidedly inferior to sunflowers or oats, peas and vetches, as a silage crop, when compared on their dry matter basis. Corn in this district, except under especially favourable soil conditions, is not a

profitable crop to grow. Sunflowers have given very satisfactory results during the six-year period, and although rather difficult to harvest produce high yields of fairly good quality silage. The labour requirements of the crop, however, are relatively high, and the cost of production is therefore correspondingly high.

Oats, peas and vetches as a silage crop is particularly suited to this district. Higher yields of dry matter are obtained at decidedly lower costs than for any of the other crops in the experiment. The crop demands a relatively low labour expenditure, does not deplete soil fertility to the same extent as other silage crops, provides an exceptionally good quality of silage, may be used as a nurse crop for hay and is especially adapted to meet the needs of the stock farmer in the Eastern Townships of Quebec from the standpoint of a succulent roughage.

Turnips have given very high yields of green crop, but due to their high moisture content are not so satisfactory when compared on their dry matter basis. This crop requires more labour to handle than any feed crop grown on the farm, which makes their production as an economical stock feed, practically inhibitive.

CROP ROTATION EXPERIMENTS

A project dealing with crop rotations was started eight years ago, in which six rotation systems were laid out side by side on an area of land with conditions of soil and natural phenomenon, as nearly uniform as possible. The object in view in this experiment, was to ascertain as far as possible the response of crops to various rotational conditions, and observe wherein crops grown in different sequence were adapted to the several types of farming carried on in the district. Records have also been kept of the response of the different crops to manure applied at varying intervals in the rotations. In all cases, however, manure has been applied at the rate of four tons per acre for each crop in the rotation. The average yield for each crop, the value and cost of same as well as the gain or loss, have been recorded, and in order to provide a basis of comparison, for the different rotations, the total value and cost for the rotation and on an acre basis, have been reported. The cost and return values used for the 1929 results may be found under the heading of cost of producing crops. Results for this year are reported and also the eight-year average for corn, seven-year average for barley and timothy, and six-year average for oats and clover.

ROTATION "A" (FIVE YEARS' DURATION)

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

Manure in this rotation, is applied in the spring before the corn crop, at the rate of 20 tons per acre. Compton's Early corn is grown, seeded at the rate of one half bushel per acre. Barley is seeded at the rate of two bushels per acre and the variety used in Chinese, Ottawa 60 or O.A.C. 21.

Hay is seeded at the rate of 20 pounds per acre, made up of a mixture of eight pounds of clover, two pounds of alsike and ten pounds of timothy. Banner oats are grown, seeded at the rate of 2½ bushels per acre. These rates of seeding and seed mixtures, are used in all the rotation tests. This five-year rotation is especially adapted for mixed or general farming and is a well balanced rotation in which one fifth of the area is corn, two fifths grain and two fifths hay, or the latter may be divided into hay and pasture. The following table gives a summary of yields, values and cost for the rotation:—

ROTATION "A"

Crop	1929				Average				
	Yield	Value	Cost	Profit or loss	Years	Yield	Value	Cost	Profit or loss
		$	$	$			$	$	$
Corn	9·91 tons	21 50	42 03	−20 53	8	12·35 tons	25 83	46 37	−20 54
Barley—Grain	30·10 bush.	28 92	27 82	1 10	7	30·30 bush.	33 52	30 24	3 28
Straw	0·91 ton	.....	.....	.....	.....	1·10 tons	.....	.....	.....
Clover	2·54 tons	28 70	21 49	7 21	6	2·63 tons	27 48	21 58	5 90
Timothy	2·88 tons	32 54	15 36	17 18	7	2·41 tons	25 34	17 13	8 21
Oats—Grain	36·00 bush.	29 04	22 59	6 45	6	40·60 bush.	30 95	23 01	7 94
Straw	0·78 ton	.....	.....	.....	.....	1·02 tons	.....	.....	.....
Total from rotation	.....	140 70	129 29	11 41	.....	.....	143 12	138 33	4 79
Average per acre	.....	28 14	25 86	2 28	.....	.....	28 62	27 67	0 96

N.B.—Minus sign (−) denotes loss.

It can easily be seen that in computing the returns from the corn crop, used as silage, on a dollars and cents basis, the crop is grown at a loss. This is due to the fact that as a cash crop, corn has no market value, and the calculated value used, is figured in comparison with hay, on a dry matter basis which sets a low value on corn silage. On the other hand corn is an expensive crop to produce, due to the fact that in this district comparatively low yields are obtained, and extra cultivation and handling increases the labour costs. These factors, therefore, work together to bring about a loss on the crop. The other crops in the rotation are all grown with some profit and the average gain per acre for the rotation is 96 cents.

ROTATION "B" (FOUR YEARS' DURATION)

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

This is a very suitable rotation for mixed farming, especially adapted where a large amount of roughage in the form of hay and corn silage is used. Manure is applied to the corn crop at the rate of 16 tons per acre. One half of the area is devoted to hay, one quarter to oats and one quarter to corn. A statement of cost and returns is as follows:—

ROTATION "B"

Crop	1929				Average				
	Yield	Value	Cost	Profit or loss	Years	Yield	Value	Cost	Profit or loss
		$	$	$			$	$	$
Corn	10·44 tons	22 97	39 63	−16 66	8	10·89 tons	22 50	43 10	−20 60
Oats—Grain	53·10 bush.	43 91	29 14	14 77	6	55·10 bush.	41 31	31 01	10 30
Straw	1·42 tons	.....	.....	.....	.....	1·27 tons	.....	.....	.....
Clover	2·29 tons	25 88	19 09	6 79	6	2·26 tons	23 65	19 85	3 80
Timothy	2·59 tons	29 27	14 76	14 51	7	2·47 tons	25 79	16 50	9 29
Total for rotation	.....	122 03	102 62	19 41	.....	.....	113 25	110 46	2 79
Average per acre	.....	30 51	25 65	4 85	.....	.....	28 31	27 61	0 70

N.B.—Minus sign (−) denotes loss.

Corn is again produced at a loss and due to the fact that it makes up a larger proportion of the area, the gain per acre for the rotation is slightly lower, being only 0·70 cents.

ROTATION "C" (THREE YEARS' DURATION)

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

Manure is applied in this rotation to corn at the rate of 12 tons per acre. Not a particularly profitable rotation from a cash crop standpoint, but especially suitable in building up run down land. A large proportion in corn makes a good deal of cultivation possible and therefore is very useful in weed eradication, clover, a legume crop, every three years assists very materially in building up and maintaining fertility, and a large area of oats, provides a fair amount of grain for feed or for a cash crop. The following table shows a statement of returns:—

ROTATION "C"

Crop	1929				Average				
	Yield	Value	Cost	Profit or loss	Years	Yield	Value	Cost	Profit or loss
		$	$	$			$	$	$
Corn	6·95 tons	14 04	39 03	−24 99	8	10·46 tons	21 28	42 17	−20 89
Oats—Grain	48·10 bush.	37 91	27 09	10 82	6	51·20 bush.	38 37	28 29	10 08
Straw	0·82 ton	.....	.....	.....	.....	1·11 tons	.....	.....	.....
Clover	2·59 tons	29 27	19 77	9 50	6	2·26 tons	23 65	20 40	3 25
Total for rotation	.....	81 22	85 89	− 4 67	.....	.....	83 30	90 86	−7 56
Average per acre	.....	27 07	28 63	− 1 56	.....	.....	27 77	30 29	−2 52

N.B.—Minus sign (−) denotes loss.

The final profit or loss per acre for this rotation shows that it is operated at a loss in dollars and cents. Just what profit may be gained in building up and maintaining fertility with such a rotation is difficult to determine, but certainly must have considerable value. The corn crop occupies a large area and hence brings the profits down considerably. Due to climatic conditions also it is difficult sometimes to obtain a good stand of clover which makes up the total area in hay in this rotation. This lowers the yield of hay and therefore decreases the profits also.

ROTATION "D" (SIX YEARS' DURATION)

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

Manure is applied to the corn crop in this rotation at the rate of 16 tons per acre. A further application is top dressed on clover sod for timothy in the fourth year of the rotation, at the rate of eight tons per acre. This rotation is a very suitable rotation from many standpoints providing as it does only a small

proportion of corn and therefore distributing the loss from this crop over a larger area of more profitable crops. A large amount of hay is grown which provides a saving in both seed and labour. A good proportion is devoted to grain and necessary pasture is provided. Returns are tabulated as follows:—

ROTATION "D"

Crop	1929				Average				
	Yield	Value	Cost	Profit or loss	Years	Yield	Value	Cost	Profit or loss
		$	$	$			$	$	$
Corn	11·09 tons	28 83	40 83	−12 00	8	9·86 tons	21 02	44 34	− 23 32
Barley—Grain	33·70 bush.	30 95	27 10	3 85	7	30·60 bush.	33 57	29 04	4 53
Straw	0·66 ton	.....	.....	.....	.....	1·04 tons	.....	.....	.....
Clover	1·25 tons	14 12	20 12	− 6 00	6	2·71 tons	28 17	19 46	8 71
Timothy	3·25 tons	36 72	19 39	17 33	7	3·11 tons	32 57	22 08	10 49
Timothy	3·25 tons	36 72	16 39	20 33	7	2·75 tons	29 04	18 22	10 82
Oats—Grain	56·10 bush.	44 55	24 49	20 06	6	51·70 bush.	38 82	24 68	14 14
Straw	1·04 tons	.....	.....	.....	.....	1·25 tons	.....	.....	.....
Total for rotation	.....	191 89	148 32	43 57	.....	.....	183 19	157 82	25 37
Average per acre	.....	31 98	24 72	7 26	.....	.....	30 53	26 30	4 23

N.B.—Minus sign (−) denotes loss.

The average profit per acre for this rotation is shown as $4.23, with all crops but corn showing fair profits. Timothy hay shows particularly profitable cash returns.

ROTATION "E" (FOUR YEARS' DURATION)

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

A rotation in which no cultivated succulent crops are grown. Manure is applied for oats at eight tons per acre and to third year timothy at the same rate. This is a rotation which provides fairly profitable cash crops at low labour expenditure. This rotation might be suitable for a type of mixed farming in which some of the crops are disposed of as cash crops and not all fed to live stock. Or it may be used on back fields far away from buildings, as a supplementary rotation to some of the others shown. The returns are as follows:—

ROTATION "E"

Crop	1929				Average				
	Yield	Value	Cost	Profit or loss	Years	Yield	Value	Cost	Profit or loss
		$	$	$			$	$	$
Oats—Grain	60·50 bush.	47 72	29 51	18 21	6	45 80 bush.	35 28	30 38	4 85
Straw	1·04 tons	.....	.....	.....	.....	1·26 tons	.....	.....	.....
Clover	3·00 tons	33 90	20 12	13 78	6	2·77 tons	29 02	19 46	9 56
Timothy	2·38 tons	26 89	19 39	7 50	7	2·77 tons	29 13	22 09	7 04
Timothy	2·48 tons	28 02	16 99	11 03	7	2·39 tons	24 90	18 98	5 92
Total for rotation	.....	136 53	86 01	50 52	.....	.....	118 28	90 91	27 37
Average per acre	.....	34 13	21 50	12 63	.....	.....	29 57	22 73	6 84

With no corn crop to lower the average, this rotation shows a decidedly higher cash profit than any before mentioned. In a rotation such as this, however, it is much more difficult to maintain fertility and control weeds.

A check rotation is also included in this test in which the crops are grown in the same sequence as in rotation "E" and conditions are the same in every way except that this rotation receives no manure. In this check, however, in spite of the fact that no manure or fertilizer has been applied, the actual gain per acre from the rotation is higher than in the other rotation. While the average yield of crop is lower than in the other rotations, the increases in the cases where manure was applied, was not enough to pay the cost of manuring. This seems contrary to results generally. It is true, however, that the land when the experiment was originally started was in a comparatively high state of fertility and in eight years this fertility has not deteriorated to any considerable extent. It is also true that a systematic rotation in itself helps to maintain the soil productively and crops will continue to grow well for a considerable time, without special artificial assistance in the way of manure. The following table shows the returns for the check rotation:—

CHECK ROTATION

Crop	1929				Average				
	Yield	Value	Cost	Profit or loss	Years	Yield	Value	Cost	Profit or loss
		$	$	$			$	$	$
Oats.....Grain	45·70 bush.	35 82	21 67	14 15	6	40·00 bush.	30 03	21 05	8 98
Clover.....Straw	0·73 ton	.....	.....	.....	.....	0·89 ton	.....	.....	.....
Timothy.....	2·01 tons	22 83	15 32	7 51	6	2·01 tons	20 91	13 33	7 58
Timothy.....	2·42 tons	27 35	12 19	15 16	7	2·30 tons	24 19	11 97	12 22
	1·99 tons	22 49	12 19	10 30	7	2·24 tons	23 53	11 97	11 56
Total for rotation.....	.....	108 49	61 37	47 12	.....	.....	98 66	58 32	40 34
Average per acre.....	.....	27 12	15 34	11 78	.....	.....	24 66	14 58	10 08

It would appear from an examination of these results that the returns which can be expected from even the best of these rotations is very small indeed. Of course it must be remembered that interest on investment and a charge of $1.50 per ton for the manure has been charged against the crops and these are items which are often overlooked by the average farmer. However, the fact still remains that the returns are low. It is true that the yields are not high and might be increased by a change in some of the methods. Some other method of comparison might also be employed. For instance instead of comparing the rotations on the basis of their cash value, the crops could be marketed by feeding to live stock and thereby might tell a different story.

In order to arrive at a comparison along this line, we have attempted to calculate the value of these crops and rotations on the basis of the digestible nutrients which they produce or contain. We realize, of course, that such a basis has weaknesses. Unfortunately, we are not in a position to have chemical analysis made of these crops, and the results arrived at, are from figures based on average analyses of the various crops as presented in Henry and Morrison's "Feeds and Feeding." It is true that these results may not in all cases correspond with an actual analysis of the crops under consideration, if such analysis were practical or possible. But when it is considered that the tables of Henry and Morrison are computed from the average of a number of samples and the crop yields which we are using represent the average yields over six to eight years, it would seem that, while not being perhaps absolute results, form a basis for a reasonably reliable comparison. We present therefore, a table showing the digestible protein, carbohydrates, fats and total digestible nutrients obtained from these rotations calculated on the above mentioned basis:—

DIGESTIBLE NUTRIENTS IN CROPS FROM DIFFERENT ROTATIONS

—	Crude protein	Carbo-hydrates	Fat	Total
	lb.	lb.	lb.	lb.
Rotation "A"				
Corn	247·00	3,161·60	98·80	3,630·90
Barley	149·83	1,849·53	36·32	2,082·17
Clover	210·40	2,088·22	57·86	2,430·12
Timothy	144·60	2,062·96	57·84	2,337·70
Oats	154·30	1,588·23	70·82	1,902·04
Total for rotation	906·13	10,750·54	321·64	12,382·93
Average per acre	181·23	2,150·11	64·33	2,476·59
Rotation "B"				
Corn	217·80	2,787·84	87·12	3,201·66
Oats	207·12	2,058·08	94·05	2,477·11
Clover	180·80	1,794·44	49·72	2,088·24
Timothy	148·20	2,114·32	59·28	2,396·90
Total for rotation	753·92	8,754·68	290·17	10,162·91
Average per acre	188·48	2,188·67	72·54	2,540·73
Rotation "C"				
Corn	209·20	2,677·76	83·68	3,075·24
Oats	191·06	1,852·68	86·13	2,237·84
Clover	180·80	1,794·44	49·72	2,088·24
Total for rotation	581·06	6,324·88	219·53	7,401·32
Average per acre	193·69	2,108·29	73·18	2,467·11
Rotation "D"				
Corn	197·20	2,524·16	78·88	2,898·84
Barley	150·91	1,817·32	35·98	2,050·23
Clover	216·80	2,151·74	59·62	2,504·04
Timothy	186·60	2,662·16	74·64	3,016·70
Timothy	165·00	2,354·00	49·50	2,667·50
Oats	195·51	1,980·81	89·30	2,997·49
Total for rotation	1,112·02	13,490·19	387·92	16,134·80
Average per acre	185·34	2,248·36	64·65	2,689·13
Rotation "E"				
Oats	176·25	1,884·82	81·85	2,245·39
Clover	221·60	2,199·38	60·94	2,559·48
Timothy	166·20	2,371·12	66·48	2,686·90
Timothy	143·40	2,045·84	57·36	2,318·30
Total for rotation	707·45	8,501·16	266·63	9,810·07
Average per acre	176·86	2,125·29	66·66	2,452·52
Check Rotation				
Oats	149·72	1,466·84	67·70	1,769·12
Clover	160·80	1,595·94	44·22	1,857·24
Timothy	138·00	1,968·80	55·20	2,231·00
Timothy	134·40	1,917·44	53·76	2,172·80
Total for rotation	582·92	6,949·02	220·88	8,030·16
Average per acre	145·73	1,737·25	55·22	2,007·54

The table is fairly self explanatory, but in order to summarize it, the following table shows the order in which the various rotations rank with respect to the different nutrients and also the rank on their cash value basis:—

PRODUCTION PER ACRE OF THE VARIOUS NUTRIENTS IN ORDER OF RANK

Rotation	Total nutrients	Rotation	Protein	Rotation	Carbohydrates	Rotation	Fat	Rotation	Gain or loss
	lb.		lb.		lb.		lb.		$
D	2,689·13	C	193·69	D	2,248·36	C	73·18	Check.	9 64
B	2,540·73	B	188·48	B	2,188·67	B	72·54	E	6 84
A	2,476·59	D	185·34	A	2,150·11	E	66·66	D	4 23
C	2,467·11	A	181·23	E	2,125·29	D	64·65	A	0 96
E	2,452·52	E	176·86	C	2,108·29	A	64·33	B	0 70
Check	2,007·54	Check.	145·73	Check.	1,737·25	Check.	55·22	C	−2 52
Total	14,633·62		1,071·33		12,557·97		396·58		19 85
Average	2,438·94		178·55		2,092·99		66·10		3 31

N.B.—Minus sign (−) denotes loss.

Rotation "D" it will be seen is higher in total digestible nutrients and carbohydrates than any of the others. It is also a fact that although lower than some of the others in protein, fat and cash gain per acre, it is considerably higher than average. It would appear therefore that rotation "D" is a fairly useful rotation, if not the most practical of any in the test.

"B" rotation also ranks fairly high and from a digestible nutrient standpoint, is about as good as "D," but falls off considerably when compared on the cash basis.

"C" rotation with its large proportion of clover provides for a larger protein content and is also highest in fat, but in other respects is considerably inferior. Where large amounts of protein are required, this rotation might be valuable.

In most instances, rotation "A" is comparatively low, which is rather difficult to explain, unless it is due to the fact that manure put on in a large quantity at only one place in the rotation, does not produce as good results as when put on in smaller amounts and more often, as applies in rotation "D," which is also a comparatively long rotation.

Rotation "E" is low, except when compared on a cash basis, which may be explained again by the fact that all the crops in the rotation are cash crops, whereas when compared on a nutrient basis, there is not the variety of crops to increase the production in a year, for instance when one of the crops might be light.

In regard to the check, while it is the highest on a cash basis, it is low in every case when digestible nutrients are considered.

DRAINAGE EXPERIMENT

A project was started in 1922, in which a rotation of corn, oats, clover and timothy were grown on each of two fields, one of which was drained by a thorough system of tile drains, while the other field was not artificially drained in any way. The object in view was to determine the increase in crop and therefore the increase in revenue which might be expected by drainage. It is conclusively proven from other records in the past, that in low lying or swampy lands, where the water is held, drainage will change an absolutely unproductive area into a fairly high producing field. It is rather doubtful, however, in a field in which there is enough natural drainage to remove most of the surplus moisture, if an underground drainage system would be a paying

investment. The results from the investigations at this station would indicate that sufficient increase in crops cannot be expected to warrant the expenditure that such a system requires.

The area upon which this experiment is being conducted comprises in each field 20 acres of land upon which five acres of each of the above mentioned crops are grown. The land in each field has a decided slope to the west which provides for plenty of surface drainage. Records of yields have been kept for eight years except in the case of corn for which crop only seven years results are available. The yields for 1929 and also the average yield for the period are shown in the following table:—

YIELD OF CROPS ON DRAINED AND UNDRAINED LAND

Treatment	Corn		Oats			Clover		Timothy	
	1929	7-year average	1929		8-year average	1929	8-year average	1929	8-year average
	tons	tons				tons	tons	tons	tons
Drained	10·60	10·11	Grain....bush. Straw....tons	40·0 0·92	42·9 0·88	1·55	1·38	2·09	1·57
Undrained	9·89	7·83	Grain....bush. Straw....tons	43·1 0·86	35·4 0·77	1·68	1·60	2·12	1·72
Increase from drainage	0·71	2·28	Grain....bush. Straw....tons	−3·1 0·06	7·5 0·11	−0·13	−0·22	−0·03	−0·15

N.B.—Minus sign (−) denotes decrease.

From the results in this table, the increases due to drainage are very small indeed, the seven-year average increase for corn being only 2·28 tons, and the eight-year average for oats 7·5 bushels of grain and 0·11 tons of straw, while clover and timothy actually show a higher average yield on the undrained land, the difference being — 0·22 and 0·15 of a ton respectively.

The values of the crops produced give a fairly good idea of the value of the drainage system, and are as follows:—

RETURN VALUE OF CROPS ON DRAINED AND UNDRAINED LAND

Treatment	Corn		Oats		Clover		Timothy		Total	
	1929	7-year average	1929	8-year average	1929	8-year average	1929	8-year average	1929	Average
	$	$	$	$	$	$	$	$	$	$
Drained	24 38	20 46	32 48	31 50	17 51	15 22	23 62	17 29	97 99	84 47
Undrained	20 18	14 94	34 47	26 16	18 98	17 49	23 96	18 90	97 59	77 49
Increase due to drainage	4 20	5 52	−1 99	5 34	−1 47	−2 27	−0 34	−1 61	0 40	6 98

N.B.—Minus sign (−) denotes decrease.

In regard to corn and oats an increase in value of crops is quite in evidence. Each year of the experiment increases have been obtained with these crops on the drained land with the exception of oats in 1929 in which year, the undrained land produced a higher yield of grain. Clover and timothy show higher average returns on the undrained land. Only once in eight years has the yield of clover been higher on the drained land, namely, in 1923. Higher yields of timothy have been obtained on the drained land in five of the eight years of the experiment. It is true that none of the differences in yield are outstanding. However, when it is considered that the cost of draining was $57.64 per acre, while the average increase in value per acre, all crops considered, is only $6.98 it would seem logical to conclude that the installation of a drainage system on some land is not a sound economic venture.

DEPTH OF PLOUGHING

Seven years' results from an experiment comparing shallow ploughing with deep ploughing, shows that on land of the type upon which the experiment is conducted, nothing is to be gained from deep ploughing. In fact, the records tend to show increases in crop on the shallow ploughed land and it would appear that ploughing four inches deep, or deep enough to allow for the preparation of a good seed bed, is all that is necessary. In this experiment, manure is applied to sod land and ploughed down, and it is just possible that the shallow ploughing retains the manure nearer to the surface and permits the plant roots, especially the young plants, to more easily reach the food nutrients supplied in the manure. Also the available material may be used by the plant before leaching away in the drainage water, occurs to any considerable extent. These points may explain the larger crops on the shallow ploughing. The following table shows the yields for 1929, and the average yields for the four crops in the rotation.

DEPTH OF PLOUGHING EXPERIMENT, 1923 TO 1929

Treatment	Corn		Oats		Clover		Timothy	
	1929	7-year average	1929	6-year average	1929	7-year average	1929	6-year average
	tons	tons	bush.	bush.	tons	tons	tons	tons
Ploughed 4 inches	13·25	12·57	33·5	47·7	2·16	1·96	2·35	1·90
Ploughed 7 inches	9·64	11·83	35·9	45·9	1·97	1·69	2·17	1·84

The average yield in each case is higher on the area ploughed only four inches deep.

PREPARING SOD LAND FOR GRAIN

For seven years a project has been under test at this Station in which different cultural methods used in preparing sod land for grain have been compared. Records have also been kept in order to ascertain the effect of these treatments on the subsequent crops in a rotation of oats, corn, oats, clover, timothy in which the special treatments are employed on sod land after timothy in preparation for the oat crop listed first in the rotation. The yields as recorded for 1929 and also the seven years' average yields are as follows:—

PREPARING SOD LAND FOR GRAIN, 1929

Treatment	*Oats	Corn	Oats	Clover	Timothy
	bush.	tons	bush.	tons	tons
Land fall ploughed	16·5	10·02	39·4	1·78	2·74
Land spring ploughed	15·7	13·43	32·6	1·56	2·62
Plough July, top work, rib in late fall	16·5	6·82	32·3	1·45	2·51
Plough July, top work, do not rib	20·7	6·46	33·5	1·51	2·51
Plough July, top work, replough late fall	16·5	10·63	32·8	2·01	3·05
Average of all treatments	17·2	9·47	34·1	1·86	2·69

PREPARING SOD LAND FOR GRAIN, AVERAGE SEVEN YEARS

Treatment	*Oats	Corn	Oats	Clover	Timothy
	bush.	tons	bush.	tons	tons
Fall plough	33·7	10·65	39·9	1·11	1·75
Spring plough	37·1	11·60	40·8	1·20	1·69
Plough July, top work, ribbed	36·7	9·21	38·0	0·96	1·41
Plough July, top work, not ribbed	39·4	9·18	38·0	0·94	1·42
Plough July, top work, replough	31·7	9·47	37·9	1·13	1·65
Average of all treatments	35·7	10·02	38·9	1·07	1·58

* Six year average.

From results to date no one treatment has produced consistently enough increase in yield of crop, to furnish conclusive proof that it is superior to any other or all other treatments. Considered only from a yield standpoint, it would appear that straight spring and fall ploughing, without additional top working, have a slight advantage with spring ploughing somewhat better than fall ploughing. It is true, however, that couch grass, which is probably the most troublesome weed with which we have to contend, persists to a much more marked degree in the spring and fall ploughed plots, than it does on the plots which are top-worked during the comparatively hot, dry months in late summer and early fall. If allowed to grow without a good deal of extra cultivation in the spring when preparing the seed bed, and the actual removal of the grass roots from

The stiff-tooth cultivator; thorough and frequent use of this implement assists materially in weed control.

the land, the couch grass on the spring and fall ploughed plots, would soon grow so luxuriantly as to crowd out all crops grown on the area. The plots on which the other three treatments are practised, are entirely free of this weed. The results seem to show no advantage from ribbing the land in the fall, neither from standpoint of yield nor as a more efficient method of weed control. Ploughing a second time in late fall does not show any particular advantage over one ploughing. It is important, however, in weed control to top-work the areas thoroughly, beginning as soon as the land is ploughed, when the vitality of the couch grass plant is lower than at any time in its life cycle, and continuing the cultivation at frequent intervals during the hot dry weather

OTHER INVESTIGATIONS IN FIELD HUSBANDRY

Besides the projects recorded in this report, a number of other important investigations in Field Husbandry are in progress at this station. These include such experiments as commercial fertilizers for hay, manure and commercial fertilizer for the potato crop, liming experiments, amounts and place of applying manure in the rotation, tests with green manure crops, cost of breaking land and other related investigations. The problem of pasture production has, in the past, occupied a place of lesser importance as compared with experiments in other fields of agriculture. Of late years, however, pasture is receiving a good deal of attention and while some experiments have been in progress at this station for a number of years, plans were drawn up in the fall of 1929 to greatly expand this work, and it is hoped that a good deal of information will be obtained from these experiments.

FORAGE CROPS

ENSILAGE CROPS

CORN

Previous to 1929 the variety test of ensilage corn at this Station had been conducted on comparatively light, well-drained soil, which, although not typical of much of the soil in this district, is nevertheless considered the best on which to grow the crop. In 1929, however, the test was conducted on a fairly heavy clay loam soil which is similar to large areas of farm land in the Eastern Townships. On this soil the crop grew very slowly during the first part of the season, and, although seasonal conditions were fairly satisfactory, and growth comparatively rapid in August and early September, the crop was somewhat lighter than is usually obtained at this Station.

Following is a statement showing the results obtained with the varieties tested in 1929:—

ENSILAGE CORN—TEST OF VARIETIES, 1929

Variety	Source	Height		Stage of Maturity	Yield per acre	
					Green weight	Dry weight
		ft.	in.		tons	tons
Burr Leaming	Geo. S. Carter	7	0	Silk	18·135	2·803
Longfellow	Johnston	6	4	Early milk	17·879	2·633
Bailey	Bondy	7	1	Early milk	15·337	2·517
Compton's Early	J. O. Duke	6	7	Early milk	17·525	2·449
Red Cob	Ewing	7	0	Silk	19·950	2·378
Minnesota No. 13	O. Will	6	1	Early dough	13·775	2·342
White Cap Yellow Dent	Steele-Briggs	6	7	Early milk	15·500	2·302
Wisconsin No. 7	J. O. Duke	6	7	Silk	16·265	2·193
Longfellow	J. O. Duke	6	4	Early milk	14·937	2·160
North Dakota	Steele-Briggs	6	7	Early milk	16·302	2·159
Quebec 28	Macdonald College	5	4	Early dough	13·907	2·145
Northwestern Dent	Exp. Farm, Brandon	5	3	Late dough	12·640	2·118
Iroquois Hybrid	Macdonald College	5	9	Early dough	14·630	2·105
Golden Glow	J. O. Duke	6	7	Silk	14·545	2·099
Wisconsin No. 7 x Twitchell's Pride	Exp. Sta., Summerland	6	3	Early milk	13·970	2·089
Hybrid	Wimple	6	0	Silk	13·890	2·047
Northwestern Dent	Macdonald College	5	6	Late milk	12·802	1·997
Northwestern Dent x Stowel's Evergreen	Macdonald College	6	1	Early milk	14·485	1·966
Amber Flint	Wimple	5	10	Silk	13·167	1·895
Gehu	McKenzie	4	1	Late dough	9·202	1·729
Yellow Dent	Wimple	4	10	Silk	9·502	1·371
Average					14·683	2·166

Of the varieties listed in the foregoing table, a number have now been included in the test for the past seven years. Following is an average of the results obtained:—

ENSILAGE CORN—AVERAGE OF RESULTS, 1923 TO 1929

Variety	Height		Yield per acre	
			Green weight	Dry matter
	ft.	in.	tons	tons
Compton's Early	7	5	22·662	3·281
Northwestern Dent, M.C	7	3	18·172	3·165
Golden Glow	7	11	20·146	3·128
Wisconsin No. 7	8	9	20·301	3·120
Longfellow	7	11	21·205	3·103
North Dakota	7	5	19·874	2·991
White Cap Yellow Dent	7	8	18·478	2·969
Quebec 28	6	5	16·781	2·878

Although other varieties have occasionally produced larger crops, the results obtained over a period of seven years indicate that Compton's Early and Northwestern Dent, Macdonald College, may be depended upon to produce the most satisfactory crops in the eastern portion of the district served by this Station. For the western counties, where the climate is more suitable for the crop, such varieties as Golden Glow and Wisconsin No. 7 should prove more satisfactory.

GRAIN MIXTURES FOR ENSILAGE

During the past five or six years, grain mixtures, particularly oats, peas and vetch, have been rapidly replacing both corn and sunflowers as an ensilage crop throughout the Eastern Townships. Under the particular conditions of soil and climate, prevalent in the district, such mixtures may be depended upon to give a better and more consistent yield of feed than corn, while as a crop they can be more cheaply grown and are easier to handle than sunflowers. Although a mixture of oats, peas and vetch is most commonly used, there are other species which may or may not combine to form suitable mixtures. Also there is much to be learned with regard to the most satisfactory varieties to use in forming such mixtures. The results obtained with mixtures tested in 1929, are shown in the following table:—

GRAIN MIXTURES FOR ENSILAGE, 1929

No.	Mixture and seeding per acre	Stage when cut	Per cent of each variety in forage	Yield per acre	
				Green weight	Dry matter
				tons	tons
3	Banner, Ottawa 49.....Oat.....	2 bush.Milk.....	72·46	9·81	2·947
	Golden Vine.....Pea.....	1 bush.Peas formed....	27·54		
9	Victory.....Oat.....	2 bush.Milk.....	66·02	10·14	2·792
	Chancellor.....Pea.....	½ bush.Dough.....	29·44		
	Vetch.....	½ bush.Full bloom.....	4·54		
11	Gold Rain.....Oat.....	2 bush.Milk.....	81·25	10·05	2·762
	Chancellor.....Pea.....	½ bush.Dough.....	17·50		
	Vetch.....	½ bush.Full bloom.....	1·25		
22	Gold Rain.....Oat.....	1 bush.Milk.....	45·48	8·97	2·754
	Early Red Fife.....Wheat.....	½ bush.Milk.....	14·05		
	O.A.C. 181.....Pea.....	1 bush.Dough.....	40·47		

GRAIN MIXTURES FOR ENSILAGE, 1929—*Concluded*

No.	Mixture and seeding per acre			Stage when cut	Per cent of each variety in forage	Yield per acre	
						Green weight	Dry matter
						tons	tons
12	Longfellow, Ottawa 478	Oat	2 bush.	Milk	49·84	9·60	2·742
	Chancellor	Pea	½ bush.	Dough	42·99		
	Vetch		¼ bush.	Full bloom	7·17		
10	Laurel, Ottawa 477	Oat	2 bush.	Milk	77·65	8·94	2·689
	Chancellor	Pea	½ bush.	Dough	16·11		
	Vetch		¼ bush.	Full bloom	6·24		
21	Gold Rain	Oat	2 bush.	Milk	47·47	10·68	2·682
	O.A.C. 181	Pea	1½ bush.	Dough	52·53		
8	Banner, Ottawa 49	Oat	2 bush.	Milk	79·30	9·69	2·658
	Chancellor	Pea	½ bush.	Dough	17·51		
	Vetch		¼ bush.	Full bloom	3·19		
1	Banner, Ottawa 49	Oat	2 bush.	Milk	81·79	9·50	2·623
	Chancellor	Pea	¾ bush.	Dough	18·21		
4	Banner, Ottawa 49	Oat	2 bush.	Milk	75·69	8·94	2·563
	Mackay	Pea	1 bush.	Peas formed	24·31		
20	Gold Rain	Oat	2 bush.	Milk	79·86	9·89	2·508
	O.A.C. 181	Pea	1 bush.	Dough	20·14		
6	Banner, Ottawa 49	Oat	2 bush.	Milk	95·05	7·86	2·327
	Alaska	Pea	1 bush.	Advanced dough	4·95		
2	Banner, Ottawa 49	Oat	2 bush.	Milk	80·35	8·97	2·286
	Arthur	Pea	1 bush.	Pods filled	19·65		
19	Gold Rain	Oat	2 bush.	Milk	77·70	8·07	2·220
	O.A.C. 181	Pea	¾ bush.	Dough	15·88		
	Vetch		¼ bush.	Full bloom	6·42		
7	Legacy, Ottawa 678	Oat	2 bush.	Dough	64·54	8·19	2·204
	Chancellor	Pea	½ bush.	Dough	33·46		
	Vetch		¼ bush.	Full bloom	2·00		
5	Legacy, Ottawa 678	Oat	2 bush.	Dough	69·86	6·84	1·934
	Arthur	Pea	1 bush.	Pods filled	30·14		
13	Spring Rye		1½ bush.	Advanced dough	33·76	8·22	1·933
	Chancellor	Pea	¾ bush.	Dough	66·24		
15	Banner, Ottawa 49	Oat	1½ bush.	Milk	52·29	7·74	1·825
	Spring Rye		½ bush.	Advanced dough	30·27		
	Chancellor	Pea	½ bush.	Dough	11·92		
	Vetch		¼ bush.	Full bloom	5·52		
16	Feeder	Barley	1½ bush.	Advanced dough	19·14	7·29	1·799
	Golden Vine	Pea	40 lb.	Pods filled	71·29		
	Vetch		¼ bush.	Full bloom	9·57		
14	Spring Rye		1½ bush.	Advanced dough	68·34	7·02	1·536
	Chancellor	Pea	½ bush.	Dough	25·18		
	Vetch		¼ bush.	Full bloom	6·48		
17	Banner, Ottawa 49	Oat	1 bush.	Milk	28·73	6·93	1·654
	Feeder	Barley	1 bush.	Advanced dough	14·94		
	Golden Vine	Pea	40 lb.	Pods filled	52·10		
	Vetch		¼ bush.	Full bloom	4·23		
18	Japanese	Millet	9 lb.	Heading	11·27	7·05	1·483
	Banner, Ottawa 49	Oat	1 bush.	Milk	36·73		
	Golden Vine	Pea	40 lb.	Pods filled	45·81		
	Vetch		¼ bush.	Full bloom	6·19		
	Average					8·65	2·314

A number of the mixtures listed in the foregoing table, have been tested each year since 1925. Following are the average results obtained:—

GRAIN MIXTURES FOR ENSILAGE—AVERAGE OF RESULTS, 1925 TO 1929

Mixture and seeding per acre			Yield per acre	
			Green weight	Dry matter
			tons	tons
Gold Rain	Oat	2 bush.	9·96	3·266
Chancellor	Pea	½ bush.		
Vetch		¼ bush.		
Laurel, Ottawa 477	Oat	2 bush.	8·95	3·060
Chancellor	Pea	½ bush.		
Vetch		¼ bush.		
Victory	Oat	2 bush.	10·00	2·986
Chancellor	Pea	½ bush.		
Vetch		¼ bush.		
Banner, Ottawa 49	Oat	2 bush.	9·60	2·937
Golden Vine	Pea	1 bush.		
Banner, Ottawa 49	Oat	1½ bush.	8·55	2·799
Spring Rye		½ bush.		
Chancellor	Pea	½ bush.		
Vetch		¼ bush.		
Banner, Ottawa 49	Oat	2 bush.	8·87	2·735
Chancellor	Pea	1 bush.		
Banner, Ottawa 49	Oat	2 bush.	9·59	2·671
Mackay	Pea	1 bush.		
Banner, Ottawa 49	Oat	2 bush.	8·95	2·592
Arthur	Pea	1 bush.		
Banner, Ottawa 49	Oat	2 bush.	9·35	2·632
Chancellor	Pea	½ bush.		
Vetch		¼ bush.		
Spring Rye		1½ bush.	7·25	2·382
Chancellor	Pea	½ bush.		
Vetch		¼ bush.		

As may be noted, the largest yield of dry matter, or material of actual feeding value, has been obtained over the five-year period with a mixture of Gold Rain oats, Chancellor peas and vetch. The use of the variety Banner in place of Gold Rain, with an otherwise similar mixture, has resulted in a decrease in yield of 0·632 of a ton, or 1,264 pounds of dry matter per acre, indicating that Gold Rain is a more suitable variety for such mixtures. Laurel, a tall-growing, hulless variety of oats has also given excellent results. It should also be noted that when different varieties of peas are used with the same variety of oats, the yield varies. For the five-year average of several varieties of peas, grown with Banner oats, the largest yield was obtained with the variety Golden Vine.

It has also been observed that the addition of vetch to peas and oats in a mixture, has decreased rather than increased the yield. Furthermore, as may be noted from this table of one year's results, vetch forms a very small portion of the crop when harvested. In view of the comparatively high price of vetch seed, it is doubtful if its use in grain mixtures for ensilage is advisable.

As stated in previous reports from this Station, grain mixtures, when grown for ensilage, should be cut as soon after lodging as possible. If the lodged crop remains uncut for several days, stem rot will usually start on the

stems of vetch or peas, and if much of the crop is in this condition, the ensilage made from it, will be of inferior quality. Accordingly, if it is possible to keep the crop standing until the most desirable stage of maturity is reached, the best results will be obtained. For this purpose one-half bushel of spring rye per acre included in the mixture, has proven fairly satisfactory. Excellent results were also obtained in 1929, by replacing one bushel of oats in the mixture with three-quarters of a bushel of Early Red Fife wheat, as shown in mixtures Nos. 21 and 22 in the statement on 1929 results.

SUNFLOWERS

Under the general conditions of soil and climate in much of the district served by this Station, sunflowers have proven a more dependable crop than ensilage corn. For the past ten years, sunflowers have been used on the main farm as a regular farm crop, alone or mixed with corn, and during that period have, without exception, produced satisfactory yields.

In 1929, the variety test with this crop was conducted on land adjoining, and similar in all respects to that on which the varieties of corn were grown. The average yield, however, of five varieties of sunflowers was 4·107 tons of dry matter per acre, while that of twenty-one varieties of ensilage corn was 2·166 tons, a very significant difference.

Following are the results obtained in 1929 with five varieties of sunflowers tested in quadruplicate plots:—

SUNFLOWERS—TEST OF VARIETIES, 1929

Variety	Source	Height		Stage of maturity	Yield per acre	
					Green weight	Dry matter
		ft.	in.		tons	tons
Ottawa 76	Exp. Farm, Ottawa	6	1	50 per cent ripe	31·310	4·913
Mammoth Russian	Disco	8	0	75 per cent bloom	26·300	4·293
Manchurian	McKenzie	6	9	75 per cent bloom	25·600	3·937
Mammoth Russian	McDonald	7	4	50 per cent bloom	26·000	3·782
Mennonite	Exp. Farm Rosthern	4	1	50 per cent ripe	20·215	3·612
Average					25·885	4·107

Although the variety Ottawa 76 produced the heaviest crop in 1929, such results are decidedly unusual, as over a period of six years, the best yields have been obtained with the taller, later varieties. Of these the most satisfactory is Mammoth Russian. Seed of this variety is usually handled by most seedsmen throughout the district.

ROOT CROPS

MANGELS

Owing to unfavourable weather, during the spring of 1927, seeding of mangels was delayed about three weeks, it being impossible to get the soil into a satisfactory condition before the latter part of May. The various varieties in the test of varieties were sown on May 27 and 28. Throughout the remainder of the season conditions were very satisfactory, but, as a result of late seeding, yields were somewhat lighter than usual.

During recent years much of the seed obtained from seed houses, for use in the variety test of mangels at this Station, has been of poor quality and low

in vitality. As a result, although all seedings were made at the rate of from ten to twelve pounds per acre, frequently germination was so weak that not enough plants appeared to form a satisfactory stand. In 1929, however, the quality of seed obtained was much better and a full stand of plants was obtained with practically all of the twenty-nine varieties included in the variety test.

Following is a statement of the results obtained with the varieties tested in 1929:—

MANGELS—TEST OF VARIETIES, 1929

Variety	Source	General type and colour	Yield per acre	
			Green weight	Dry matter
			tons	tons
Yellow Intermediate	Ottawa	Orange, Intermediate	21·860	2·909
Elvetham Mammoth	Hjalmar Hartman	Red, Long	17·120	2·397
White Green Top Half Sugar	Hjalmar Hartman	White, Intermediate	18·880	2·384
Giant White Half Sugar	Moore	White, Intermediate	21·655	2·335
Danish Sludstrup	Ewing	Orange, Intermediate	19·695	2·242
Sludstrup	Steves	Yellow, Intermediate	19·425	2·201
Mammoth Long Red	Sutton	Red, Long	19·955	2·162
Red Intermediate	Lennoxville	Red, Intermediate	20·160	2·155
Red Eckendorffer	Svalof	Red, Tankard	18·220	2·088
Giant White Half Sugar	Ewing	White, Intermediate	17·790	2·085
Barres Oval	Svalof	Yellow, Intermediate	18·380	2·069
Giant Rose Half Sugar	Ewing	Rose, Intermediate	16·290	2·063
Sludstrup Barres	Hjalmar Hartman	Yellow, Intermediate	17·660	2·035
Eclipse	McKenzie	Yellow, Tankard	21·850	2·023
Stryno Barres	Hjalmar Hartman	Yellow, Intermediate	18·380	2·004
Barres Half Long	Svalof	Yellow, Intermediate	16·240	1·986
Long Red Mammoth	Ewing	Red, Long	17·910	1·976
Yellow Globe	Sutton	Yellow, Globe	20·350	1·968
Danish Sludstrup	McDonald	Orange, Intermediate	17·280	1·871
Red Globe	Bruce	Red, Globe	15·620	1·859
Fjerritslev Barres	Hjalmar Hartman	Yellow, Intermediate	17·510	1·845
Eckendorffer Yellow	Hjalmar Hartman	Yellow, Tankard	18·470	1·807
Giant Yellow Globe	Ewing	Yellow, Globe	19·370	1·798
Giant Yellow Intermediate	Ewing	Orange, Intermediate	16·650	1·793
Red Globe	Ewing	Red, Globe	15·460	1·775
Yellow Eckendorffer	Svalof	Yellow, Tankard	18·790	1·775
White Red Top Half Sugar	Hjalmar Hartman	Rose, Intermediate	14·920	1·757
Eckendorffer Red	Hjalmar Hartman	Red, Tankard	17·640	1·583
Golden Tankard	Bruce	Orange, Tankard	15·120	1·545
Average			18·229	2·017

Of the varieties listed in the foregoing table, a number, the seed of which is obtainable from Canadian sources, have been tested for the past seven years. Of these the eight listed in the following statement have proven the most productive.

MANGELS—AVERAGE OF RESULTS, 1923 TO 1929

Variety	Source	General type and colour	Yield per acre	
			Green weight	Dry matter
			tons	tons
Yellow Intermediate	Ottawa	Orange, Intermediate	29·763	3·439
Giant Rose Intermediate	Ewing	Rose, Pink, Intermediate	25·513	3·190
Danish Sludstrup	McDonald	Orange, Intermediate	31·569	3·027
Danish Sludstrup	Ewing	Orange, Intermediate	26·848	2·847
Long Red Mammoth	Ewing	Red, Long	22·024	2·676
Red Globe	Ewing	Red, Globe	24·203	2·396
Giant Yellow Globe	Ewing	Yellow, Globe	25·438	2·142
Giant Yellow Intermediate	Ewing	Orange, Intermediate	21·313	2·133

Although high yields are occasionally obtained with all of the several types of mangels, the best results can be consistently expected from good strains of the Yellow Intermediate and Sludstrup varieties. With these varieties the roots are usually of medium size, smooth and uniform in appearance, and of comparatively high dry matter content.

Varieties of the rose intermediate and white intermediate types, have also proven quite satisfactory.

Varieties of the globe and tankard types have, as a rule, proven low in dry matter and therefore of low feeding value.

In the long red varieties, the dry matter content is, as a rule, high, but the yield is usually low and the individual roots rough and prongy.

SWEDE TURNIPS

The season of 1929 was in many respects particularly favourable for swede turnips, and excellent crops were obtained throughout the district. At this Station, however, a rather general infection of club root occurred and the yields obtained with the majority of the fifty-four varieties tested were comparatively low. Although the crop from every variety contained roots in a more or less diseased condition, the resistance to the disease of certain varieties was much greater than others. In the following table the per cent of roots diseased with club root in each variety is shown, together with the yield and the source from which the seed was obtained.

SWEDE TURNIPS—TEST OF VARIETIES, 1929

Variety	Source	General type and colour	Per cent of roots diseased with club roots	Yield per acre	
				Green weight	Dry matter
			p.c.	tons	tons
Bangholm 8312	Macdonald College	Purple Top, Globe	37·9	30·48	2·936
Ferguson's Favourite	Dupuy & Ferguson	Purple Top, Globe	39·0	32·85	2·835
Magnum Bonum	McDonald	Purple Top, Globe	14·9	31·53	2·811
New Masterpiece	Webb	Purple Top, Globe	22·8	39·46	2·765
Derby Green Top	Bruce	Bronze Top, Globe	33·9	30·38	2·701
Magnum Bonum	Ewing	Purple Top, Globe	23·2	29·51	2·623
Resistant Bangholm	Exp. Station, Kentville	Purple Top, Globe	37·5	24·53	2·589
Millpond	Carter	Purple Top, Globe	48·9	29·24	2·565
Good Luck	Steele-Briggs	Purple Top, Globe	33·8	32·02	2·499
Hall's Westbury	Ewing	Purple Top, Globe	50·2	28·37	2·484
Garton's Superlative	Ewing	Purple Top, Globe	20·3	32·42	2·475
Canadian Gem Purple Top	Steele-Briggs	Purple Top, Globe	28·6	26·64	2·462
Superlative	Garton	Purple Top, Globe	19·8	34·63	2·460
Acquisition	Sutton	Purple Top, Globe	29·7	28·62	2·366
Hartley's Bronze Top	Bruce	Bronze Top, Globe	29·3	23·51	2·352
Canadian Gem	Bruce	Purple Top, Globe	39·9	27·63	2·326
Hazard's Improved Bronze Top	Steele-Briggs	Bronze Top, Globe	28·5	24·21	2·239
North Western	McKenzie	Purple Top, Globe	29·0	28·50	2·234
Kangaroo	Steele-Briggs	Bronze Top, Oval	43·3	27·74	2·219
Magnificent	Garton	Purple Top, Globe	34·6	26·48	2·200
Keel Well	Garton	Bronze Top, Globe	29·9	24·89	2·184
Ditmars	Exp. Sta., Lennoxville	Bronze Top, Globe	38·9	23·49	2·178
Ditmars	McNutt	Bronze Top, Globe	42·9	26·16	2·170
Model	Garton	Bronze Top, Globe	32·9	24·67	2·150
Sutton's Champion Purple Top	Ewing	Purple Top, Globe	37·1	23·94	2·132
New Buffalo	Webb	Purple Top, Globe	35·9	25·78	2·110
Improved Lord Derby	Sutton	Bronze Top, Globe	37·7	25·22	2·092
Danish Queen	McDonald	Purple Top, Globe	47·5	26·50	2·058
Champion	Sutton	Purple Top, Globe	41·1	23·71	2·042
Bangholm	Exp. Farm, Nappan	Purple Top, Globe	50·4	17·73	2·029
New Balmoral	Webb	Purple Top, Globe	40·5	24·99	2·029

SWEDE TURNIPS—TEST OF VARIETIES, 1929—*Concluded*

Variety	Source	General type and colour	Per cent of roots diseased with blub roots	Yield per acre	
				Green weight	Dry matter
			p.c.	tons	tons
Hall's Westbury	Kelway	Purple Top, Globe	42·0	22·51	1·980
Improved Lathian	Drummond	Purple Top, Globe	35·5	23·53	1·977
Sterling Castle	Drummond	Bronze Top, Oval	44·3	22·93	1·971
Viking	Garton	Bronze Top, Globe	38·4	21·92	1·965
Giant King	Webb	Purple Top, Globe	56·3	20·92	1·886
Extra Improved	Drummond	Purple Top, Oval	41·7	21·71	1·868
Improved Bronze Top	Drummond	Bronze Top, Oval	41·6	21·31	1·731
Ferguson's Perfection	Dupuy & Ferguson	Bronze Top, Globe	62·7	19·75	1·728
Monarch	McKenzie	Purple Top, Globe	53·3	18·68	1·632
Bangholm (Lyngby Sludsgard)	D. L. F.	Purple Top, Globe	41·7	15·40	1·615
Imperial	Webb	Purple Top, Globe	42·0	21·10	1·608
Purple Top	Exp. Farm, Ottawa	Purple Top, Globe	49·6	19·75	1·601
Bangholm 8112	Macdonald College	Purple Top, Globe	54·0	20·07	1·534
New Empire	Webb	Bronze Top, Globe	53·0	18·16	1·499
Laing's Purple Top	Ewing	Purple Top, Globe	49·5	16·34	1·488
Ne Plus Ultra	Dupuy & Ferguson	Bronze Top, Globe	59·7	19·19	1·480
Kelway's Perfect Purple Top	Kelway	Purple Top, Globe	57·8	16·53	1·350
Breadstone	McKenzie	Bronze Top, Globe	46·4	16·08	1·249
Laing's Improved Purple Top	Dupuy & Ferguson	Bronze Top, Globe	74·2	14·88	1·227
Kangaroo	Ewing	Bronze Top, Oval	34·6	18·64	1·210
Mammoth Clyde Purple Top	Dupuy & Ferguson	Purple Top, Globe	74·2	11·11	0·972
Average				23·97	2·055

Following is a six-year average of the results obtained with several commonly used varieties, the seed of which was obtained from Canadian sources:—

SWEDE TURNIPS, AVERAGE OF RESULTS, 1923 TO 1927 AND 1929

Variety	Source	General type and colour	Yield per acre	
			Green weight	Dry matter
			tons	tons
Ditmars	McNutt	Bronze Top, Globe	30·88	3·016
Magnum Bonum	Ewing	Purple Top, Globe	27·08	2·901
Garton's Superlative	Ewing	Purple Top, Globe	28·87	2·808
Canadian Gem	Bruce	Purple Top, Globe	28·68	2·598
Hall's Westbury	Ewing	Purple Top, Globe	28·81	2·562
Elephant or Monarch	Bruce	Purple Top, Globe	27·26	2·577
Hartley's Bronze Top	Bruce	Bronze Top, Globe	23·73	2·561
Sutton's Champion	Ewing	Purple Top, Globe	22·20	2·310
Mammoth Clyde	Dupuy & Ferguson	Purple Top, Globe	24·00	2·137
Kangaroo	Ewing	Bronze Top, Oval	24·61	2·096

When averaged over the six-year period, the variety Ditmars has, as may be noted, proven the highest yielding in both total weight of roots and dry matter per acre. In 1929, as a result of its susceptibility to club root, it was comparatively low-yielding. Club root, however, is not common throughout the district, and, where it occurs frequently, can be easily controlled by correcting soil acidity.

FIELD CARROTS

Although comparatively lower-yielding than either mangels or swede turnips, small areas of field carrots are grown annually on many farms throughout the Eastern Townships.

Following are the average results obtained with varieties and strains that have been tested each year since 1923:—

FIELD CARROTS, AVERAGE OF RESULTS, 1923 TO 1929

Variety	Source	General type and colour	Yield per acre	
			Green weight	Dry matter
			tons	tons
White Belgian	Bruce	White, Long	19·76	2·506
Mammoth Intermediate White	Bruce	White, Intermediate	20·18	2·073
White Belgian	Ewing	White, Long	19·23	1·872
Danish Champion	Exp. Farm, Ottawa	Yellow, Intermediate	17·66	1·816
Long Orange Belgian	Bruce	Orange, Long	16·47	1·813
Yellow Intermediate	Ewing	Yellow, Intermediate	19·09	1·797
White Belgian	Dupuy & Ferguson	White, Long	17·26	1·744
Long Orange	Bruce	Orange, Long	14·60	1·441

In general it may be stated that although the variety White Belgian, the seed of which was obtained from Bruce, has proven superior in yield to other varieties, it is not as desirable in all respects as some of the others. The roots of this variety are very long and are usually deeply rooted in the ground. Accordingly, they are very hard to harvest and break easily when handled. Varieties of the intermediate type such as Mammoth Intermediate White, Danish Champion and Yellow Intermediate are usually more satisfactory.

CEREALS

OATS

In 1929 a total of eighty varieties and strains of oats were grown in the various tests conducted at this Station. Of these, nineteen were grown in triplicate one-hundred-and-twentieth-acre plots. Following is a statement of the results obtained:—

OATS—TEST OF VARIETIES, 1929

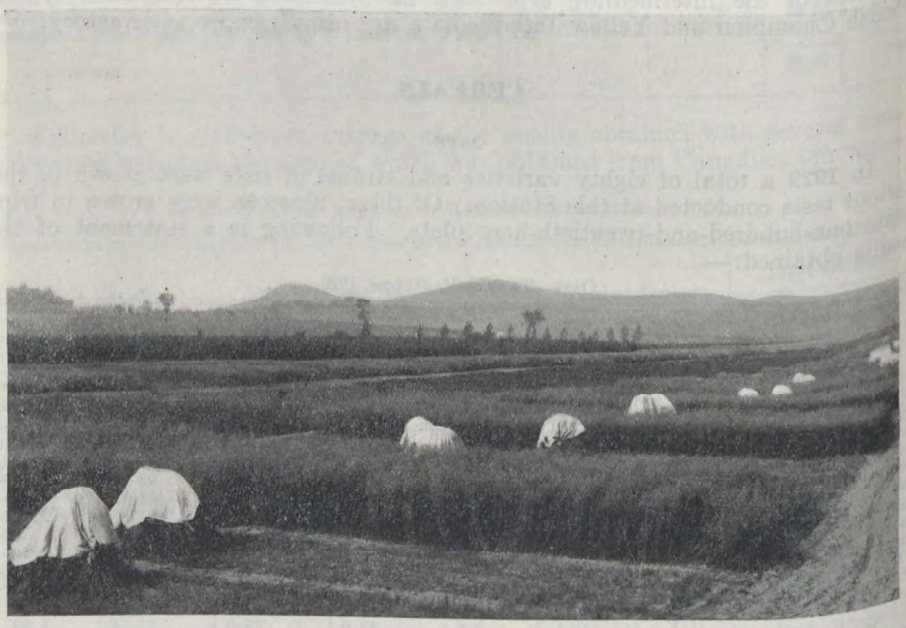
Variety	Number of days maturing	Strength of straw on scale of 10 points	Length of straw	Weight per measured bushel	Total yield of grain per acre	Yield of kernel per acre*
			in.	lb.	bush.	lb.
Columbia, Ottawa 78	110	8·3	41·0	33·0	92·36	2,260·8
Banner, Ottawa 49	102	9·3	45·3	30·0	92·29	2,195·9
Cartier, Macdonald College	92	9·6	35·0	39·0	84·63	2,172·1
La Salle, Macdonald College	112	9·0	43·8	35·0	83·08	2,160·3
Liberty, Ottawa 480	100	10·0	40·0	47·0	Hulless	2,068·0
Brant, Macdonald College	112	9·0	45·0	35·5	81·81	2,030·1
Star	113	9·3	41·7	32·0	84·85	2,018·8
Victory	106	9·3	43·0	35·0	84·84	1,991·5
Andrew A	111	9·0	42·3	29·5	88·76	1,991·2
Legacy, Ottawa 678	98	9·6	34·0	29·5	81·17	1,945·0
Gold Rain	97	9·7	43·0	35·5	79·06	1,935·4
Banner, Langille	101	8·3	41·0	33·0	78·56	1,802·9
Banner 44, Macdonald College	103	9·2	43·4	33·0	75·53	1,797·6
Banner, Griffin	112	7·7	44·7	34·0	70·16	1,729·1
Daubeny, Ottawa 47	93	10·0	34·0	32·5	65·14	1,648·9
Laurel, Ottawa 477	100	10·0	36·0	43·5	Hulless	1,586·0
O.A.C. No. 3	93	10·0	36·3	33·0	61·76	1,574·2
Forward	110	8·5	44·5	31·5	68·08	1,527·2
Alaska	92	10·0	35·6	35·0	56·47	1,487·2
Average						1,890·6

*This was obtained by determining the percentage of hull in each case.

Of the varieties listed in the foregoing table, twelve have been tested for the past four years. The average results obtained during the period are as follows:—

OATS—AVERAGE OF RESULTS, 1926 TO 1929

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
			in.	bush.	lb.
Legacy, Ottawa 678	98·0	8·9	41·3	89·79	2,229
Banner, Ottawa 49	107·0	8·0	48·3	85·15	2,082
Banner, Langille	105·2	6·6	47·4	86·33	2,036
Victory	106·2	9·0	47·6	82·51	1,965
Gold Rain	100·0	8·6	46·7	79·37	1,954
Banner, Griffin	106·7	7·0	46·5	77·38	1,935
La Salle, Macdonald College	109·7	8·6	48·7	74·97	1,929
Banner 44, Macdonald College	107·5	8·3	46·8	74·90	1,794
O.A.C. No. 3	92·3	8·6	40·6	64·43	1,767
Daubeny, Ottawa 47	93·2	8·5	39·2	66·13	1,722
Alaska	92·6	8·3	38·7	63·77	1,696
Laurel, Ottawa 477	104·7	9·5	42·9	Hulless	1,641



General view of the cereal and forage experiments, 1929.

When averaged over the four-year period from 1926 to 1929, Legacy, Ottawa 678 has given decidedly better results than all other varieties tested. Owing to its earliness it is apparently more suitable for much of the district served by this Station than the various strains of Banner, and, under average farm conditions, should prove higher-yielding than Alaska. So far it has proven fairly stiff-strawed and has not lodged easily even in fertile low-lying land. Although the grain is small, slender and of rather poor appearance, it is comparatively thin-hulled and of higher feeding value than the taller and later varieties. The variety is of comparatively recent origin and is not yet

registered. Accordingly, seed of it is not available at present. Of other varieties, the seed of which is easily obtainable, the best results under ordinary conditions will be obtained with some of the strains of Banner. Where an early variety is required, Daubeny, O.A.C. No. 3 or Alaska are fairly satisfactory.

BARLEY

Excellent yields were again obtained with the various varieties of barley, tested in 1/120-acre plots in 1929. Although seeding was unusually late, the bulk of it being done on May 22 and 23, the seed germinated quickly and several varieties matured in periods, averaging nine days less than the average for the previous six years.

Following are the results obtained with sixteen varieties tested in triplicate 1/120-acre plots:—

BARLEY—TEST OF VARIETIES, 1929

Variety	Kind	Number of days maturing	Strength of straw on scale of 10 points	Length of straw	Weight per measured bushel	Yield of grain per acre
				in.	lb.	bush.
Bearer, Ottawa 475	6-rowed	96	9·0	39·8	49·0	66·20
Trebi	6-rowed	97	9·0	36·5	48·0	65·63
Charlottetown 80	2-rowed	102	9·3	32·7	54·0	65·52
Hannchen	2-rowed	96	8·3	36·5	59·0	64·02
Star	6-rowed	92	10·0	30·3	51·5	63·76
Manchurian, Cap Rouge 14	6-rowed	89	9·5	36·5	49·0	62·26
Gold (Swedish)	6-rowed	97	9·3	34·0	55·0	61·65
Pontiac, Macdonald College	6-rowed	88	8·7	38·6	50·5	59·26
O.A.C. 21	6-rowed	86	10·0	36·2	53·0	59·01
French Chevalier	2-rowed	95	10·0	48·0	55·5	53·13
Plumage Archer	2-rowed	108	9·0	35·5	55·0	51·88
Chinese, Ottawa 60	6-rowed	86	10·0	36·0	49·5	51·50
Duckbill 207, Macdonald College	2-rowed	105	9·6	36·7	54·5	49·54
Himalayan, Ottawa 59	Hulless	84	10·0	31·0	64·5	47·08
Monk, Macdonald College	2-rowed	96	9·5	42·5	48·0	42·00
Guymayle 513, Macdonald College	Hulless	84	9·6	31·7	63·5	35·06
						56·09

Of the varieties listed in the foregoing table, four have been tested for six years. The average results for this period are as follows:—

BARLEY—AVERAGE OF RESULTS, 1923 TO 1927 AND 1929

Variety	Kind	Number of days maturing	Strength of straw on scale of 10 points	Length of straw	Yield per acre
				in.	bush.
Chinese, Ottawa 60	6-rowed	92·2	8·3	45·3	69·19
O.A.C. 21	6-rowed	92·2	8·4	46·9	68·08
Charlottetown 80	2-rowed	100·2	8·4	38·9	67·88
Himalayan, Ottawa 59	Hulless	87·6	9·5	30·9	57·60

So far the tall-growing six-rowed varieties have proven most satisfactory over a period of several years. Of these, Chinese, Ottawa 60 and O.A.C. 21

are both excellent varieties, the difference in yield over the six-year period being insignificant. Of the two, O.A.C. 21 is the most widely grown and as a result the seed is more easily obtainable.

Charlottetown 80 a comparatively short-strawed two-rowed variety, has also produced good yields. It is somewhat later than the six-rowed varieties and earlier than those of the Duckbill type. At this Station crops of this variety have been very satisfactory, maturing evenly and producing grain of excellent quality.

Himalayan, Ottawa 59, is as may be noted in the foregoing table, a hulless variety which matures very early in the season. It will not lodge easily and on very fertile soil has given excellent results.

Of varieties tested for less than six years, Gold has given an average yield for three seasons of 72·01 bushels per acre, and Bearer, Ottawa 475, 69·66 bushels. During the same period the average yield of O.A.C. 21 was 66·96 bushels per acre.

Although high-yielding, neither of these newer varieties are entirely satisfactory. Gold is comparatively short-strawed and on poor soil or in unfavourable seasons may grow so short as to be difficult to handle with a binder. Bearer, Ottawa 475, although tall-growing, lodges more easily than O.A.C. 21 and produces grain which is small and of comparatively poor appearance.

SPRING WHEAT

Although good yields of spring wheat are usually obtained at this Station, the crop in 1929 was decidedly light. This was apparently due to late seeding and comparatively dry weather during July, which checked growth and hastened ripening of the grain.

Following is a five-year average of the results obtained with four of the principal varieties tested:—

WHEAT—AVERAGE OF RESULTS, 1925 TO 1929

Variety	Number of days maturing	Height	Strength of straw on scale of 10 points	Yield per acre
		in.		bush.
Huron, Ottawa 3	107·4	43·1	9·1	32·95
Pringle's Champlain 207, Macdonald College	111·5	43·7	9·5	30·14
Garnet, Ottawa 625	101·3	41·7	9·1	29·73
Marquis, Ottawa 15	106·0	43·8	9·9	27·29

As stated in previous reports, the variety Huron, Ottawa 3, is apparently the most satisfactory variety for this district. In yield and quality of grain it is not significantly superior to Pringle's Champlain 207, Macdonald College, but being somewhat earlier, is better adapted to the climate. Garnet, Ottawa 625, and Marquis, Ottawa 15, although maturing early and producing grain of high quality, have proven comparatively low-yielding at this Station.

FALL WHEAT

For the past six years, tests have been conducted with a number of varieties of fall wheat, and with the exception of the winter of 1927 and 1928, wintering of the hardier varieties has been satisfactory. In general the yields obtained have been about equal to those of spring wheat, but the crop is as a rule ready for cutting late in July or early in August, at which time the weather is usually ideal for harvesting.

In the following table the results obtained in 1929 with varieties tested in triplicate one hundred and twentieth-acre plots are shown:—

FALL WHEAT—TEST OF VARIETIES, 1929

Variety	Date ripe	Length of straw	Strength of straw on scale of 10 points	Per cent stand	Yield per acre
		in.			bush.
Kharkov 1312, Macdonald College	July 31	41·7	10	90·0	32·66
Kharkov 214, Macdonald College	Aug. 2	40·6	10	81·6	32·00
Kharkov 2212, Macdonald College	Aug. 1	38·3	10	88·3	31·00
Kharkov 112, Macdonald College	July 30	37·7	10	88·3	30·34
O.A.C. 104	Aug. 3	46·0	10	72·5	30·00
Dawson's Golden Chaff	Aug. 1	37·7	10	60·6	28·66
Red Rock	Aug. 1	42·0	10	55·5	26·50
Minturki	Aug. 1	35·0	10	58·0	26·34
Kanred	Aug. 3	32·5	10	60·0	23·50
Average					29·00

Of the varieties listed in the foregoing table, a number have been grown each year since 1924. Of these the best results have been obtained with Kharkov 1312, Macdonald College. It has proven quite hardy and when sown on a suitable site should winter satisfactorily throughout the district.

Rod-row tests of fall wheat.

FALL RYE

A small area of Dakoid fall rye was again grown in 1929. It wintered very satisfactorily and produced a crop of 55·50 bushels of grain per acre. During the six years that fall rye has been grown at this Station, it has proven quite hardy and has produced high yields. In general it seems to give the best results on comparatively light, well-drained soil. Although growing to a height of from four to five feet it seldom lodges and as a rule the crop is ready for harvest about August 1. Accordingly, very little difficulty may be expected in getting the crop harvested in good condition.

Rye is an excellent feed for live stock and it would seem that the crop should be more commonly grown throughout the Eastern Townships.

FIELD PEAS

As a general rule excellent yields are obtained with suitable varieties of field peas at this Station. In 1929 the average yield of eight varieties tested in quadruplicate plots was 27·15 bushels. In the same season one-half acre of the variety O.A.C. 181, produced a crop of 35·6 bushels per acre. The land on which this crop was produced was typical of much of the farm land throughout the Eastern Townships being a high naturally well-drained clay in an average state of fertility. Such yields could be easily duplicated on many farms throughout the district, and, in view of the high feeding and cash value of the crop, should prove quite profitable.

Following is a statement showing the average results obtained during the past five years with six of the most promising varieties tested:—

FIELD PEAS—AVERAGE OF RESULTS, 1925 TO 1929

Variety	Number of days maturing	Length of vine	Yield per acre
		in.	bush.
O.A.C. 181	102·4	54·7	31·13
Mackay, Ottawa 25	115·0	57·6	29·62
Arthur, Ottawa 18	103·8	45·1	29·62
Cartier, Ottawa 19	109·4	50·1	29·12
Chancellor, Ottawa 26	102·9	52·3	26·12
Prussian Blue	115·4	53·9	24·62

In general, it has been found that in the usual season experienced at Lennoxville, the most satisfactory results are obtained with comparatively early maturing varieties. When it is possible to cut the crop in August there will usually be sufficient good drying weather to ensure harvesting it in good condition. If, however, the crop is cut later it has been observed that it drys slowly and is frequently damaged by rain before it is fit to harvest. Accordingly, such varieties as O.A.C. 181 and Arthur, Ottawa 18, are best adapted to the climate and as indicated in the foregoing table, are comparatively high-yielding.

FIELD BEANS

For the past six years variety tests with field beans have been conducted at this Station, and, without exception, excellent yields have been obtained each year with suitable varieties. Under average conditions throughout this district field beans may be expected to produce satisfactory crops, and can be grown to advantage on many farms as a cash crop.

Following is a five-year average of the results obtained with five of the highest-yielding varieties tested:—

FIELD BEANS—AVERAGE OF RESULTS, 1925 TO 1929

Variety	Number of days maturing	Height of plant	Yield per acre
		in.	bush.
Red Kidney	113·4	14·7	39·39
Selected White, Lennoxville	113·4	15·2	34·53
Navy, Ottawa 711	106·6	12·3	34·50
Robust	115·4	16·5	28·85
Improved Yellow Eye	111·9	14·0	28·16

Although the variety Red Kidney has produced the largest yields, the crop is not as readily saleable as white beans of the navy type or the yellow eye. The cooking quality is, however, excellent, and, although owing to its lateness, the vines are frequently killed by frost, the beans are rarely damaged. For home use or local sale, the variety should prove very satisfactory.

Of the other varieties, Navy, Ottawa 711 is decidedly superior. It matures early, is seldom injured by frost and the beans are of excellent quality. For commercial purposes, it is a most satisfactory variety. Selected White, Lennoxville, although high-yielding, has proven a little late for this district.

GRAIN MIXTURES

As a general rule good yields of grain may be obtained by growing suitable varieties of different species together in a mixture. In addition, such mixtures if containing wheat, barley or peas, are of relatively higher feeding value than oats alone and from the experience gained at this Station, better yields of grain may also be expected.

Although mixtures of grain have been tested at this Station for the past six years, the project was extended in 1926, to include mixtures of a number of newer varieties which had given excellent results when grown alone. Also, owing to continued wet weather during the early part of the season of 1928, the stand on the various plots of grain mixtures was patchy and the yields obtained of little or no comparative value. Accordingly, in order to show a fair comparison of the best mixtures tested, the following table is made up of results obtained in 1926, 1927 and 1929:—

GRAIN MIXTURES—AVERAGE OF RESULTS, 1926, 1927 AND 1929

Variety and rate per acre			Number of days maturing	Height	Strength of straw on scale of 10 points	Per cent of crop	Yield per acre	
							Grain	Digestable nutrients
				in.			lb.	lb.
Charlottetown 80	Barley	36 pounds	101·0	40·5	.....	42·0	.....	.....
Huron, Ottawa 3	Wheat	30 "	106·3	45·7	.....	14·7	.....	.....
Banner, Ottawa 49	Oat	51 "	103·3	46·8	9·6	43·3	3,037	2,296·15
Charlottetown 80	Barley	36 "	101·0	41·2	.....	37·4	.....	.....
Ruby, Ottawa 623	Wheat	30 "	101·0	40·8	.....	9·2	.....	.....
Banner, Ottawa 49	Oat	51 "	103·3	46·0	8·9	53·4	3,030	2,262·15
Banner, Ottawa 49	Oat	2 bushels	102·3	50·0	.....	89·0	.....	.....
Arthur	Pea	½ bushels	102·0	55·0	8·5	11·0	2,970	2,205·08
Charlottetown 80	Barley	1 bushel.	101·0	39·0	.....	48·6	.....	.....
Legacy, Ottawa 678	Oat	2 bushels	101·0	39·3	10·0	51·4	2,949	2,193·73
Charlottetown 80	Barley	1 bushel.	101·0	41·2	.....	47·7	.....	.....
Banner, Ottawa 49	Oat	2 bushels	103·3	46·2	8·6	52·3	2,937	2,109·83
Duckbill, Ottawa 57	Barley	30 pounds	104·0	43·3	.....	17·4	.....	.....
Huron, Ottawa 3	Wheat	25 "	106·3	46·0	.....	12·7	.....	.....
Banner, Ottawa 49	Oat	45 "	102·3	46·6	.....	54·3	.....	.....
Arthur	Pea	30 "	102·0	50·2	7·0	15·6	2,841	2,052·11
O.A.C. 21	Barley	1 bushel	93·3	42·8	.....	53·6	.....	.....
Alaska	Oat	2 bushels	93·6	44·2	9·0	46·4	2,728	1,995·06
Chinese, Ottawa 60	Barley	1 bushel	94·0	43·2	.....	37·4	.....	.....
Banner, Ottawa 49	Oat	2 bushels	103·3	47·5	9·0	62·6	2,628	1,944·27
Duckbill, Ottawa 57	Barley	36 pounds	104·0	41·1	.....	24·9	.....	.....
Huron, Ottawa 3	Wheat	30 "	106·3	39·3	.....	14·7	.....	.....
Banner, Ottawa 49	Oat	51 "	103·3	45·8	9·6	60·4	2,625	1,942·95
Chinese, Ottawa 60	Barley	1 bushel	93·3	43·0	.....	49·7	.....	.....
Alaska	Oat	2 bushels	93·6	43·2	9·6	50·3	2,695	1,938·57
Chinese, Ottawa 60	Barley	1 bushel	93·3	42·8	.....	48·0	.....	.....
Daubeny	Oat	2 bushels	93·6	43·0	10·0	52·0	2,555	1,909·09
Duckbill, Ottawa 57	Barley	1½ bushels	104·0	43·2	.....	55·0	.....	.....
Huron, Ottawa 3	Wheat	1 bushel	106·0	46·6	9·6	45·0	2,356	1,775·24
Duckbill, Ottawa 57	Barley	1 bushel	104·0	41·3	.....	52·4	.....	.....
Huron. Ottawa 3	Wheat	½ "	106·3	46·0	.....	20·4	.....	.....
Arthur	Pea	½ "	102·0	51·0	7·5	27·2	2,078	1,634·80

In this experiment, the best yields of grain have, as may be noted, been obtained with a mixture of barley, wheat and oats. The two leading mixtures are, however, not entirely satisfactory, as the variety of barley, Charlottetown 80, is somewhat shorter than the wheat and oats. Such mixtures when cut with a binder, form sheaves in which the heads of barley are quite close to the band, with the result that they dry slowly and in unfavourable weather the crop may prove difficult to handle. It may also be noted that when Duckbill, Ottawa, 57, barley is substituted for Charlottetown 80, in an otherwise similar mixture, the yield is reduced by 412 pounds of grain per acre. Furthermore the percentage of barley in the threshed crop was reduced from 42·0 to 24·9 per cent, thus lowering the feeding value of the grain.

The mixture of Charlottetown 80 barley and Legacy, Ottawa 678 oats, has proven very satisfactory in all respects. The two varieties are approximately the same height, mature together and the proportion of barley and oats in the crop is about equal.

Where earliness is an important factor, a mixture of O.A.C. 21, barley and Alaska oats should prove very satisfactory.

HORTICULTURE

VEGETABLES

POTATOES

Although the acreage of potatoes was somewhat reduced in 1929, in the Eastern Townships, the crop was comparatively free from disease and the yields above average.

SPRAYING VS. DUSTING.—Although the soil and climate in the district served by this Station are quite satisfactory for potato growing, low to average yields are the rule rather than the exception. The reason for this seems to be chiefly the lack of satisfactory control of the Colorado potato beetle and potato blights. The use of spray pumps or dusters is by no means general and the implement most commonly used to apply insecticides and fungicides is the ordinary watering can. Frequently the materials used are improperly mixed or unsatisfactory. It is also a common practice to apply poison for the control of beetles, but to disregard entirely the often more serious menace of blights. Satisfactory spray pumps and dusters, as well as suitable insecticides and fungicides, are comparatively cheap and efficient, and their proper use will do much to increase the yields of potatoes.

For the past seven years the common Bordeaux calcium arsenate spray has been compared with two commercial and one home-mixed dust. The results obtained have indicated that any of the four preparations are satisfactory if applied thoroughly and at the right times. Slightly better control has been obtained by dusting with copper arsenical dusts, than by spraying with Bordeaux mixture and calcium arsenate. This is no doubt due to the better distribution of the dust. If applied to wet foliage, the dust unites with the moisture, and, if drying weather follows, the coating thus formed is quite as permanent as that sprayed on.

From the standpoint of costs, dust is somewhat more expensive than spray, but as it can be applied more cheaply the actual difference, when the operations are complete, is not great. For the grower of one or two acres of potatoes, dusting with a hand-driven duster is probably more economical than spraying with a hand pump. For growers of larger areas, special sprayers are more commonly used.

SPROUTING SEED POTATOES.—Each year since 1923, with the exception of 1925, an experiment has been conducted to determine the value of sprouting seed potatoes before planting. The varieties used have been Irish Cobbler and Green Mountain. The method of sprouting adopted has been similar to that used generally by gardeners in this district, and is described in the annual report from this Station for the year 1928. Following is a six-year average of the results obtained:—

POTATO-SPROUTING EXPERIMENT, AVERAGE OF RESULTS, 1923, 1924 AND 1926 TO 1929

Variety and method	Average number of days earlier due to sprouting	Date ready for use 1929	Yield per acre: Marketable	Yield per acre: Unmarketable
			bush. lb.	bush. lb.
Green Mountain—				
Small whole, dormant		Aug. 21	305 5	70 28
Small whole, sprouted	14·6	" 3	336 22	80 23
Large whole, dormant		" 21	330 32	60 0
Large whole, sprouted	14·2	" 1	410 57	76 27
Cut set, dormant		" 18	322 10	91 48
Cut set, sprouted	12·1	July 31	402 1	87 26
Irish Cobbler—				
Small whole, dormant		Aug. 16	344 10	90 14
Small whole, sprouted	17·8	July 21	335 51	91 39
Large whole, dormant		Aug. 16	326 22	100 0
Large whole, sprouted	18·0	July 19	348 39	110 52
Cut set, dormant		Aug. 14	318 52	96 1
Cut set, sprouted	19·0	July 15	334 33	75 7

AVERAGE YIELD PER ACRE

—	Dormant: Marketable	Dormant: Unmarketable	Sprouted: Marketable	Sprouted: Unmarketable
	bush. lb.	bush. lb.	bush. lb.	bush. lb.
Green Mountain	319 16	74 5	383 7	81 25
Irish Cobbler	329 48	95 25	339 41	92 33

From the foregoing table it may be noted that, although the yield of potatoes was not greatly increased, marketable potatoes were available from twelve to nineteen days earlier as a result of sprouting. From the results obtained it would, therefore, seem that the practice of sprouting seed potatoes is of value only when the price for very early potatoes is sufficiently high to compensate for the additional expense entailed.

GARDEN PEAS

TEST OF VARIETIES.—Of the twenty-four varieties tested in 1929, the largest yield was obtained with the variety Director, obtained from the Dominion Experimental Station at Windermere, B.C., which produced a crop of 27 pounds of unshelled peas from one thirty-foot row. It is a medium early variety which produces large well-filled pods. The vines attained a height of about four feet, and, under normal conditions in this district, the variety requires brushing. Excellent results were obtained with another variety, obtained from the same source as Director, known as Lincoln. This is also a medium early variety, but the pods, although tightly filled, are rather small. The vines are from two and a half to three feet in height, and under average conditions the variety will produce satisfactory crops without brushing.

Among the varieties of which the seed is easily obtainable commercially, the following are recommended for commercial plantings: Blue Bantam (early), Gradus (medium early), and Stratagem (late). For the home or kitchen garden where brushing is not a problem, Alaska (early), Gradus (medium early) and Telephone (late), should prove very satisfactory.

TOMATOES

TEST OF VARIETIES.—The season of 1929 was again quite favourable for the tomato crop, the first killing frost occurring on September 19. As a result all of the twenty-nine varieties included in the variety test produced comparatively large crops of ripe fruit.

Of varieties which have been tested for about five years, the most satisfactory are Alacrity and Bonny Best. Both varieties are very early and produce comparatively smooth, medium-sized tomatoes of excellent quality.

Among the varieties which have been grown for shorter periods than five years, one known as Marvena, the seed of which was obtained from the Harris Seed Company, has produced very heavy crops of large tomatoes. The fruit is, however, somewhat rough and the quality only fair. Excellent results have also been obtained with several cross-bred varieties originated at the Central Experimental Farm, Ottawa.

BEANS

TEST OF VARIETIES.—During the fourteen years that variety tests of beans have been conducted at this Station, the only varieties that have produced satisfactory crops are those that apparently possess a high degree of resistance to pod spot or anthracnose. Of these, Pencil Pod Black Wax and Round Pod Kidney Wax have proven the most satisfactory of the yellow-podded varieties. Hudson Long Pod, which also produced yellow pods, is somewhat later and more productive. The quality, however, is slightly inferior, the pods being flat and inclined to become stringy soon after turning yellow. A strain of this variety developed at the Central Experimental Farm, Ottawa, has proven superior in quality of crop to the ordinary commercial strain obtained from seedsmen.

Among the green-podded varieties, Refugee 1000-1 and Masterpiece have proven quite resistant to anthracnose, and produce fairly good crops of excellent quality.

Of several varieties of pole beans tested, a variety known as Golden Cluster has produced yields slightly larger than Kentucky Wonder. The pods are also of better quality.

LETTUCE

TEST OF VARIETIES.—Of the fifteen varieties tested in 1929, the best results were obtained with those previously recommended. So far, however, no really satisfactory variety of head lettuce has been tested at this Station. Iceberg forms compact heads of good marketable quality and colour, but, at Lennoxville, has shown a marked tendency to bolt, and in changeable weather scalds badly. Big Boston, while seldom bolting, scalds easily and on account of the smooth leaf, is not as readily saleable as varieties of the Iceberg type. Salamander, although similar to Iceberg in many respects, rarely forms good compact heads. The variety New York is probably the most satisfactory of all varieties tested, although, on account of its dark green colour and rather thick leaf, it has not proven as readily saleable as Iceberg. In the leaf or open head group, Grand Rapids and Black Seeded Simpson have proven ideal.

DATE OF SEEDING CABBAGE HEAD LETTUCE.—For the past two years, seed of the varieties Big Boston, Iceberg and New York has been sown at different dates throughout the season in order to determine the influence of time of seeding on the development and quality of heads. The first seedings are made early in April, in the hotbed, and the plants transplanted to the open garden when about one inch high. Further seedings are made in cold frames, and, in the open garden, at intervals of about two weeks until the middle of July. The plants raised in the cold frame are transplanted to the garden when about one inch high, and those from seedings in the open are thinned to eight inches apart when about the same size.

So far practically all plants from the seeding in the hotbed have either formed small loose heads, or bolted to seed stalks. With the seedings in the cold frame fairly good results have been obtained with Big Boston and New York. With Iceberg only about one-half of the plants have formed good heads. Plants from the third and fourth seedings, made during the first and third weeks in May, formed a good percentage of heads with each variety. From the fifth seeding, Iceberg and Big Boston formed good heads, but with New York it proved too late and very few mature heads developed. Later seedings have been unsuccessful with all three varieties.

ONIONS

TEST OF VARIETIES.—Although variety tests of onions have been conducted at this Station each year since 1925, the experiment has been rearranged from time to time, in that varieties have been dropped and others included. The last general change of varieties was made in 1926. Accordingly, in order to include a number of varieties, tested for the first time in 1926, the following table is made up from results obtained with the outstanding varieties tested from 1926 to 1929:—

ONIONS—AVERAGE OF RESULTS, 1926 TO 1929

Variety	Colour	Shape	Yield from two thirty-foot rows	
			lb.	oz.
Ailsa Craig	Yellow	Oval	28	0
Red Wethersfield	Red	Slightly flat	27	4
Giant Prize Taker	Yellow	Oval	26	12
Extra Early Flat Red	Red	Flat	26	2
Yellow Globe Danvers	Yellow	Oval	25	12
Southport White Globe	Red	Globe	24	4
Southport White Globe	White	Globe	21	12
Southport Yellow Globe	Yellow	Globe	20	4
White Portugal	White	Flat	18	8

As may be noted there is very little difference in the yield of the first four varieties listed in the foregoing table. Throughout this district, however, the trade seems to prefer a red-skinned onion of globular shape. Accordingly, Red Wethersfield, which is well known, is without doubt the most satisfactory for commercial purposes. For home use, Ailsa Craig will prove very satisfactory. Of the white-skinned varieties, Southport White Globe is the most satisfactory for storage and general use. White Portugal is very useful for early bunching and pickling.

TRANSPLANTING ONIONS.—For the past eleven years seed of four of the leading varieties of onions, has been sown in the hotbed, during early April, and the plants obtained transplanted to the open garden about the middle of May. Without exception larger yields and better maturity of the crop have been obtained than with seed of the same variety sown in the open. In general the increase in yield has been about thirty per cent.

CABBAGE

TEST OF VARIETIES.—Although a large number of varieties of cabbage have been tested at this Station, during the last three years, none of the varieties included in the experiment during that period, have proven superior in any way to those previously recommended. These are: early, Golden Acre and Copenhagen Market; mid-season, Succession; late, Ex Amager Danish Ballhead.

DIFFERENT DATES OF SEEDING.—For the past six years, seed of Copenhagen Market and Ex Amager Danish Ballhead has been sown at intervals of about two weeks throughout the season. The first seedings are made in the hotbed in late April, the second in a cold frame and the remainder in the open garden until about the third week in July. So far, good marketable heads have been obtained from all seedings of Copenhagen Market, up to the end of June, although many of the heads from the later seedings were much smaller than from seedings in May and late April.

In 1929, the variety Golden Acre was included in the experiment, and, although results from one year cannot be considered as conclusive, the results obtained were very satisfactory, marketable heads being formed from seeding as late as July 7. It was also observed that the heads developed better during hot weather than with Copenhagen Market, and that from late seedings, a more satisfactory crop was obtained.

With the variety Ex Amager Danish Ballhead, seedings up to the middle of June have usually produced goods heads. Later seedings have not proven successful.

CAULIFLOWER

TEST OF VARIETIES.—Six varieties of cauliflower were grown in 1929, and of these, Early Snowball, which has now been grown at this Station for fourteen years, proved the most satisfactory. It is an early variety, but has given excellent results in successive plantings, and, may thus be used to advantage throughout the season. Of other varieties tested, Danish Giant was fairly satisfactory. Danish Perfection and Large Late Algiers produced very large heads of good quality, but many of the plants bolted or formed dwarf heads.

DIFFERENT DATES OF SEEDING.—In order to determine how late in the season cauliflower seed may be sown, and a marketable crop obtained, an experiment with different dates of seeding has been conducted for the past five years. The first seeding is made early in April in the hotbed, and the next late in the same month in a cold frame. Further seedings are then made, in the open, at intervals of about two weeks, until the middle of July. The varieties used have been Early Snowball and Dwarf Erfurt.

So far satisfactory results have been obtained with all seedings of both varieties up to the middle of June. With Early Snowball, good heads have been produced in three out of five years from seedings as late as the first of July, and in 1929, from the seeding made in the middle of July.

GARDEN BEETS

TEST OF VARIETIES.—Of sixteen varieties of garden beets tested in 1929, the outstanding were Detroit Dark Red and Crosby Egyptian. Detroit Dark Red is most suitable for early bunching, and, if sown late, for winter storage. Crosby Egyptian produces smooth uniform beets of medium size and very dark colour. It is an excellent variety for bunching. Both varieties have been grown at this Station each season since 1915. Among the varieties which have been tested for shorter periods, Cardinal Globe has proven fairly satisfactory. Also a strain of Dark Red Ball, obtained from the Central Experimental Farm, Ottawa, produced a splendid crop of very uniform beets in 1929.

DIFFERENT DATES OF SEEDING.—In this experiment, which has now been conducted for seven years, it has been found that beets of good bunching size may be expected from seedings of Detroit Dark Red, as late as the end of June.

GARDEN CARROTS

TEST OF VARIETIES.—Among the varieties of carrots that have been tested for five or more years, Chantenay and Nantes Half Long have proven the most satisfactory. Of varieties that have been included in the experiment for shorter periods, Early Scarlet Horn, the seed of which was obtained from Dupuy & Ferguson, proved to be of excellent quality and fairly productive. Coreless, obtained from the Harris Seed Co., was also outstanding in that it was quite early and of better quality than Chantenay.

DIFFERENT DATES OF SEEDING.—In this project, seed of Chantenay is sown at intervals of about two weeks from as early in the season as it is possible to work the ground, until the middle of July. During the seven years that the experiment has been conducted it has been observed that carrots of bunching size will develop from early seedings in from 90 to 95 days. From later seeding development is slower, seedings in early June requiring up to 105 days to produce carrots of satisfactory size. Seedings later than the middle of June have, therefore, rarely produced marketable crops.

SPINACH

TEST OF VARIETIES.—Of the large number of varieties of spinach that have been tested since 1915, Victoria and King of Denmark have proven the most satisfactory. Long Standing, which has been grown for eight years, is a very good variety in that it has not formed seed stalks early, and the leaves are of excellent quality. The plants are, however, small and the yield less than with Victoria and King of Denmark.

PEPPERS

TEST OF VARIETIES.—Although there is a good demand for both ripe and green peppers throughout the district, very few are produced by local gardeners. From the experience gained at this Station, peppers may be raised with less labour and risk than a crop of tomatoes. On the other hand the returns will, at the usual price of peppers, be much more.

Of varieties which have been tested for five or more years, Neapolitan has proven the most dependable. It is comparatively early and the peppers are of good size. Good results have also been obtained with Squash or Tomato and Bullnose.

SQUASH

TEST OF VARIETIES.—Each year since 1915, a number of varieties of squash have been tested, and although a great many newer varieties have been grown, the most satisfactory have invariably been Green Hubbard and Golden Hubbard.

Although a number of the so-called summer squash have been tried for the past six years, they have all proven to be of comparatively poor quality and unsatisfactory for table use.

Of the crookneck varieties, Giant Summer Crookneck is recommended.

Large White Bush has proven the most satisfactory of the vegetable marrows.

MUSKMELON

TEST OF VARIETIES.—Each year a number of varieties of muskmelons is grown in the frames used earlier in the season for the growing of tomato plants. Of the twelve varieties tested in 1929, the best large melons were produced by the variety Oka. Fairly good results were also obtained with the variety Extra Early Hackensack. Of the small melons, Emerald Gem proved to be the most satisfactory.

CELERY

TEST OF VARIETIES.—For the past two years, a great deal of trouble has been experienced by growers of celery throughout this district, in the control of celery blight. The crop at this Station has also been badly infected, and, although sprayed eight times in 1928 and eleven times in 1929, with Bordeaux mixture, only a few varieties have produced satisfactory crops. Of these Easy Blanching has been fairly clean and has produced good marketable celery. White Plume has also been fairly free from disease, but the celery, although of excellent quality, is small and not readily marketable. Control has also been effective with Rose Ribbed, a strong-growing large variety, the stalks of which are a pale rose pink in colour. On account of this colour, however, it is not readily saleable, but for home use, as a late variety, it should prove very satisfactory.

SWEET CORN

TEST OF VARIETIES.—Of the many varieties of sweet corn that have been tested at this Station, the most satisfactory results have been obtained with three varieties originated at the Central Experimental Farm, Ottawa. These are Banting, Pickaninny and Early Malcolm.

Banting is a very early yellow variety which produces a medium-sized cob with deep kernels. In quality it is excellent. In 1928 a small area of this variety was allowed to ripen and a number of samples of the seed obtained sent to gardeners throughout the district. The reports received were very encouraging, many being quite enthusiastic as to the merits of the variety. Most of these growers raised a quantity of seed from the samples sent out, and the planting of this variety in 1930 will, in all probability, be greatly increased.

Pickaninny is very similar to Banting, except that the kernels, when ready for use, are deep purple to almost black in colour.

Early Malcolm, which is now well known throughout the district, is a white corn of good quality, about ten days later than Banting and four or five days earlier than the well-known Golden Bantam.

Promising results were obtained in 1929 with two strains of Gold Nugget, A and B. Both were almost as early as Banting and the cobs of fair size. The kernels were of fairly good depth and the quality fair.

TREE FRUITS

APPLES

VARIETY ORCHARD.—The winter of 1928-29, as well as the fall of 1928, was unusually favourable for apple trees, as a result of which, no winter-killing occurred in the variety orchard at this Station. Many of the trees in the orchard have now attained a fair size and for the past few years have borne good crops of fruit. This is, no doubt, due largely to the regular application of nitrogenous fertilizers each spring and the partial mulching of the ground under the trees with grass, cut in the open spaces between the trees. With this treatment the trees have made growth early in the season, which has ripened in late summer or early fall, and have thus entered the winter in the best possible condition.

Although the crop of apples in 1929 was the largest and best obtained to date, no varieties of apparent merit, not mentioned in previous reports from this Station, bore fruit. Of previously recommended varieties the most suitable are in order of season as follows: Galetta, Melba, Joyce, Lobo, Winton, Donald

and Lawfam. These varieties, which have been originated by the Dominion Horticulturist, have proven much hardier than the ordinary commercial varieties such as McIntosh, Fameuse and Wealthy. Melba, Lobo and Joyce, on account of their superior quality and attractive appearance, are of undoubted value for commercial plantings even in districts where hardiness is not a determining factor. In sections where the severity of the climate prohibits the growing of the more common varieties, all of these newer sorts should prove of great value for home use and local sale.

CO-OPERATIVE EXPERIMENTS IN COMMERCIAL ORCHARDS

In addition to the experimental work with apples conducted at Lennoxville, this Station is responsible, under the direction of the Dominion Horticulturist, for the supervision of a series of co-operative experiments begun in 1925 in commercial orchards at St. Paul de Abbotsford, P.Q. and Chateauguay Basin, P.Q.

At Chateauguay Basin approximately five acres are utilized in the orchard of Mr. S. R. Jack. The experiments consist of a comparison of nitrate of soda and sulphate of ammonia, used with leguminous and non-leguminous cover crops and clean cultivation. Owing to the comparatively high fertility of the soil at the beginning of the experiments, and the nature of the work, no outstanding results have been obtained so far. It has been observed, however, that where either nitrate of soda, or sulphate of ammonia, are used in conjunction with a leguminous cover crop, the trees are in a very healthy and vigorous condition.

In Mr. A. W. Buzzell's orchard at St. Paul de Abbotsford, a number of interesting experiments are being conducted. These consist of the following:—

Comparison of different fertilizer ingredients.

Comparison of sulphate of ammonia and nitrate of soda.

Comparison of straw and grass mulch with ordinary sod culture.

Tests of various synthetic fertilizers.

Comparison of fall and spring applications of nitrate of soda and sulphate of ammonia.

Although definite results cannot be expected from such experiments in the comparatively short time that they have been conducted, a great deal of valuable and interesting data have been obtained. Following is a brief progress report on three of the outstanding phases of the work.

MULCHING VS. ORDINARY SOD CULTURE.—In this experiment sixty fameuse trees about 25 years old, growing in sod, have been mulched each year, in the late fall, with eighty pounds of straw. This straw has been spread evenly over the ground underneath the tree on an area extending from about eighteen inches from the trunk to one foot beyond the spread of the branches. For comparison another lot of sixty trees of the same variety, growing in sod, and planted at the same distance, but somewhat larger in size have been grown in sod only for the same period. Both lots are divided into five plots of twelve trees each, four of which in each lot have different applications of fertilizer, and one as a check which is not fertilized.

So far very little difference has been noted in the response of the trees of applications of fertilizer, although in the check plot in the non-mulched area, the trees are showing unmistakable signs of lack of fertility in the soil. Decidedly beneficial results have, however, been obtained from mulching.

Following is a statement showing the average yield per tree on each area for the five-year period in which the experiment has been conducted:—

FAMEUSE APPLES—SOD-MULCHED VS. SOD AT ABBOTSFORD, P.Q.

AVERAGE OF RESULTS, 1925 TO 1929

Treatment	Yield per tree					
	1925	1926	1927	1928	1929	Average
	bush.	bush.	bush.	bush.	bush.	bush.
*Mulch of 80 pounds of straw per year...	6·08	7·95	5·27	7·95	8·11	7·07
No mulch.....	2·35	14·75	1·45	13·78	1·78	6·82

*The trees in the mulched area were a little younger than those in the unmulched area and their on-bearing year was different from those on the unmulched area, there being practically no crop on the mulched area in 1924.

For several years previous to the beginning of the experiment, both lots of trees, although in a comparatively healthy condition, were decidedly biennial in bearing. From the foregoing table it may be noted that except for a slight increase in the 1926 crop followed by a corresponding decrease in 1927, the mulched trees have been quite uniform in production each year, the main difference being a gradual increase in crop over the period. On the non-mulched area, production has remained decidedly biennial. Furthermore the mulched trees, which at the beginning of the experiment were under a considerable handicap in the matter of size and could not carry the same amount of fruit as those in sod only, have gradually overcome this lead, and, over the whole period, have actually borne the largest crop per tree. It has also been noted that the mulched trees are in a much better condition generally and that the fruit attains a larger size and grades higher.

This experiment is being continued and should prove productive of very interesting results in the future.

SULPHATE OF AMMONIA VS. NITRATE OF SODA.—For the past five years nitrate of soda and sulphate of ammonia have been applied, at the customary time in the spring, to respective plots of three varieties growing in sod. Owing to the difference in the analysis of the two fertilizers, sulphate of ammonia containing approximately twenty per cent of nitrogen in the form of ammonia, and nitrate of soda, about fifteen per cent in the form of nitrate, slightly larger amounts of nitrate of soda were applied per tree.

So far with each variety, little or no difference has been noticeable in the appearance of the trees in either plot, all having made good annual growth and bore heavy crops on alternate years. The growth of grass has also been similar with each fertilizer. In 1925 and 1926 it was found necessary to cut it only once, but for the past three years two cuttings have been necessary; one in June and another in late August. No grass is removed from the orchard it being allowed to lie where cut.

The plots in the Fameuse variety are composed of twelve trees each and those of Wealthy and Arabka of nine.

Following is a condensed statement of the results obtained:—

APPLES—NITRATE OF SODA VS. SULPHATE OF AMMONIA AT ABBOTSFORD, P.Q.—AVERAGE OF RESULTS 1925 TO 1929

Variety	Fertilizer application	Average yield per tree					Average
		1925	1926	1927	1928	1929	
		bush.	bush.	bush.	bush.	bush.	bush.
Wealthy	Sulphate of ammonia, 4 pounds per tree	no crop	10·61	0·63	10·11	3·05	4·88
	Nitrate of soda, 5 pounds per tree	no crop	8·60	1·54	6·61	4·55	4·26
Winter Arabka	Sulphate of ammonia, 4½ pounds per tree	2·39	9·89	0·83	8·67	2·44	4·84
	Nitrate of soda, 6 pounds per tree	3·39	11·00	1·78	9·22	2·78	5·63
Fameuse	Sulphate of ammonia, 4½ pounds per tree	2·85	16·17	1·46	13·42	1·62	7·10
	Nitrate of soda, 6 pounds per tree	1·12	13·97	0·04	12·06	0·37	5·51

Three varieties, average yield per tree during period: Sulphate of ammonia..... 5·61 bushels
Nitrate of soda..... 5·13 "

Although the average yield per tree for the five-year period is slightly larger where sulphate of ammonia has been used, the difference is scarcely enough to be considered significant. It would seem, however, that sulphate of ammonia in this experiment at least has proven to be a satisfactory source of nitrogen for apple trees.

COMPARISON OF FERTILIZER COMBINATIONS FOR WEALTHY APPLE TREES.—The Wealthy apple trees used for this experiment are all mature trees very uniform in size and growing in a rather poor but uniform soil. The area is divided into four plots of nine trees each, three of which receive different applications of fertilizers, and one which is not fertilized in any way being used for a check.

All applications of fertilizer are made in the spring at the time when the buds are bursting, the material being spread evenly over the ground under each tree from two feet from the trunk to about the same distance beyond the spread of the branches.

Where fertilizers have been applied, grass growth has been very heavy, particularly so on the plots receiving superphosphate, and superphosphate and muriate in addition to nitrate of soda.

As the grass is cut and left lying on the ground, the accumulation of decomposed vegetable matter under trees on these plots has increased each year so that during the past season it was quite noticeable and no doubt has a very beneficial effect on the trees.

The first applications of fertilizer were made in 1925, but the crop on the entire area, was very light and not considered worth picking. Accordingly, in the following statement the yields obtained during the past four years only are shown:—

WEALTHY APPLES FERTILZIER EXPERIMENT AT ABBOTSFORD, P.Q.—AVERAGE OF RESULTS, 1926 TO 1929

Fertilizer application	Yield per tree					Average yield per acre
	1926	1927	1928	1929	Ave.	
	bush.	bush.	bush.	bush.	bush.	bush.
Nitrate of soda 5 pounds per tree	8·60	1·54	6·61	4·55	5·32	367·08
Nitrate of soda, 5 pounds per tree						
Superphosphate, 5 pounds per tree	6·23	4·51	6·83	8·28	6·46	457·74
Nitrate of soda, 5 pounds per tree						
Superphosphate, 5 pounds per tree						
Muriate of potash, 1 pound per tree	9·67	2·71	10·28	9·28	7·98	550·62
Check, *no fertilizer*	5·33	2·64	3·15	4·00	3·78	261·51

Although it is generally believed that nitrogenous fertilizers are all that apple trees growing in sod require, the trees in this experiment have responded very favourably to applications of phosphoric acid and potash in conjunction with nitrogen. Also with the application of complete fertilizer, and that containing nitrogen and phosphorous only, bearing has been more regular than with nitrogen alone. The fertilized plots have also produced much larger crops than those obtained on the check.

It is planned to continue this experiment for several years.

SMALL FRUITS

STRAWBERRIES

Although the winter of 1928-29 was comparatively mild and the snowfall light, strawberry plants that were protected by a mulch, wintered well, most plantations throughout the district having a full stand of plants at the beginning of the season. The weather, up to the time of the first picking, was favourable and the first part of the crop was of excellent size and quality. Hot dry weather during June, however, shortened the period of bearing and final yields were slightly below average.

With the plantation at this Station, the straw used for mulch, during the winter, when removed in the spring is spread between the rows, and left there throughout the season. This forms a thick mulch which checks weeds, keeps the berries clean during rains, and conserves moisture. The advantage of this mulch was clearly indicated in 1929, as the strawberry plantation at this Station remained in full bearing for at least a week longer than most plantations throughout the district.

Test of Varieties.—Although many varieties have been tested, no early variety has been found superior to Senator Dunlap for commercial purposes. Furthermore the plants are available at practically all seed houses and nurseries, and therefore easily obtainable.

Of the later varieties, Parson Beauty is probably the best of those easily obtainable commercially. A variety known as Kellogg Prize has also proven fairly satisfactory. The berries are of fine appearance, being of large size, smooth even shape and bright red in colour. The quality and flavour is similar to Senator Dunlap and the flowers are perfect.

Of varieties which are not generally handled by dealers, two varieties, Portia and Cassandra, originated by the Dominion Horticulturist, have proven outstanding. Portia is the best late variety for commercial plantings, that has been tested at this Station. The flowers, however, are imperfect and another late variety, having perfect flowers, must be planted with it. For this purpose either Cassandra or Kellogg Prize would prove quite satisfactory.

ORNAMENTAL GARDENING

ANNUALS

Generally, satisfactory results were obtained with practically all of the many varieties and species of annual flowers tested in 1929. Several large beds of canna and dahlia were again grown and made a pleasing and brilliant display.

An unusual effect was obtained by the outdoor seeding of twenty-six varieties of annuals in one large bed. Although several of the varieties did not come up to expectations, the results, as a whole, were quite satisfactory. This

bed provided a splendid demonstration of what may be accomplished, in this climate, in the growing of annual flowers without the aid of hotbeds or other artificial heat. Among the varieties and species which proved satisfactory in this bed, the following were outstanding: Calendula, Candytuft, Swan River, Daisy, Clarkia, Corn Flower, Eschscoltzia, Carnation, Poppy, Nasturtium, Mignonette, Godetia, Annual Gypsophila, Laventeria and Annual Lupin.

A large number of annuals, the seed of which was started in the hotbed, were also grown. These included a number of varieties of Stocks, Asters, Antirrhinum, Scabiosa, Phlox Drummondii and Petunia. The results obtained were very satisfactory and the ornamental effects pleasing.

Unusually pleasing results were obtained with a long narrow bed of mixed Salpiglossis, bordered with Golden Sunset Rudbeckia. The colours of these two species blended nicely the whole bed forming a strikingly brilliant colour combination.

Bed of *hydrangea paniculata grandiflora* in early September.

GLADIOLI.—A total of one hundred and seventy-five varieties of this beautiful flower were grown in 1929. For one hundred varieties of this collection, the Station is indebted to Mr. Eric Fisher, who is a great admirer of gladioli and made this donation in order that the collection, at this Station, might be as complete as possible. A number of the outstanding varieties in the collection were: Copper and Bronze, Frosty, Bengal Tiger, Carmine Kid, Betty Snow, Lady Byng, Longfellow, Florence Nightingale, Golden Dream, Golden Eagle, Midsummer Dream and Red Copper.

PERENNIALS

The many varieties and species of perennial flowering plants, growing in the various beds throughout the ornamental grounds, were as usual very satisfactory. With these a splendid combination of brilliant bloom was maintained from early May until late October.

PAEONY.—A large bed of twenty-six varieties of this favourite perennial produced a truly wonderful display of bloom. A few of the most outstanding varieties were: Walter Laxton, Victor Hugo, Felix Crousse, Queen Victoria, Rubra Superba, Monbane and Solange.

IRIS.—The season proved particularily favourable for iris. A large bed of German iris, containing forty-seven named varieties, provided a splendid opportunity for observing and comparing the many unusual and strangely beautiful blooms of this popular flower. Several of the best varieties were as follows: Mrs. H. Darwin, Eldorado, Elaine Grey, Princess Victoria, Louise, Mrs. Mahony, Glory of Reading, Queen of May, Lady June, Florentina, Queen Emma, Mrs. Sherwin Wright and White Knight.

POULTRY

The work carried on with poultry during 1929 was a continuation of experiments and observation tests in breeding, feeding, and selecting for greater average egg production, better uniformity of egg-size, and general improvement of the poultry industry in the Eastern Townships. Barred Plymouth Rocks are the breed kept at this Station for selection, and experimental tests. Tests that apply to the improvement of any laying breed of poultry are given first consideration, and since a number of these certain tests have been carried on for a period of ten years, average results can be considered a great deal more reliable than in the case of tests which have only been under way for a very few years.

Four of the pens in the experimental breeding house were used during 1929 as special pens for the breeding stock, consisting of yearling, two-year-old and older hens which had made good egg-records in their pullet year, and had been retained chiefly for their value as reproducers of better stock. These females were mated about February 15 to males which were from hens that had produced eggs of good size and shape, as well as a high record of production.

The females used in the special pens are given below with their winter egg-record as well as their yearly record in their pullet year.

EGG-RECORDS, PEN A 13

Hen No.	Winter	Year	Hen No.	Winter	Year
	eggs	eggs		eggs	eggs
C.I. 141	94	291	C.F. 173	90	249
C.I. 148	45	219	C.F. 175	57	243
C.I. 150	68	279	C.E. 163	43	209
C.H. 185	31	237	J 761	71	241
C.G. 113	51	203	J 810	67	227
C.G. 116	84	226	J 819	79	214
C.G. 127	60	214	I 508	86	242

Ten of the 14 hens used as breeders in pen A were registered hens which had qualified for registration in the Quebec Western Egg-Laying Contest. The total 14 females had an average winter egg-record of 66·1 eggs each, and an average year's record of 235·3 eggs each in their pullet year, with an average egg-size of 24·9 ounces per dozen. These hens were mated to a registered young male, Lennoxville 5 F., which was from a registered dam with an official egg-record of 269 eggs, and a registered grand-dam with an official egg-record of 209 eggs. Unfortunately this male took sick about March 18, and had to be replaced by a young male, C.N.P.R.A., H 457, which was eligible for registration, being from a registered hen with an official egg-record of 229 eggs, and a registered

grand-dam with an official egg-record of 200 eggs. From this pen 403 eggs were set during the hatching season which proved 93·5 per cent fertile and 55·2 per cent of the fertile eggs hatched.

EGG-RECORDS, PEN B 12

Hen No.	Winter	Year	Hen No.	Winter	Year
	eggs	eggs		eggs	eggs
C.H. 183	76	269	I 529	67	214
J 640	80	209	I 553	70	226
J 685	79	211	I 571	49	231
J 693	53	188	H 319	63	222
J 697	78	230	H 332	79	249
J 704	52	223	H 389	52	206
J 705	69	217	H 435	72	242

The 14 hens used as breeders in this pen had an average winter egg-record of 67·1 eggs each, and an average year's record of 224·1 eggs each in their pullet year, with an average egg-size of 24·4 ounces per dozen. These hens were mated to a very large registered young male, Lennoxville 4 F., which was from a registered dam with an official egg-record of 237 eggs, and she in turn was from a hen which registered in the contest with 209 eggs as her official egg-record. This young male was sired by an approved male, C.N.P.R.A., G 471, which was from a hen which registered with an official record of 223 eggs. From this pen 248 eggs were set during the hatching season which proved 91·1 per cent fertile, and 52·2 per cent of the fertile eggs hatched.

EGG-RECORDS, PEN C 11

Hen No.	Winter	Year	Hen No.	Winter	Year
	eggs	eggs		eggs	eggs
K 854	65	201	J 766	52	234
K 867	31	207	J 775	97	205
K 913	72	207	J 783	71	240
K 952	77	207	I 501	78	217
K 959	56	203	H 310	49	205
K 991	46	211	H 404	92	207
J 658	47	201	H 440	51	216
J 746	93	223			

The 15 hens used as breeders in this pen had an average winter egg-record of 65·8 eggs each, and an average year's record of 212·3 eggs each in their pullet year. Owing to the fact that the average egg-size of those hens was slightly below the standard size, particular attention was given to see that they were mated to a young male from a hen with good egg-size. The male which was used in this pen, No. M 25, was from a registered hen which had made an official egg-record of 249 eggs, and he was sired by a son of a registered hen with an egg-record of 223 eggs. From this pen 417 eggs were set which proved 85·5 per cent fertile, and 62·8 of the fertile eggs hatched.

EGG-RECORDS, PEN D 10

Hen No.	Winter	Year	Hen No.	Winter	Year
	eggs	eggs		eggs	eggs
K 850	89	179	K 948	24	178
K 856	26	190	K 954	77	197
K 860	46	171	K 960	44	211
K 887	12	174	J 606	62	180
K 899	20	199	J 663	68	194
K 905	60	196	L 178	61	226
K 915	27	181	L 200	75	244
K 935	50	179			

The 15 hens used as breeders in this pen had an average winter egg-record of 49·4 eggs each, and an average year's record of 193·3 eggs each in their pullet year. These hens were mated to a young male No. M 28, which was the son of a hen that had produced 227 eggs in her pullet year. From this mating 411 eggs were set, which proved 88·1 per cent fertile, and 59·4 per cent of the fertile eggs hatched.

INCUBATION

All the eggs set were hatched artificially in the incubators which were operated in the basement of the Poultry Administration Building. The first eggs were set on March 15, and the incubators were kept in operation until May 25. An individual record is kept of the number of eggs set from each hen used in the breeding pens, the number of infertile eggs, the number of dead in shell during incubation, and the number that hatch. The chicks are pedigree-banded before being removed from the incubators to the brooders, and are carefully observed at various times during the growing season to note difference in progeny of different individuals used in breeding experiments.

BEST DATE FOR INCUBATION

To determine the most profitable date for incubation with regard to fertility and hatchability, eggs are used for incubation during March, April and May, and records are kept of the results of fertility and hatchability for each month during which the eggs were set. This project has been under way at this Station for ten years, and a summary of the results tabulated 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
1929	44·9	58·8	46·3	53·7	48·5	54·9
Average	81·1	40·1	83·8	54·1	83·0	62·1

NOTE.—It would be well to mention that the use of pullet eggs as well as hen eggs for hatching in this project reduced the average to quite an extent. The difference between hen eggs and pullet eggs for incubation may be noted in the section devoted to 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 six 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	1929	91·0	49·4

Average for six years, 87·2 per cent fertile and 58·9 per cent hatched.

BREEDING FOR FERTILITY, HATCHABILITY AND LIVABILITY

This project was started primarily with the object of proving the advantage of using eggs for hatching from hens that had made their records in their pullet year and then been given a rest period, 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 for the past ten years at this Station. To those who are anxious to partially reduce the cost of renewing the poultry flock on their farms, the following summary should be of convincing benefit:—

HATCHING RESULTS OF HENS VS. PULLETS

—	Hens			Pullets		
	Per cent fertile	Per cent fertile eggs hatched	Per cent alive at 6 weeks	Per cent fertile	Per cent fertile eggs hatched	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
1929	51·1	57·3	97·2	42·7	54·5	89·0
Average	83·4	55·6	95·6	80·0	41·8	82·9

NOTE.—A very noticeable fact of this project was the much lower percentage of weak stunted chicks among those hatched from hen's eggs, than was the case in those hatched from eggs from pullets.

BROODING OF CHICKS

From the eggs set during the spring of 1929, 1,840 chicks were hatched, of these 975 were sold as day-old chicks, in lots of fifty or less to those anxious to secure a start in improved bred-to-lay stock, and the others were brooded in colony houses which were equipped with coal-burning brooder stoves, to supply the necessary heat requirements. Over 93·0 per cent of the chicks put in the brooders were alive at six weeks of age.

COST OF REARING CHICKS

So many farmers were desirous of knowing just what it would cost for feed to raise pullets for the laying pens, caused this project to be started in 1919 with the object of getting an approximate average over a period of years. All feed used each month was charged at the actual prevailing market prices of the district, and the average number of chicks fed during each month was the basis of calculating the cost per chick per month. The test continued for ten years, and the average cost for feed to raise a pullet to maturity was 76 cents each. To this cost must be added the cost of the chick at hatching time, and cost of brooding and attention during the growing stage. It might also be mentioned that during the ten years' test, that a few pullets were 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 ten years' tests, giving the average cost per bird for a year.

Cost of Feeding Layers

1920	1921	1922	1923	1924	1925	1926	1927	1928	1929
$	$	$	$	$	$	$	$	$	$
3 12	2 50	1 83½	2 05¾	2 13	2 51¼	2 43½	2 53	2 86½	2 29

Taking an average of ten years' cost would give $2.43 as the average cost of feed per bird for a year.

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

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 (Winter Months)

1920	1921	1922	1923	1924	1925	1926	1927	1928	1929
16	16	13	16	14	16	16	14	17	14

EGGS REQUIRED TO PAY COST OF FEED PER BIRD FOR YEAR

1920	1921	1922	1923	1924	1925	1926	1927	1928	1929
53	54	50	54	57	63	58	59	69	57

NOTE.—In almost every case where feed prices were higher, the price received for eggs was higher also.

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 nine years is as follows:—

COST OF FEEDING BREEDING BIRDS

1921	1922	1923	1924	1925	1926	1927	1928	1929
$	$	$	$	$	$	$	$	$
2 56	1 87	1 70¾	1 79	2 52¼	2 23½	2 24	2 28¼	2 13

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 10 years)

Average number of pullets used in pens each year	No.	141
Average cost of feed consumed per bird each year	$	2 42
Average number of eggs produced per bird each year	No.	169
Average price of eggs per dozen each year	cts.	50
Average per cent production per day each year	%	45·1
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.	78
Average cost of feed consumed per bird each year	$	2 15
Average number of eggs produced per bird each year	No.	109
Average price of eggs per dozen each year	cts.	50
Average per cent production per day each year	%	29·6
Average profit over cost of feed per bird each year	$	2 31

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.

The amount of various feeds used by pullets and hens at this Station for twelve months (November 1, 1928, to October 30, 1929) is given in the following summary table:—

Summary of Laying Pullets and Breeding Hens, 1928–29

Number of Birds, Costs of Feed, Amounts of Feeds, Averages, etc.

—	Average number of birds	Total cost of feed	Average cost of feed per bird	Pullets				Total pound of scratch feed used	Total pound of mash used	Total pound of grit used	Total pound of shell used	Miscellaneous
				Total eggs laid	Average eggs per bird	Average price per doz. for eggs sold	Total value of eggs laid					
	No.	$	$			cts.	$	lb.	lb.	lb.	lb.	lb.
Winter months—Nov. 1 to Feb. 28	277	191 65	0 69	14,057	50·7	57·5	673 56	4,112	3,248	170	234	750
Total 12 months—Nov. 1 to Oct. 30	193	442 52	2 29	34,926	181·0	48·0	1,397 04	8,744	8,279	450	727	1,050

—	Average number of birds	Total cost of feed	Average cost of feed per bird	Hens				Total pound of scratch feed used	Total pound of mash used	Total pound of grit used	Total pound of shell used	Green feed
				Total eggs laid	Average eggs per bird	Average price per doz. for eggs sold	Total value of eggs laid					
	No.	$	$			cts.	$	lb.	lb.	lb.	lb.	lb.
Winter months—Nov. 1 to Feb. 28	59	36 37	0 62	279	4·7	·60	13 95	880	557	30	5	200
Total 12 months—Nov. 1 to Oct. 30	48	102 30	2 13	3,923	81·7	48·8	159 54	1,921	2,036	107	105	400

EGG-LAYING CONTEST

The seventh Quebec Western Egg-Laying Contest to be conducted at this Station was completed on October 23, 1929, and the breeds of poultry represented in this contest were 11 pens of White Leghorns, 6 pens of Barred Plymouth Rocks, 2 pens of White Wyandottes and 1 pen of White Plymouth Rocks. For the benefit of those who were desirous of knowing what quantities of feed the various breeds consumed during the 51 weeks of the contest, the following summary was prepared from the seventh contest:—

51 weeks. AMOUNTS OF DIFFERENT FEEDS USED IN 7TH CONTEST 1928-29

Breed	Number of birds	Pounds of scratch grain used	Pounds of dry mash used	Pounds of grit used	Pounds of shell used	Pounds of green feed used	Average pounds of scratch per bird	Average pounds of mash per bird	Average pounds of grit per bird	Average pounds of shell per bird	Average pounds of green feed per bird	Total scrap and bone fed	Scrap and bone fed per bird
		lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.
S.C.W. Leghorns.....	132	3,877	6,392	251	499	3,598	29·4	48·4	1·9	3·8	27·3	256	1·9
Barred P. Rocks.....	72	2,463	4,024	128	329	2,016	34·2	55·7	1·8	4·6	28·0	144	2·0
W. Wyandottes.....	24	772	1,225	37	80	672	32·2	51·0	1·5	3·3	28·0	48	2·0
White Rocks.....	12	390	676	25	49	336	32·5	56·3	2·1	4·1	28·0	24	2·0
Total.....	240	7,502	12,317	441	957	6,622	32·0	52·8	1·8	3·9	27·8	472	2·0

The following table will give the egg production of the birds in the seventh contest and the average percentage of the various breeds:—

SEVENTH QUEBEC WESTERN EGG-LAYING CONTEST, LENNOXVILLE, P.Q., 1928-29

Breed	Number of birds entered	Per cent laid less than 100 eggs	Per cent laid less than 150 eggs	Per cent laid 150 eggs and over	Per cent laid 200 eggs and over	Per cent laid 225 eggs and over	Per cent registered birds	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 cost of 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.W. Leghorns	132	20·4	42·4	57·6	21·2	6·1	18·9	24·6	24·1	3·48	3·78	2 09	3 80	216·2	147·3
White Wyandottes	24	16·7	29·2	70·8	37·5	16·7	29·2	24·9	24·5	4·69	5·80	2 36	4 25	222·6	165·1
Barred P. Rocks	72	15·3	29·2	70·8	38·9	13·9	31·9	24·8	24·3	4·85	5·87	2 43	4 37	218·9	170·1
White Rocks	12	25·0	66·7	33·3	.....	.....	.....	.....	25·4	5·02	5·90	2 40	2 85	.....	131·3
Totals	240	39·6	38·3	61·7	31·2	9·2	22·9	.....	.....	.....	.....	.....	.....	.....	.....

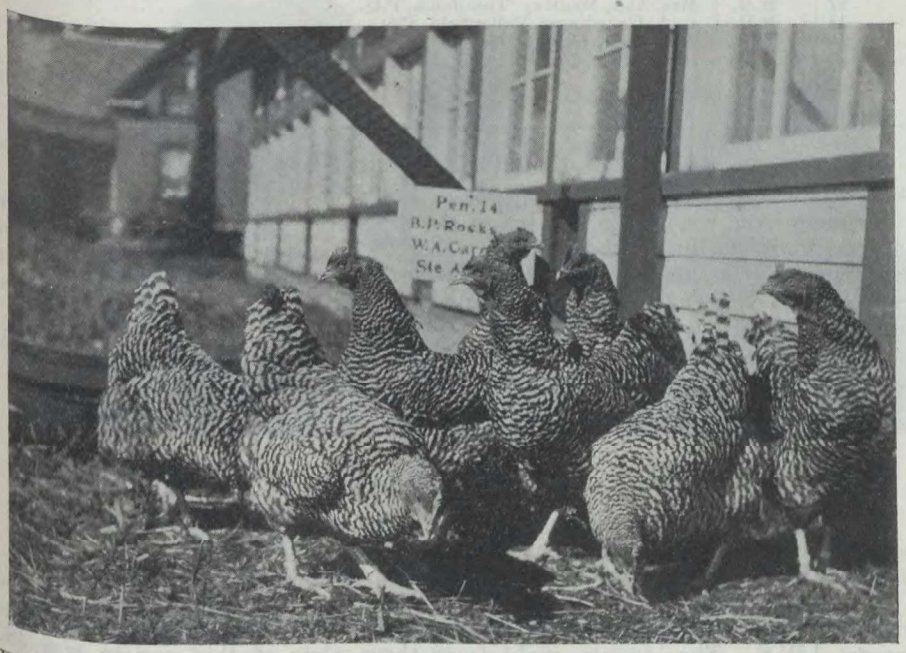
SUMMARY OF SEVEN CONTESTS CONDUCTED AT LENNOXVILLE, P.Q.

Breed	Number of birds entered in 7 years	Number of 2nd generation birds entered in 7 years	Number of birds that laid less than 100 eggs	Number of birds that laid 150 eggs and over	Number of birds that laid 200 eggs and over	Number of birds that laid 225 eggs and over	Number of birds registered	Per cent birds registered in 7 years	Average eggs per registered bird per year	Average eggs per bird per year in 7 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 (7)	666	114	87	444	156	60	93	14·0	221·6	163·3	2 12	3 91
Barred P. Rocks (7)	448	132	55	280	138	63	77	16·8	229·5	168·3	2 34	3 63
White Wyandottes (7)	288	68	27	186	71	28	47	16·3	219·5	166·7	2 30	4 05
R. I. Reds (3)	52	0	20	23	4	2	2	3·8	232·0	124·0	2 07	2 03
Chanticlers (2)	34	10	27	2	2	0	2	5·8	210·5	68·0	2 00	1 25
Silver Wyandottes (2)	20	0	7	2	0	0	0	0	0	107·0	2 01	1 57
White Rocks (1)	12	0	3	4	0	0	0	0	0	131·3	2 40	2 85

N.B.—The figures in parentheses, near the breed, give the number of years that each breed was represented in the Contests.

As all standings of pens and individuals are taken by score of points instead of by number of eggs produced, it is interesting to note that more care and thought has been given to the improvement of the character of egg-size in the breeding stock used, and more birds were registered during the 1929 contest than has been the case in any previous contest conducted at this Station. The ten highest pens according to points are given as follows:—

Pen	Breed	Highest Pens According to Points	Points
14	B.R.	W. A. Carr, Ste. Agathe des Monts, P.Q.	2,276·7
10	W.L.	W. M. Parsons, Barnston, P.Q.	2,193·8
3	W.L.	John E. Burnet, Cowansville, P.Q.	2,176·2
16	B.R.	H. R. Drew, R.R. 3, North Hatley, P.Q.	2,166·2
19	W.W.	Miss R. G. Knight, Beebe, P.Q.	2,130·7
15	B.R.	Experimental Station, Lennoxville, P.Q.	2,079·0
17	B.R.	Mrs. Alex. MacKay, Tomifobia, P.Q.	2,014·4
9	W.L.	C. D. Calder, Cowansville, P.Q.	2,004·6
11	W.L.	Riverside Poultry Farm, Bishop's Crossing	1,969·3
5	W.L.	Circle Bar Poultry Farm, Calumet, P.Q.	1,921·5



Highest pen in the 1929 Egg-laying Contest, owned by W. A. Carr, Ste. Agathe des Monts, Que.

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

HIGHEST INDIVIDUALS ACCORDING TO POINTS

	Points
No. J 207 W.W.—Bond Little, North Hatley, P.Q., R.R. 1	319·0
No. J 197 W.W.—Miss R. G. Knight, Beebe, P.Q.	285·2
No. J 35 W.L.—John E. Burnet, Cowansville, P.Q.	284·7
No. J 34 W.L.—John E. Burnet, Cowansville, P.Q.	278·8
No. J 44 W.L.—Laurel Poultry Farm, Rougemont, P.Q.	275·1
No. J 151 B.R.—Experimental Station, Lennoxville, P.Q.	273·8
No. J 164 B.R.—H. R. Drew, North Hatley, P.Q., R.R. 3	271·9
No. J 55 W.L.—Circle Bar Farm, Calumet, P.Q.	268·8
No. J 112 W.L.—Riverside Poultry Farm, Bishop's Crossing	268·4
No. J 158 B.R.—Experimental Station, Lennoxville, P.Q.	264·8

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.

Owners who had birds registered in the seventh contest were as follows:—

Pen No.	Breed	Owner and Address	Number of birds registered
1	W.L.	J. H. Jackson, Port Dover, Ont.	1
3	W.L.	John E. Burnet, Cowansville, P.Q.	6
4	W.L.	Laurel Poultry Farm, Rougemont, P.Q.	1
5	W.L.	Circle Bar Poultry Farm, Calumet, P.Q.	2
7	W.L.	Poultry Dept., Macdonald College, P.Q.	1
8	W.L.	O. Moring, Dorval, P.Q.	2
9	W.L.	C. D. Calder, Cowansville, P.Q.	4
10	W.L.	W. M. Parsons, Barnston, P.Q.	5
11	W.L.	Riverside Poultry Farm, Bishop's Crossing	3
13	B.R.	V. E. Nablo, South Cayuga, Ont.	2
14	B.R.	W. A. Carr, Ste. Agathe des Months, P.Q.	7
15	B.R.	Experimental Station, Lennoxville, P.Q.	2
16	B.R.	H. R. Drew, North Hatley, P.Q., R.R. 3	3
17	B.R.	Mrs. Alex. MacKay, Tomifobia, P.Q.	7
18	B.R.	L. A. Gnaedinger, Valleyfield, P.Q.	2
19	W.W.	Miss R. G. Knight, Beebe, P.Q.	4
20	W.W.	Bond Little, North Hatley, P.Q., R.R. 1	3
			55

Twenty-six of the birds that were registered were daughters of registered hens.

Some of the work of inspection of the registered birds on the owner's plant has been handled during the past six years by this Station, and has been very encouraging in results. More second-generation pullets are being entered in contests each year, and there were a good number of males eligible for registration during 1929.

The applications for plans of poultry housing, advice as to breeding, feeding, and general care, are becoming more numerous each year.

FIBRE PLANTS

FLAX

Although somewhat unsatisfactory results have, in the past, been obtained with fibre flax, an excellent yield of good fibre was obtained in 1929 with the variety J.W.S. The average yield from three plots of this variety was 480 pounds of scutched fibre, and 90 pounds of tow. The fibre was of good length and fair quality.

HEMP

For the past five years, one-half acre of hemp has been grown each year to determine the cost of production, and profit or loss per acre with the crop. Owing to the necessity of using unsuitable machinery for the handling of the crop, costs have been high. On the other hand, however, the yield and quality of the fibre produced has also been high. Accordingly, even with unusually high costs, the experiment has shown a profit in four out of the five years that it has been conducted. The profits range from $51.59 per acre in 1925, to $10.28 per acre in 1927. The crop in 1929 gave a profit of $22.10 per acre.

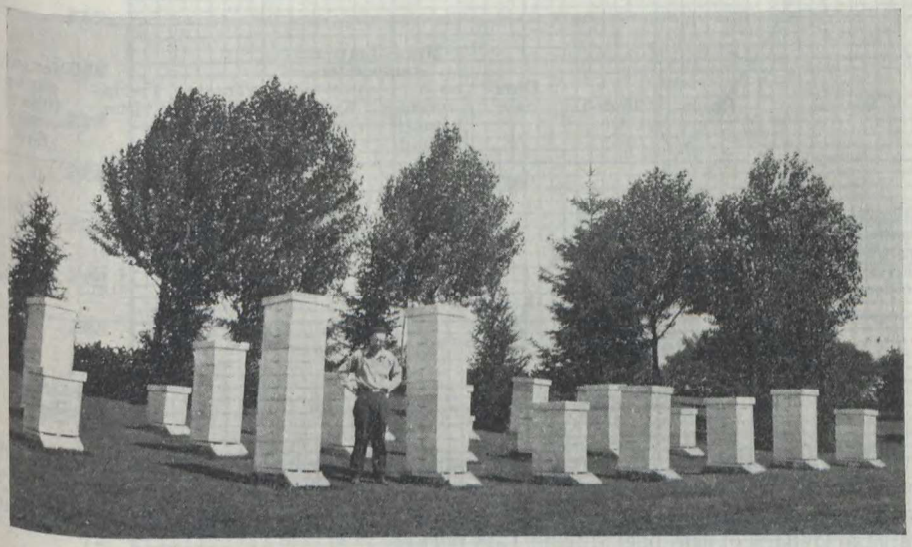
BEES

HONEY FLOW

The season of 1929 was the most favourable for bees and the production of honey since the apiary was started in 1924.

The average number of pounds of honey produced per colony was 122·69 pounds, and the highest yield per colony was 255·5 pounds of excellent quality.

Owing to the mild winter the bees wintered in excellent condition, especially the eight colonies kept outside in wintering cases. Those wintered inside were not in as good condition, probably due to the fact that the cellar in which they were kept was not the very best, as the variations of the outside temperature affects the inside temperature, which causes the bees to be more or less uneasy.



Large yields of honey were obtained in 1929.

The weather during the spring was favourable for the building up of the colonies and the gathering of nectar. The main honey flow, consisting chiefly of alsike and White Dutch clover, commenced 15 days earlier than the previous year. This was preceded by a good flow from dandelions and fruit bloom. The following table shows the net gains and losses of an average colony which was kept on scales, from May 1 to October 1, and weighed every morning at seven o'clock throughout the season, for the year 1929, also the average for six years:—

HONEY FLOW 1929, AND AVERAGE 1924 TO 1929

—	May	June	July	August	September	Total gain over loss
	lb.	lb.	lb.	lb.	lb.	lb.
Net gain, 1929	29	41·75	151·25	.....	.....	201·5
Net loss, 1929	.....	.....	.....	5·50	12·00	.....
Average net gain, 1924 to 1929	4·83	28·08	112·67	.....	.....	133·71
Average net loss, 1924 to 1929	.....	.....	.....	3·20	8·67	.....

It has been noted that only when weather conditions are favourable will bees work freely, and that even during the best seasons there are many days in which no gains are made.

SOURCES OF NECTAR

A record is kept of the approximate date and duration of the various honey flows. Clovers are the chief sources of nectar from which surplus honey is obtained, but willow, dandelion, fruit bloom and golden-rod are important in the building up and maintaining of colony strength. Following is a record of the duration of each source of nectar in 1929, with a summary of the meterological records during each period:—

SOURCE AND DURATION OF HONEY FLOWS, AND GAINS DURING 1929

Sources	Begun	Ended	Duration	Mean of extreme temperature		Total hours of sunshine	Precipitation	Net gain during time of honey flow
				Average maximum	Average minimum			
			days			hours	inches	lb.
Willows	May 10	May 25	15	62·60	36·53	110·7	1·35	9·50
Dandelion	May 22	June 6	21	69·09	44·33	175·2	1·41	37·50
Fruit bloom	May 19	June 8	20	66·35	43·95	140·7	1·91	30·25
Clovers	June 16	Aug. 1	46	77·86	52·52	384·4	4·75	189·25
Golden-rod	July 28	Sept. 19	53	73·92	50·43	330·4	6·35	−10·50

N.B.—(−) minus sign denotes loss.

HOURLY GAINS AND LOSSES

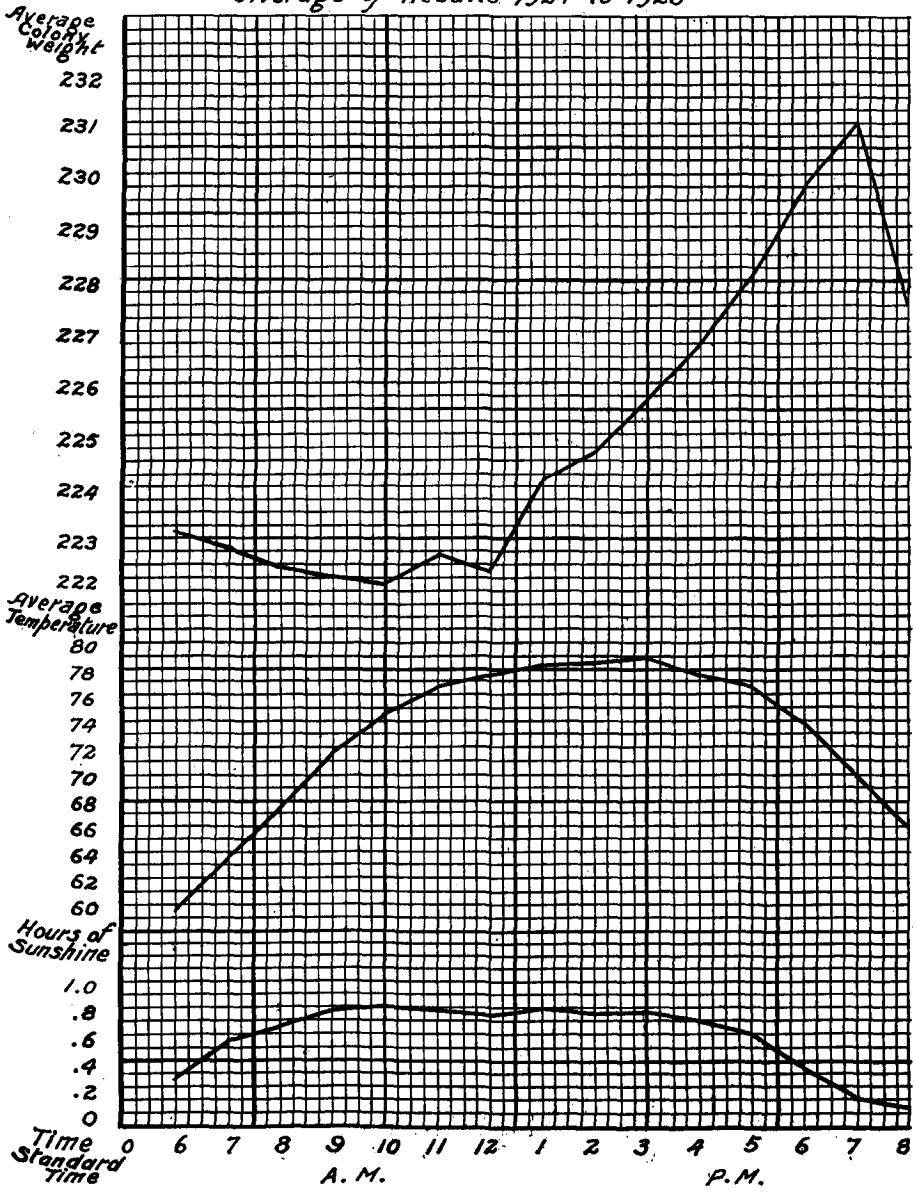
The variation in the average weight of a colony for four years will be noted in the following graph. This colony was weighed every hour for ten days each year, during the heaviest honey flow, and records taken as well of the daily activities of the bees during this period.

The most important fact shown in this graph is the decline in the increase in weight of a colony during the middle of the day, which is probably due to the high temperature and the low relative humidity which has a tendency to dry the secretion of the nectar available for the bees, together with the flight of the young bees and drones which occurs at about the same period. The temperature plays an important part in the secretion of nectar, the bees being generally more active and the gain in weight the heaviest towards the end of the day. From twelve to seven o'clock in the afternoon there is a gradual increase in the weight of the colony, as will be seen from the foregoing graph, when at that time it drops off very noticeably.

COMPARISON OF TYPES OF HIVES

A comparison was made between eight, ten and twelve-frame Langstroth hives and a ten-frame Jumbo hive. All the colonies were in good condition at the beginning of the honey flow, but unfortunately the colony in the ten-frame Jumbo hive swarmed on the first day of July, and later became queenless, therefore, could hardly be compared with the other types of hives, as to crop. The swarm did not produce any surplus, and had to be fed 16 pounds of honey.

Hourly Gain or loss in Weight of Colony in Relation to Sunshine and Temperature.
Average of Results 1924 to 1928



which, if deducted from the crop of the parent colony, which is 41·50 pounds of honey, leaves a net gain for the swarm of 15·50 pounds of honey. Following is a statement of the results obtained in 1929, with four types of hives:—

COMPARISON OF TYPES OF HIVES, 1929

Type of hive	Number of colonies in experiment	Average number of combs covered by bees in spring	Average stimulative feeding given in spring	Average net production of honey
			lb.	lb.
8-frame Langstroth	2	6·50	.....	80·00
10-frame Langstroth	4	8·75	9·62	113·50
12-frame Langstroth	2	10·00	2·50	156·25
10-frame Jumbo	1	5·00	5·00	15·50

WINTERING

Nineteen colonies were wintered in 1928-29. Of these nine single colonies and one double colony were placed in the cellar, and eight were left outside in quadruplicate wintering cases. All colonies, except the double colony in the Jumbo hive, came through the winter in excellent condition, especially those that were wintered outside.

COMPARISON OF CELLAR VS. OUTDOOR WINTERING OF BEES

A comparison was made in wintering bees in cellar versus outside in collapsible four-colony wintering cases. Twelve colonies in ten-frame Langstroth hives were used for this experiment, and divided into three lots of four hives each.

Outline of Experiment

Lot 1. Wintering in cellar.

Lot 2. Wintering outside in a collapsible wintering case, packed with four inches of dry planer shavings, leaves or chaff.

Lot 3. Wintering outside, the same as lot 2, with the exception that there is added to each of the four hives a shallow super as a storage for stores, in order to give the colonies more room for brood.

Cellar vs. Outside Wintering, 1928–29

Kind of wintering	Kind of hives	Total number of hives in experiment	Food chamber	Average number of combs covered by bees at last examination in fall	Average number of combs covered by brood at last examination in fall	Stores fed during fall	Colnies that died during winter	Colonies that were queenless at first examination	Colonies that had to be united in spring	Total colonies left in experiment, spring count	Average number of combs covered by bees at first examination in spring	Average number of combs covered by brood at first examination in spring	Average stores left in spring	Average stores consumed during fall, winter and spring	Average stimulative feeding given in spring	Average net production of honey produced per colony and swarm	Total colonies increase
						lb.							lb.	lb.	lb.	lb.	
Cellar.....	10-fr...	4	.....	18	7·20	19·20	.....	.....	.....	4	7·80	4·80	5·80	33·95	8·15	109·5	0
Outdoor.....	10-fr...	4	.....	22·5	6·00	23·00	.....	.....	.....	4	9·50	4·50	11·25	32·25	3·12	155·87	0
Outdoor.....	10-fr...	4	S.S..	17·0	5·75	17·87	.....	.....	.....	4	11·75	5·62	11·25	38·37	.....	137·25	1

Five-year Average 1924 to 1929

Cellar.....	10-fr...	31	....	13·6	5·81	17·80	1	2	3	27	6·71	3·46	9·05	26·13	7·04	65·17	14 (1 lost).
Outdoor.....	10-fr...	17	.....	14·31	4·96	23·55	.....	1	1	16	6·48	3·48	15·70	27·82	3·35	81·56	3 (1 lost).
Outdoor.....	10-fr...	15	S.S...	16·2	5·75	14·10	.....	.....	1	14	10·55	4·65	17·11	34·78	1·25	90·03	3

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

It will be noted in the foregoing table that in 1929, lot 1, wintered in the cellar, consumed throughout the fall, winter and spring 33·95 pounds of stores and produced 109 pounds of honey per colony. Lot 2, wintered outside, consumed 32·25 pounds of stores and produced 155·87 pounds of honey. These figures might be misleading, but one of the colonies in lot 2, came through the winter exceedingly strong and produced the unusual amount of 255·5 pounds of honey, which brought the average of the four colonies quite high. Lot 3, wintered outside, with shallow supers, consumed 38·37 pounds of stores and produced 137·25 pounds of honey.

In the table giving the five-year average lot 1 consumed 26·13 pounds of stores and produced 65·17 pounds of honey. Lot 2 consumed 27·82 pounds of stores and produced 81·56 pounds of honey and lot 3 consumed 34·78 pounds of stores and produced 90·03 pounds of honey. This shows quite conclusively that lot 3, wintered outside in a wintering case, with shallow supers, has the preference over lot 2, wintered outside without shallow supers, and that lot 2 has the preference over lot 1, wintered in the cellar.

It is well at this point to draw attention to the description of the cellar which is used at this Station for wintering bees. It is not considered a practical storage place for bees, as it is an excavation in one end of the implement shed, the walls and floor are of cement, and it is without any heat whatever, with the exception of a small Quebec heater that is used in the cellar during the coldest weather. There is more or less of a variation in temperature which causes uneasiness in the bees. An ideal cellar for wintering bees should be moderately dry, well ventilated and have a uniform temperature of around 45° F.

FALL FEEDING

Th colonies did not require as much feeding as usual in the fall of 1929, to bring them up to the standard weight for wintering, as the hives contained a good supply of clover honey. An average of 18·5 pounds of sugar was fed to the eight-frame Langstroth hive, 10·71 pounds to the ten-frame, 11·25 pounds to the twelve-frame, and 10 pounds to the ten-frame Jumbo. The feeding began on the 9th of October and ended on the 19th. Following is a statement showing the average amount of sugar fed to colonies in each type of hive for the past five years:—

FALL FEEDING, AVERAGE OF RESULTS, 1925 TO 1929

Type of hive	Total number colonies in experiment	Average number combs covered by ball of bees before feeding	Average weight of colonies before feeding	Average pounds sugar fed per colony	Average pounds honey fed per colony	Average weight of colony after feeding	Average number combs covered by bees after feeding	Average net gain during feeding	Average weight of colony when in cellar
				lb.	lb.	lb.		lb.	lb.
8-frame Langstroth.....	10	6·87	39·37	16·95	1·57	55·80	7·10	16·42	51·92
10-frame Langstroth.....	31	8·38	48·75	13·97	2·12	62·73	7·71	13·97	58·24
12-frame Langstroth.....	10	9·00	55·02	13·32	3·12	68·40	9·00	13·37	64·42
10-frame Jumbo.....	9	7·62	59·57	15·85	1·40	77·22	7·30	17·65	74·25

YIELD AND INCREASE

The eighteen colonies made a total net production of 2,208·5 pounds of honey, or an average of 122·69 pounds of honey per colony. The apiary was increased to twenty-one colonies, which were all in good condition at the last examination in the fall.

GENERAL NOTES

NEW BUILDINGS.—The only new building erected at this Station in 1929 was a Lord and Burnham steel frame greenhouse, 16 by 25 feet, on a cement foundation. The greenhouse is connected to the horticultural building by a building 12 by 16 feet, with glass sides, which will be used as a potting room and a place for starting seeds. This connecting building has a fire-proof cellar, which is all of cement and iron, and in this cellar is the boiler for the heating system of the greenhouse.

Shingling, painting and other necessary repairs were made on various buildings on the farm.

FENCES.—There were 100 rods of new wire fencing erected, of the nine-wire, forty-eight-inch Frost and Wood make, attached to good clear cedar posts one rod apart, which was finished and painted. A considerable amount of permanent fence was also repainted.

ROADS.—A certain amount of gravel is drawn in winter and piled to repair the farm roads in summer. The Provincial Department of Highways surfaced one and one-half miles of the Quebec Provincial highway leading from Lennoxville through the farm to Quebec, with crushed rock and asphalt, which is very much appreciated, especially in relieving the dust nuisance in summer and the mud in spring and fall.

EXCURSIONS.—The St. Francis District Holstein Club held their annual Field Day at the Station on June 25, with a good attendance. There was an auction sale of calves donated by the breeders. A certain per cent of the sale was contributed to the club for extension work.

The Provincial Jersey Cattle Club held their June Jersey Jubilee at the Station on June 27, for the fourth time. There were breeders and others present from various parts of the Eastern Townships. Seven calves were sold by auction and one raffled. These calves were contributed outright to the club by the breeders, and the proceeds were a great addition to the Club finances.

The Sherbrooke Rotary Club, consisting of sixty members, as well as some of the farmers of the district, were guests of the Station on the evening of July 16. Lunch was served on the lawn, after which the gathering was addressed by Mr. F. C. Nunnick, Chief of the Extension and Publicity Division of the Central Experimental Farm, Ottawa. A visit was then made to the barns and grounds, which was a surprise to a number of the business men who had never visited the Station to see the different lines of work that are being carried on.

The fifteenth annual Field Day was held on August 8, and was attended by one of the largest gatherings ever held at the Station. It was estimated that 1,500 people were present. Various addresses were given on agricultural topics, in both French and English, and a judging competition was conducted in live stock for the boys. The work in the various divisions was inspected by the visitors in company with the staff in charge of the work in each division.

On August 27, the meeting of the Quebec Pomological Society paid a visit to the experiments in the commercial orchards being conducted in co-operation with Mr. A. W. Buzzell, at Abbotsford, P.Q. About 250 were present and were addressed by Mr. F. S. Browne, of the Lennoxville Experimental Station, who has had charge of these experiments, and by Prof. J. H. Lavoie, Chief of the Horticultural Service, of the province of Quebec.

EXHIBITIONS.—The Station had an educational exhibit at the Sherbrooke Poultry Show in January, also at the Floricultural Show, at Lennoxville, in August, and at the Cookshire Fair.

The centre space in the industrial building at Sherbrooke, which has been occupied by the Experimental Station exhibit for a number of years, was rearranged this year and a different colour scheme used, which added much to the attractiveness of the exhibit. This work was done by the Extension and Publicity Division from Ottawa.

The Station was also represented with their exhibit at the Scotstown Fair.

The staff from the Station acted as judges at different fall fairs throughout the townships, and also assisted at various meetings in the district.

Various articles on agriculture were written by the staff for the press during the year.

The Experimental Station appreciates most fully what the local presss has done in keping the work and activities of the Station before the public.

The Experimental Station also esteems very highly the interest taken in the farm by the business and professional men of Lennoxville, Sherbrooke and other towns of the Eastern Townships.

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