DOMINION OF CANADA

DEPARTMENT OF AGRICULTURE

DOMINION EXPERIMENTAL FARMS

EXPERIMENTAL STATION

LENNOXVILLE, QUE.

REPORT OF THE SUPERINTENDENT

J. A. McCLARY

FOR THE YEAR 1930

Partial view of the ornamental grounds.

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DOMINION EXPERIMENTAL STATION, LENNOXVILLE, QUE.

REPORT OF THE SUPERINTENDENT, J. A. McCLARY

THE SEASON

While several extremes in monthly meteorological records have been noted, the records for the year, although ranging in some cases above, and in others below average, have shown no great extremes for any particular set of data. The precipitation for the first six months of the year was considerably above the average. During the last six months, however, it was exceedingly low. In fact, there has only been on one or two occasions a lower rainfall for a six-months period in this district than that experienced from July to December in 1930. The total precipitation for the year was 35·90 inches, as compared with the sixteen-year average of 38·12. The total rainfall was 28·88 inches, which was 1·59 inches below average. The snowfall only totalled 80·20 inches, while the average for sixteen years is 85·39 inches.

The mean temperature for the year was slightly higher than the average. Only four months in the year showed an average temperature lower than the sixteen-year average. The highest temperature recorded during the year was 89 on June 6, and the lowest —32° on February 7.

The sunshine recorded for the year was considerably higher than the sixteen-year average of 1,713·7 hours. The 1930 record was 1,828·7 hours, 97 hours more than the average.

The ice left the St. Francis river on April 10, which was somewhat later than usual. Wagons were first used on April 1, and the first seeding was started on April 30. Hay was harvested under ideal conditions and, due to the fairly wet weather during the growing season, the crop was better than average. The dry weather did not set in early enough to affect the growth of grain very materially, and average yields were obtained with ideal weather during the harvest. Grain harvest was completed on September 2, and all the crops, including corn, potatoes, and roots, were in the barns in excellent condition by October 17, and the freeze-up occurred on November 27, before which all the fall work was completed. The river froze over December 16. The following table gives a summary of records for the year with the sixteen-year average:—

METEOROLOGICAL RECORDS AT LENNOXVILLE, P.Q., 1930

Month	Temperature °F						Precipitation				Sunshine	
	Mean		Maximum		Minimum		Rain	Snow	Total precipitation			
	1930	Average 16 years	Highest	Mean maximum	Lowest	Mean minimum			1930	Average 16 years	1930	Average 16 years
							in.	in.	in.	in.	hours	hours
January	14·03	11·86	49	24·90	−30	3·16	3·07	20·5	5·12	3·18	76·7	77·6
February	14·67	13·01	53	27·07	−32	2·28	0·63	12·0	1·83	1·93	127·5	96·5
March	25·13	25·37	52	34·32	−18	15·93	1·68	23·0	3·98	2·78	128·5	141·4
April	38·44	39·44	70	50·66	13	26·23	0·94	6·2	1·56	2·58	178·6	159·4
May	53·01	50·50	83	64·61	28	41·42	6·22	.....	6·22	2·84	179·9	195·8
June	66·85	60·34	89	77·80	33	55·90	4·08	.....	4·08	3·25	219·8	205·3
July	65·14	65·76	87	77·22	42	53·06	3·52	.....	3·52	3·82	249·7	235·6
August	62·42	63·44	85	74·97	39	49·87	2·16	.....	2·16	3·99	239·5	215·5
September	58·42	55·64	86	69·27	32	47·57	1·78	.....	1·78	3·77	152·4	158·8
October	45·85	45·07	82	58·19	21	33·51	1·40	Flurries	1·40	4·04	151·6	124·8
November	36·91	32·66	60	45·33	3	28·50	2·22	3·50	2·57	3·29	80·8	69·4
December	21·71	18·12	44	29·74	−13	13·68	0·18	15·00	1·68	2·65	43·7	51·6
Total or average	41·88	40·93	89	52·84	−32	30·93	28·88	80·20	35·90	38·12	1,828·7	1,731·7

In order to arrive at some conclusions as to the occurrence of frost in this district, a table of records has been compiled, presenting certain data in connection with the phenomenon. In these data, frost is represented by a temperature of 32° F., which may or may not be sufficient frost to injure crops. Some figure must be used, however, as a basis of comparison and 32° F. has been chosen as this figure:—

First and Last Frosts and Frost Free Period

Year	Last freezing temperature in spring		First freezing temperature in fall		Frost free period	Date of freeze-up
	Minimum temperature	Date	Minimum temperature	Date	Days	Date
1915	31	June 3	31	Aug. 27	84	Nov. 15
1916	29	May 15	32	Sept. 4	112	Nov. 11
1917	27	May 28	32	Sept. 8	102	Nov. 9
1918	31	June 21	30	Aug. 18	57	Nov. 27
1919	30	June 29	30	Sept. 5	67	Nov. 25
1920	30	May 17	32	Sept. 19	124	Nov. 19
1921	31	June 16	31	Aug. 16	61	Nov. 21
1922	29	May 28	32	Sept. 8	103	Nov. 5
1923	31	June 16	31	Aug. 16	61	Nov. 23
1924	31	June 2	32	Sept. 4	94	Nov. 24
1925	32	May 29	30	Sept. 9	103	Nov. 24
1926	32	June 6	31	Sept. 3	88	Nov. 20
1927	31	June 4	32	Sept. 9	97	Nov. 12
1928	29	May 17	30	Sept. 10	115	Nov. 16
1929	29	May 23	29	Sept. 19	118	Nov. 15
1930	30	May 19	32	Sept. 11	115	Nov. 27
Average 16 years	30·2	June 1	31·1	Sept. 4	93·8	Nov. 18

It will be noticed from this table that the average frost-free period is 93·8 days. This represents the average for sixteen years. The longest free period was 124 days in 1930 and the shortest 57 days in 1918. The average date of the last freezing temperature in spring is June 1, while the average of the first freezing temperature in fall is September 4. July is the only month in which frost has not occurred in the sixteen-year period.

ANIMAL HUSBANDRY

BEEF CATTLE

WINTER FEEDING OF BEEF CATTLE

As it has been customary, since the Experimental Station at Lennoxville was established sixteen years ago, to purchase a certain number of stockers locally in the district for feeding and experimental purposes, ninety-two steers, averaging 924 pounds each, were purchased in the fall of 1929.

As this section of the Eastern Townships is practically the only one in the province of Quebec in which beef raising is carried on, and it is so well adapted for this line of work, with its rolling green pastures, fertile meadows, and excellent running spring water, which make ideal conditions for beef raising, it is considered the duty of this Station to carry on certain experimental work in feeding beef cattle.

Following is a list of the experiments conducted and the results obtained in this year's experimental work in steer feeding:—

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

VALUATION PLACED ON FEEDS

Barley	$ 36 00 per ton
Wheat	37 00 "
Oil cake	55 00 "
Meal mixture	38 00 "
Hay	8 00 "
Ensilage	3 00 "
Pasture per head per day	0 03½

The following table gives the meal increases per month for each experiment with the exception of experiment No. 2, where lot 1 received a uniform amount of meal throughout the feeding period:—

January	31 days	3 pounds per day	93 pounds
February	28 days	4 " "	112 "
March	31 days	5 " "	155 "
April	30 days	6½ " "	195 "
May	22 days	7 " "	154 "
	142 days		709 pounds of meal mixture fed per steer.

FINISHING STEERS IN BARN VS. BARN, PASTURE AND BARN

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-four steers each were used for this experiment. They were tied in the barn November 13, and lot 1 was fed 10 pounds of hay and 30 pounds of oats, peas and vetch ensilage per head per day throughout the feeding period. Grain feeding, with this lot, was commenced on January 1, when they were started on 3 pounds of meal mixture per steer per day, which was gradually increased, as per schedule given above, until they were getting 7 pounds on May 1, and this amount was fed until they were sold on May 23. The meal mixture consisted of 58 per cent of barley, 33 per cent of wheat and 9 per cent of oil cake. Lot 2 received 12 pounds of hay and 30 pounds of ensilage per steer per day for the first period and no meal. They were turned to pasture on May 23. This lot was tied in the barn in the fall, on October 21, and fed 80 days, before being shipped to Montreal on January 10.

They were fed 12 pounds of hay, 30 pounds of ensilage and 4¾ pounds of meal mixture per steer per day during this period. The meal mixture was made up of 46 per cent of barley, 22 per cent of bran, 22 per cent of screenings and 10 per cent of oil cake. Following is a statement showing the gains made and the feed consumption of the two lots:—

FINISHING STEERS IN BARN VS. BARN, PASTURE AND BARN

—		Lot 1 — Steers finished in barn and sold May 23	Lot 2 — Steers turned to pasture and finished in barn
November 13 to May 23			
Number of steers in each lot	No.	24	24
Number of days on test	days	190	190
Total initial weight	lb.	21,555	21,255
Average initial weight	"	898·12	885·62
Total finished weight	"	27,919	24,065
Average finished weight	"	1,163·29	1,002·71
Total gain per lot	"	6,364	2,810
Average gain per steer	"	265·17	117·08
Average daily gain per steer	"	1·40	0·62
Total meal consumed	"	17,016	.....
Total hay consumed	"	45,600	54,720
Total ensilage consumed	"	136,800	136,800
Meal eaten per pound gain	"	2·67	.....
Hay eaten per pound gain	"	7·17	19·47
Ensilage eaten per pound gain	"	21·50	48·68
Total cost of feed	$	710 90	424 08
Cost of feed per head	$	29 62	17 67
Cost of feed per head per day	cts.	15·59	9·30
Cost of feed per pound gain	"	11·17	15·09
Pasture—May 23 to October 30			
Total weight, lot 2, May 23	lb.	.....	24,065
Total weight, lot 2, October 20	"	.....	29,500
Total gain per lot	"	.....	5,435
Average gain per steer	"	.....	226·46
Average daily gain per steer	"	.....	1·51
Total cost of pasture 150 days	$	.....	126 00
Cost of pasture per steer	$	.....	5 25
Cost of pasture per pound gain	cts.	.....	2·32
Barn—Oct. 21, 1930 to Jan. 10, 1931			
Total weight, lot 2, Oct. 21	lb.	.....	29,500
Total weight, lot 2, Jan. 10, 80 days	"	.....	32,730
Total gain per lot	"	.....	3,230
Average gain per steer	"	.....	135
Average daily gain per steer	"	.....	1·69
Total meal consumed	"	.....	9,120
Total hay consumed	"	.....	23,040
Total ensilage consumed	"	.....	77,600
Meal eaten per pound gain	"	.....	2·82
Hay eaten per pound gain	"	.....	7·13
Ensilage eaten per pound gain	"	.....	24·02
Total cost of feed	$	.....	317 09
Cost of feed per head	$	.....	13 21
Cost of feed per head per day	cts.	.....	16·51
Cost of feed per pound gain	"	.....	9·82
Cost of feed per pound gain, total period	"	11·17	7·56

VALUATION OF FEED OCTOBER 21, 1930 TO JANUARY 10, 1931

Bran	$ 23 00 per ton
Barley	22 00 "
Screenings	21 00 "
Oil cake	38 00 "
Meal mixture	23 80 "
Hay	8 00 "
Ensilage	3 00 "

DEDUCTION.—On account of the poor market in October for beef cattle, the twenty-four head that had been at pasture were tied in the barn October 21, and fed for 80 days. The table shows that it cost 9·82 cents to make a pound of gain for the 80 days of the last period, and 7·56 cents per pound gain from the time these steers were purchased in November, 1929, to January 10, 1931. It will be noted that it cost 11·17 cents to produce a pound of gain with the lot of steers that were finished on May 23, making a difference of 3·61 cents per pound gain in favour of the lot that were turned to pasture and then finished in the barn. This table shows very conclusively that there is no way that gains on steers can be produced as cheaply as at pasture, when it contains the right quality of grass, and plenty of good water and shade.

UNIFORM VS. GRADUALLY INCREASED FEEDING OF MEAL TO FATTENING STEERS

OBJECT OF EXPERIMENT.—To determine which of the two methods of feeding meal to steers is the most practical and profitable.

PLAN OF EXPERIMENT.—Twelve steers were divided, as uniformly as possible, into two lots of six steers each. They were fed 10 pounds of hay and 30 pounds of oats, peas and vetch ensilage per head per day throughout the experiment. Grain-feeding was commenced with both groups on January 1, lot 1 was fed 5 pounds of meal mixture per steer per day from January 1 to May 23, and lot 2 was started on 3 pounds per steer per day, which was increased 1 pound the first of each month for three months, 1½ pounds on April 1 and one-half pound May 1, so that they were getting 7 pounds of meal mixture per steer per day at the finish of the experiment. The meal mixture consisted of 58 per cent of barley, 33 per cent of wheat and 9 per cent of oil cake. Following is a statement of the results obtained:—

UNIFORM VS. GRADUALLY INCREASED FEEDING OF MEAL TO FATTENING STEERS

—		Lot 1	Lot 2
		Meal mixture 5 pounds per day throughout feeding period	Meal mixture 3 pounds per day and gradually increased to 7 pounds
Number of steers in each lot	No.	6	6
Total initial weight	lb.	6,285	6,132
Average initial weight	"	1,047·50	1,022
Total finished weight	"	7,910	7,895
Average finished weight	"	1,318·33	1,315·83
Number of days on test	days	190	190
Total gain per lot	lb.	1,625	1,763
Average gain per steer	"	270·83	293·83
Average daily gain per steer	"	1·43	1·55
Total meal consumed	"	4,260	4,254
Total hay consumed	"	11,400	11,400
Total ensilage consumed	"	34,200	34,200
Meal eaten per pound gain	"	2·62	2 41
Hay eaten per pound gain	"	7·02	6·47
Ensilage eaten per pound gain	"	21·05	19·40
Total cost of feed	$	177 84	177 73
Cost of feed per head	$	29 64	29 62
Cost of feed per head per day	cts.	15·60	15·59
Cost of feed per pound gain	"	10·94	10·08
Average cost of feed per pound gain for five years	"	10·29	10·42

DEDUCTIONS.—In this experiment the lot fed 5 pounds of meal per steer per day from January 1 to May 23, made an average daily gain of 1·43 pounds per day, at a cost of 10·94 cents per pound gain. Whereas the lot that was

started on 3 pounds of meal per steer per day and gradually increased to 7 pounds, made an average daily gain of 1·55 pounds per day, at a cost of 10·08 cents per pound gain. When averaged over the five-year period the lot fed 5 pounds of meal mixture per steer per day cost 10·29 cents per pound gain, compared with 10·42 cents for the lot which received a gradually increased meal ration, which shows a very slight advantage in favour of uniform grain feeding.

BARLEY MEAL VS. MEAL MIXTURE

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

PLAN OF EXPERIMENT.—Twelve steers were divided into two lots and tied in the barn on November 13. They were fed 10 pounds of hay and 30 pounds of oats, peas and vetch ensilage per head per day during the experiment. 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 day of each month for the first three months, 1½ pounds the first of April and one-half pound the first of May, so that they were getting 7 pounds in May until the 23rd, when they were sold. The meal mixture was made up of 58 per cent of barley, 33 per cent of wheat and 9 per cent of oil cake. Following is a statement of the results obtained with each lot in 1930, and the average cost of feed per pound gain for three years:—

BARLEY MEAL VS. MEAL MIXTURE

		Lot 1	Lot 2
		Barley meal	Meal mixture
Number of steers in each lot	No.	6	6
Number of days on test	days	190	190
Total initial weight	lb.	5,795	5,800
Average initial weight	"	965·83	966·67
Total finished weight	"	7,190	7,490
Average finished weight	"	1,198·33	1,248·33
Total gain per lot	"	1,395	1,690
Average gain per steer	"	232·50	281·67
Average daily gain per steer	"	1·22	1·48
Total meal consumed	"	4,254	4,254
Total hay consumed	"	11,400	11,400
Total ensilage consumed	"	34,200	34,200
Meal eaten per pound gain	"	3·05	2·52
Hay eaten per pound gain	"	8·17	6·75
Ensilage eaten per pound gain	"	24·52	20·24
Total cost of feed	$	173 47	177 73
Cost of feed per head	$	28 91	29 62
Cost of feed per head per day	cts.	15·22	15·59
Cost of feed per pound gain	"	12·44	10·52
Average cost of feed per pound gain for three years	"	13·15	12·14

DEDUCTIONS.—The results obtained in this experiment show that the lot fed the meal mixture cost 1·92 cents less per pound gain than the lot fed barley meal, and for the three-year average there is a difference of 1·01 cents per pound gain in favour of the meal mixture.

DUAL-PURPOSE SHORTHORNS

This herd is headed by the outstanding two-year-old bull "Neralcam Emperor" —191349—, which was bred by Alexander Maclaren, of Buckingham, P.Q., and whose sire was the Grand Champion bull "Fairy Duke" —169764—. His dam, "Valentine Empress," is a large, strong, low-built cow

of the beef type, with an R.O.P. record of 12,057 pounds of milk testing 4·04 per cent fat. The calves from this young bull are showing great promise.

The herd numbered thirty-one head on December 31, 1930, made up as follows: one two-year-old herd sire, fourteen cows, four two-year-old heifers, three yearling heifers, six heifer calves, and three bull calves.

There is a very keen demand for good dual-purpose Shorthorns, with R.O.P. records, in the Eastern Townships, as well as from other parts of Canada and the New England States. The Eastern Townships is the beef district of Quebec.

The average milk production of the Shorthorn herd, pounds of butter-fat and cost to produce 100 pounds of milk 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 are the only breed of dairy cattle kept at this Station. The herd at the end of the year 1930 consisted of forty-four head as follows: one herd bull, twenty-one cows, four two-year-old heifers, five yearlings, eight heifer calves, one two-year-old bull, one yearling bull and two bull calves.

Brampton Poppy's Observer—45654 (Imp.) Head of the Jersey herd on the Lennoxville Station.

The herd sire is the imported bull "Brampton Poppy's Observer" (imp.) —45654—. This bull is developing into a very promising individual, and his first lot of calves are showing much promise. The heifer calves are retained in the herd for breeders, and the promising bull calves are kept until six months of age, when they are offered to farmers, at reasonable prices, for breeding purposes.

CONTAGIOUS ABORTION

The same policy that was inaugurated with the co-operation of the Health of Animals Branch in 1928 of the segregation and isolation of all animals in the Shorthorn and Jersey herds that react to the blood tests for abortion is still being kept up. All the reactors to this test are isolated and kept at what is called the Ward barn, with a special attendant to look after them. All calves are taken away from their dams as soon as they are dropped and removed to isolated quarters away from both herds. They are disinfected and fed milk from the negative herd. These calves are blood tested at four months and again at six months of age, and if they are negative after these two tests they are added to the negative herd.

It is gratifying to be able to say that there is very little trouble now with abortion in the positive herd, as all calves that have come from the reacting herd are passing their two tests clean, and the main herd is increasing fast, with a good percentage of heifer calves.

There has been very little experimental work carried on with the Shorthorn and Jersey herds since the segregation of the herds under the Health of Animals Branch's policy for the control of abortion. As the largest percentage of the aged cows of both Jerseys and Shorthorns are in the positive barn, and as the calves from the reacting herd have to be reared separately under different conditions, it is practically impossible to carry on any constructive experimental work with these herds at present.

MILK RECORDS

The following table gives the milk and fat production and feed consumption records for all cows and heifers that finished a lactation period in 1930. The profit column shows a comparison only between the cost of feed and the value of the 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:—

Individual Milk Records Completed During the Year 1930

Jerseys

Name of Cow	Age at beginning of lactation period	Date of dropping calf	Number of days in lactation period	Total pounds of milk for period	Daily average yield of milk	Average per cent fat in milk	Pounds of butter fat produced in period	Pounds of butter produced in period	Value of butter at 40 cts. per pound	Value of skim-milk and butter-milk at 25 cts. per cwt.	Total value of product	Amount of meal eaten at $1.50 per cwt.	Amount of roots, ensilage and green feed eaten 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.	$
Ellen King of Grayburn..	6- 11	Aug. 1-29	278	7,338·7	26·40	4·90	359·60	423·06	169·22	17·29	186·51	2,397	8,875	1,604	2·5	59 43	0 81	14·0	26·0	127 08
Lennoxville Corinne.....	4- 8	April 20-29	300	4,253·0	14·18	5·85	248·80	292·71	117·08	9·90	126·98	1,689	7,815	1,528	4·5	49 91	1 17	17·1	22·9	77 07
Lennoxville Corinne 2nd..	4- 0	Sept. 29-29	336	8,742·6	22·65	6·63	579·63	681·92	272·77	20·15	292·92	2,630	8,114	2,032	6·0	68 75	0 79	10·1	29·9	224 17
Lennoxville Corinne 3rd..	3- 7	June 28-29	399	5,747·9	14·41	6·01	345·45	406·41	162·56	13·35	175·91	2,127	9,345	1,696	7·0	63 20	1 10	15·5	24·5	112 71
Lennoxville Lottie.....	3- 4	April 17-29	290	6,076·7	20·95	5·07	308·09	362·46	144·98	16·79	161·77	2,204	4,880	1,428	4·5	52 84	0 87	14·6	25·4	108 93
Lennoxville Roxanna.....	6- 8	Aug. 5-29	353	5,209·8	14·93	6·48	341·48	401·74	160·70	12·17	172·87	1,852	9,340	1,944	5·0	57 08	1 08	14·2	25·8	115 79
Maplehurst Fox Roxanna.	9- 9	June 18-29	469	4,838·4	10·32	5·41	261·76	307·95	123·18	11·33	134·51	2,219	10,150	2,353	9·0	71 41	1 48	23·2	16·8	63 10
Mascot Mary Belle.....	5- 11	Aug. 10-29	264	4,909·1	18·59	6·58	323·02	380·02	151·01	11·32	162·33	1,820	5,908	1,696	4·5	49 69	1 01	13·1	26·9	112 64
Ottawa Burma Lady 4th.	5- 8	June 30-29	228	5,086·2	22·31	4·98	253·29	297·99	119·20	11·97	131·17	1,723	6,228	1,306	4·5	47 15	0 93	15·8	24·2	84 02
Ottawa Gamboge Bangle.	3- 11	Oct. 30-29	376	9,016·5	23·98	5·58	503·12	591·91	236·76	21·06	257·82	2,486	8,818	2,112	6·0	67 97	0 75	11·5	28·5	189 85
Ottawa Gamboge Elsinore.....	3- 6	July 20-29	365	5,502·6	15·08	5·56	305·94	359·93	143·97	12·86	156·83	1,664	9,345	1,944	6·0	55 76	1 01	15·5	24·5	101 07
Ottawa Gamboge Lady 2nd.....	3- 3	April 16-29	308	3,625·3	11·77	6·14	222·59	261·87	104·75	8·41	113·16	1,494	7,188	1,248	4·5	44 93	1 24	17·2	22·8	68 23
Ottawa Gamboge Triumph.....	2- 3	May 2-29	527	5,420·5	10·29	6·00	325·23	382·62	153·05	12·59	165·64	1,983	10,375	2,154	9·5	68 17	1 26	17·8	22·2	97 47
Ottawa Jersey Maid.....	2- 4	Sept. 19-29	301	4,683·9	15·56	5·37	251·53	295·92	118·37	10·97	129·34	1,469	9,345	1,944	6·0	52 83	1 13	17·9	22·1	76 51
Sophie Magnet's Corinne.	9- 10	Dec. 30-29	336	9,356·8	27·85	6·01	562·34	661·58	264·63	21·74	286·37	2,344	8,535	2,024	6·0	65 06	0 70	09·8	30·2	221 31
Total for herd (15 cows)..	.....	.....	5,180	89,868·0	.....	.....	5,191·87	6,108·09	2,442·23	211·90	2,654·13	30,101	124,270	27,013	85·5	874 18	.....	.....	.....	1,779 95
Average for herd (15 cows).....	.....	.....	345	5,991·2	17·37	5·78	346·12	407·20	162·82	14·13	176·94	2,007	8,285	1,801	5·7	58 28	0 97	14·3	25·7	118 66

Shorthorns

Gem of Lennoxville 2nd..	6- 4	Mar. 21-29	313	3,693·6	11·80	4·11	151·81	178·60	71·44	8·79	80·23	1,335	8,635	2,444	4·5	49 50	1 34	27·7	12·3	30 73
Lady Hope 10th.....	10- 0	July 15-29	307	4,159·3	13·55	4·00	166·37	195·73	78·29	9·91	88·20	1,560	6,805	1,856	3·5	46 28	1 11	23·6	16·4	41 92
Lady Hope 13th.....	5- 8	June 6-29	280	7,578·4	27·07	4·22	319·81	376·25	150·50	18·01	168·51	2,655	9,560	1,936	5·0	60 40	0 92	18·4	21·6	99 11
Lennoxville Gem 4th.....	5- 0	April 2-29	318	5,913·5	18·60	4·29	253·69	298·46	119·38	14·04	133·42	2,335	10,035	2,236	4·5	65 76	1 11	22·0	18·0	67 66
Lennoxville Gem 5th.....	4- 7	June 8-29	418	7,725·1	18·48	4·21	325·27	382·67	153·07	18·36	171·43	2,972	10,785	2,424	7·5	81 71	1 06	21·4	18·6	89 72
Lennoxville Gem 6th.....	5- 4	July 30-29	243	3,265·0	13·44	4·65	151·82	178·61	71·44	7·72	79·16	1,153	7,820	1,208	2·5	37 60	1 15	21·1	18·9	41 56
Lennoxville Ruby.....	6- 9	Aug. 10-29	334	7,230·4	21·65	4·06	293·55	345·35	138·14	17·21	155·35	2,401	9,805	1,696	6·5	67 25	0 93	19·5	20·5	88 10
Lennoxville Ruby 2nd....	6- 2	Nov. 11-29	287	7,689·2	26·79	4·52	347·55	408·88	163·55	18·20	181·75	2,527	9,105	1,864	6·0	68 02	0 88	16·6	23·4	113 73
Lennoxville Ruby 3rd....	3- 10	June 4-29	405	9,201·6	22·72	3·89	357·94	421·11	168·44	21·95	190·39	3,092	11,245	2,424	6·5	82 70	0 90	19·6	20·4	107 69
Lennoxville Ruby 6th....	2- 5	Feb. 22-30	282	4,991·6	17·70	3·80	189·68	223·15	89·26	11·92	101·18	1,975	6,550	1,618	5·0	53 41	1 07	23·9	16·1	47 77
Total for herd (10 cows)..	.....	.....	3,187	61,447·7	.....	.....	2,557·49	3,008·81	1,203·51	146·11	1,349·62	22,005	90,345	19,706	51·5	621 63	.....	.....	.....	727 99
Average for herd (10 cows).....	.....	.....	319	6,144·8	19·26	4·16	255·75	300·88	120·35	14·61	134·96	2,200	9,034	1,971	5·1	62 16	101	20·7	19·3	72 80

HORSES

There are at present sixteen horses at this Station, comprising thirteen work-horses, one general-purpose horse, one two-year-old gelding, and the Clydesdale stallion "Sandy Mac." Only six of the thirteen work-horses are used during the winter. The idle horses are turned out in a yard every day for exercise, and they are fed a ration of hay, roots, and a small quantity of bran.

COST OF HORSE LABOUR

The following table gives the cost of feed and maintenance, also the cost per hour of horse labour performed at the Station in 1930, and shows how it was determined:—

Number of work horses	No.	14
Average value of each horse	$	150 00
Total work done during year by 14 horses	hrs.	19,670
Cost of feed for 14 horses—		
53,595 pounds oats at $2 per cwt	$	1,071 90
4,205 pounds bran at $1.80 per cwt	$	75 69
68,240 pounds hay at $8 per ton	$	272 96
3½ months pasture for 2 horses at $1.50 each per month	$	10 50
Total cost of feed for 14 horses for 12 months	$	1,431 05
Average cost of feed per horse for 12 months	$	102 22
Total cost of feed for 14 horses for 12 months	$	1,431 05
Labour (stable attendant) 2,358 hours at 30 cents	$	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.)	$	150 75
Total cost of 19,670 hours of horse labour	$	2,835 20
Cost per hour horse labour	cts.	14·41
Average cost per hour of horse labour for the past ten years	cts.	13·45

CLYDESDALE STALLION "SANDY MAC"

The imported Clydesdale stallion "Sandy Mac" (imp.) 24318 (20816) is still retained at this Station for breeding purposes. It is disappointing that the farmers of this district are not taking more advantage than they are of this privilege that is given them to improve the quality of the horses raised in the district.

SHEEP

A large percentage of the Oxford Down sheep at this Station are registered. The flock on December 31 consisted of nineteen registered ewes, ten registered shearlings, eighteen registered ewe lambs, sixteen grade ewes and ten grade lambs. The flock is headed by the imported Oxford Down ram "Smailholm Main Stamp 3" —41619— bred by R. H. Allan, Smailholm Mains, Kelso, Scotland. This ram is an individual of outstanding quality, good-sized, blocky and well-wooled, having a good fleece of extra quality. Much improvement is looked for in the flock by the use of this sire.

A number of ram lambs are sold annually for heading flocks in various parts of the province. The ewe lambs kept for breeders are not bred until they are eighteen months old, in order to have them properly developed. The flock is treated three or four times a year for internal parasites, with tablets prepared for this purpose, which are very easily given, and can be procured from the Canadian Co-operative Wool Growers at Lennoxville, with full directions. The shearing is done in April and the sheep and lambs are dipped before going to pasture, which keeps them free from ticks. The wool is graded and marketed through the Canadian Co-operative Wool Growers' organization.

The average weight per fleece was 7·19 pounds each, which is a gain of 1·17 pounds per fleece over last year, but the price per pound was only 13½ cents, being 9½ cents less than last year.

The percentage of lambs per ewe was small, as the twenty-six breeding ewes only raised twenty-eight lambs.

Oxford Down ram lambs.

The following table gives the cost of maintaining a flock of Oxford Down ewes and the revenue derived:—

FINANCIAL STATEMENT OF FLOCK OF REGISTERED OXFORD DOWN SHEEP

Debit

Number of breeding ewes January 1, 1930	No.	26	
Cost of feed—			
8,856 pounds of hay at $8 per ton	$	35 42	
8,856 pounds of ensilage at $3 per ton	$	13 28	
5,233 pounds of meal at $41.75 per ton	$	109 24	
5½ months pasture at 20 cents per head per month	$	26 75	
Total cost of maintaining 26 breeding ewes for one year	$		184 69
Value of 26 breeding ewes Jan. 1, 1930, at $15 each	$		390 00
Interest on investment, 6 per cent of $390	$		23 40
Service fees for ram at 50 cents each	$		13 00
Total cost of maintaining 26 breeding ewes for one year	$		611 09
Number of 1929 ewe lambs kept for breeding purposes	No.	11	
Cost of feed—			
3,958 pounds of hay at $8 per ton	$	15 83	
2,528 pounds of ensilage at $4 per ton	$	3 79	
1,253 pounds of meal at $41.75 per ton	$	26 16	
5½ months pasture at 20 cents per head per month	$	12 10	
Total cost of feed for 11 ewe lambs	$		57 88
Value of 11 shearling ewes Jan. 1, 1930 at $10 each	$		110 00
Interest on investment, 6 per cent of $110	$		6 60
Total cost of maintaining 11 shearling ewes for one year	$		174 48
Number of lambs raised from 26 breeding ewes	No.	28	
Cost of feed—			
2,196 pounds of hay at $8 per ton	$	8 78	
1,098 pounds of ensilage at $3 per ton	$	1 65	
990 pounds of meal at $41.75 per ton	$	20 67	
3 months pasture at 20 cents per head per month	$	16 80	
Total cost of maintaining 28 lambs	$		47 90
Total cost of maintaining flock for one year	$		833 47

NOTE.—Three ewes died, one on February 4, one on August 23 and one on September 15. The feed from date of death of ewes that died has since been deducted from total feed of lots, and also for those that were sold for mutton on November 1.

Credit

Sale of 4 ewes for mutton at $5 each, Nov. 1	$	20 00	
Sale of 1 shearling ewe at $5, Nov. 1	$	5 00	
Sale of 9 ram lambs at $20 each, Nov. 1	$	180 00	
Sale of 1 ram lamb at $15 each, Nov. 1	$	15 00	
Value of breeding stock sold	$		220 00
Value of 18 ewe lambs kept for breeding at $10 each	$		180 00
Value of 19 breeding ewes at $15 each	$		285 00
Value of 10 shearling ewes at $12	$		120 00
Value of wool, 36 fleeces, average weight 7·19 pounds = 259 pounds at 13½ cents per pound	$		34 96
Value of sales and of flock, December 31, 1930	$		839 96
Total cost of maintaining flock for one year	$		833 47
Profit on flock for one year	$		6 49

SWINE

The Yorkshire is the only breed of pigs kept at this Station, which is the popular breed in this district. The herd consists of one boar, five brood sows and forty-five feeders. Sixteen registered pigs were sold during the year for breeding purposes. Four old sows were disposed of for pork and five young sows, from the boar "Earincliffe Masterpiece 5128"—134950—were kept for brood sows.

Two litters of pigs are raised from each sow per year. They are bred to farrow the first litter about the middle of March and the second litter the middle of August. All sows are wintered in small movable cabins placed in such a way that the sows have to travel the length of the yard to get their feed, which gives them exercise and keeps them healthy. In summer the sows run in paddocks in which they get a certain amount of green feed.

FARROWING RECORDS

The farrowing records for the past year were upset on account of the disposal of the old sows and the keeping of five young ones from the litters farrowed in August, 1929. Three of the old sows were sold after weaning their spring litters and the fourth one after weaning her fall litter. The five young sows farrowed their first litters in August, and all are being retained as breeders. The average number of pigs raised from the spring litters was 6·50 per sow, and from the fall litters 8·33. The following table gives the number of pigs farrowed and raised during the year 1930:—

FARROWING RECORDS, 1930

Sow number	Farrowing date	Total number of pigs farrowed	Total number of pigs reared	Date weaned	Average weight when weaned
					lb.
465	March 8, 1930	8	8	May 1, 1930	28
521	March 8, 1930	15	10	May 1, 1930	28
539	March 11, 1930	3	3	May 1, 1930	24
86	March 8, 1930	5	5	May 1, 1930	40
K 113	August 10, 1930	7	7	Oct. 1, 1930	30
K 114	August 11, 1930	9	8	Oct. 1, 1930	35
K 116	August 10, 1930	13	13	Oct. 1, 1930	26
K 117	August 7, 1930	6	5	Oct. 1, 1930	34
K 119	August 13, 1930	8	8	Oct. 1, 1930	24
86	August 29, 1930	13	9	Oct. 1, 1930	16

Average number of pigs farrowed per spring litter	7·75
Average number of pigs reared per spring litter	6·50
Average number of pigs farrowed per fall litter	9·33
Average number of pigs reared per fall litter	8·33

COST OF RAISING PIGS TO WEANING AGE WITH SPRING AND FALL LITTERS

All litters, both spring and fall, are weaned when seven weeks old, which is usually the age that young pigs are sold for breeding purposes, and the right age to start feeding for bacon production. To determine the cost of raising young pigs to weaning age, from spring litters, the total feed the sow consumes from the weaning of the previous fall litter until the weaning of the spring litter, together with what feed the young pigs eat with their mother before weaning, is charged against the litter, as well as interest on investment of the value of the sow, service of boar and special labour at farrowing time. The following table gives the cost of raising spring pigs to weaning age:—

COST OF RAISING PIGS TO WEANING AGE—SPRING LITTERS

Number of sows	No.	4
Total number of pigs saved from 4 sows	No.	31
Average number of pigs saved per sow	No.	6·50
Cost of feed—		
5,120 pounds meal at $1.91 per cwt	$	97 79
938 pounds skim-milk at $0.25 per cwt	$	2 34
3,538 pounds roots at $3 per ton	$	5 31
Total cost of feed for sows and pigs to weaning age	$	105 44
Extra labour required at farrowing time, $2 per litter	$	8 00
Cost of service of boar at $1 per litter	$	4 00
Interest on investment, $40 per sow, 7 months, at 6 per cent	$	5 60
Cost to raise 31 pigs to weaning age	$	123 04
Cost to raise one pig to weaning age—spring litter	$	3 97

COST OF RAISING PIGS TO WEANING AGE—FALL LITTERS

Number of sows	No.	6
Total number of pigs saved from 6 sows	No.	50
Average number of pigs saved per sow	No.	8·33
Cost of feed—		
5,044 pounds meal at $1.98 per cwt	$	99 87
6,359 pounds skim-milk at $0.25 per cwt	$	15 90
146 pounds tankage at $3.25 per cwt	$	4 74
6 months pasture for 6 sows at $0.50 per sow per month	$	18 00
Total cost of feed for sows and pigs to weaning age	$	138 51
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 for 5 months at 6 per cent	$	6 00
Cost to raise 50 pigs to weaning age	$	162 51
Cost to raise one pig to weaning age—fall litter	$	3 25
Average cost to raise one pig to weaning age—spring and fall litters	$	3 61
Average cost to raise pigs to weaning age for the past ten years	$	3 25

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.

It may be noted that for 1930 it cost $3.97 to raise pigs from spring litters to weaning age, and $3.25 for fall litters, and the average cost of spring and fall litters was $3.61, while the ten-year average cost was $3.25.

One of the principal reasons that the litters in spring cost more than those in the fall is, that the sows are fed seven months for the spring litters and five months for the fall litters. Spring litters should not be farrowed until March and the sows are bred as soon as possible so as to have them farrow in August in order that the pigs may get well started before cold weather.

FEED COST OF RAISING REGISTERED BROOD SOWS TO BREEDING AGE

It may be of interest to have the cost of feed required to raise young registered sows to breeding age. The right age for breeding has been determined to be about eight and one-half months. A cost of $10 is placed on these pigs at weaning time which is a fair value for young registered sows at weaning age. The cost of feed has been figured from the time of weaning to breed-

ing age. This cost added to the value of pigs at weaning brings the average cost per sow to $32.37 at breeding age. The following table shows a statement of these costs:—

FEED COST OF RAISING REGISTERED BROOD SOWS TO BREEDING AGE

Number of sows	No.	5
Value of pigs at weaning age, at $10 each	$	50 00
Cost of feed—		
3,940 pounds of meal at $2.14 per cwt	$	84 32
9,407 pounds of milk at $0.25 per cwt	$	23 52
2,326 pounds of roots at $3 per ton	$	3 49
135 pounds of hay at $8 per ton	$	0 54
Total cost of 5 sows	$	161 87
Cost per sow	$	32 37

COST OF PORK PRODUCTION WITH SPRING LITTERS

OBJECT OF EXPERIMENT.—To ascertain the cost of gain during each month of the feeding period, as well as for the whole period, also to have a comparison of spring versus fall litters for pork production.

PLAN OF EXPERIMENT.—Fifteen pigs were used for this experiment, which were fifty days old when weaned. They weighed 28·40 pounds each at the commencement of the test. The feed consumed and gains made every thirty days are given in the following table:—

COST OF PORK PRODUCTION—RATIONS

Number of pigs	Days on test	Meal ration	lb.	Other feeds
15	143	*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 char	4½	
		Salt	2¼	
		60 days to finish—		
		Middlings	100	Green feed
		Ground oats	150	Skim-milk
		Ground barley	100	
		Shorts	50	
		Bran	25	
		Oil meal	14	
		Tankage	20	
		Bone char	4½	
		Salt	2¼	

VALUATION OF FEEDS

Meal mixture (first 60 days)	$ 2 09	per cwt.
Meal mixture (60 days to finish)	2 03	"
Green feed	0 15	"
Skim-milk	0 25	"

FEED COST OF PORK PRODUCTION—SPRING LITTERS

—		First 30 days from weaning	31 to 60 days	61 to 90 days	91 to 120 days	121 to 143 days	Total period
Number of pigs in experiment	No.	15	15	15	15	15	15
Initial weight, gross	lb.	426	814	1,401	2,006	2,634	426
Initial weight, average	"	28·40	54·27	93·40	133·73	175·60	28·40
Final weight, gross	"	814	1,401	2,006	2,634	3,034	3,034
Final weight, average	"	54·27	93·40	133·73	175·60	202·27	202·27
Number of days fed	days	30	30	30	30	23	143
Total gain for period	lb.	388	587	605	628	400	2,608
Average gain per hog	"	25·87	39·13	40·33	41·87	26·67	173·87
Average daily gain per hog	"	0·86	1·30	1·34	1·40	1·16	1·22
Meal consumed	"	620	1,062	1,910	2,600	2,095	8,287
Skim-milk consumed	"	2,194	3,375	2,569	3,199	1,200	2,537
Green feed consumed	"	232	900	879	.....	.....	2,011
Meal eaten per pound gain	"	1·60	1·81	3·16	4·14	5·24	3·18
Skim-milk eaten per pound gain	"	5·65	5·75	4·25	5·09	3·00	4·8
Green feed eaten per pound gain	"	0·60	1·53	1·45	.....	.....	0·77
Total cost of feed	$	18 79	31 99	47 47	62 08	46 58	206 91
Cost of feed per head	$	1 25	2 13	3 16	4 14	3 11	13 79
Cost of feed per head per day	cts.	4·17	7·10	10·53	13·80	13·52	9·64
Cost of feed per pound gain	"	4·84	5·45	7·85	9·89	11·64	7·93

STATEMENT OF RETURNS

Cost of 15 pigs at weaning at $3.97 per head	$ 59 55
Total cost of feed for 143 days	206 91
Cost of pigs when finished	266 46
Value of 3,034 pounds pork at $10.50 per cwt., Sept. 1930	318 57
Profit over cost of feed for 15 pigs	52 11
Average profit per pig	3 47

COST OF PORK PRODUCTION WITH FALL LITTERS

OBJECT OF EXPERIMENT.—To ascertain the cost per pound gain during each month of the feeding period, as well as for the whole period, also to have a comparison of spring versus fall litters for work production.

PLAN OF EXPERIMENT.—Eleven pigs were fed for this experiment which was conducted for 150 days. The following table gives the feed consumed and gains made every thirty days during the experiment:—

COST OF PORK PRODUCTION—RATIONS

Number of pigs	Days on test	Meal ration	lb.	Other feeds
11	150	*First 60 days*—		
		Ground oats	100	Roots
		Middlings	100	Turnips
		Shorts	50	Skim-milk
		Bran	25	Hay
		Ground barley	50	
		Oil meal	13	
		Tankage	13	
		Bone char	3	
		Salt	1½	
		60 days to finish—		
		Ground oats	100	Roots
		Middlings	50	Turnips
		Shorts	50	Skim-milk
		Bran	25	Hay
		Ground barley	100	
		Oil meal	13	
		Tankage	13	
		Bone char	3	
		Salt	1½	

VALUATION OF FEEDS

Meal mixture (first 60 days)	$ 2 09 per cwt.
Meal mixture (60 days to finish)	2 04 "
Roots	3 00 per ton
Skim-milk	0 25 per cwt.
Hay	8 00 per ton

FEED COST OF PORK PRODUCTION—FALL LITTERS

—		First 30 days from weaning	31 to 60 days	61 to 90 days	91 to 120 days	121 to 150 days	Total period
Number of pigs in experiment	No.	11	11	11	11	11	11
Initial weight, gross	lb.	392	795	1,210	1,700	2,081	392
Initial weight, average	"	35·64	72·27	110	154·55	189·18	35·64
Final weight, gross	"	795	1,210	1,700	2,081	2,425	2,425
Final weight, average	"	72·27	110	154·54	189·18	220·45	220·45
Number of days fed	days	30	30	30	30	30	150
Total gains for period	lb.	403	415	490	381	344	2,033
Average gain per hog	"	36·64	37·73	44·55	34·64	31·27	184·82
Average daily gain per hog	"	1·22	1·26	1·48	1·15	1·04	1·23
Meal consumed	"	577	1,012	1,586	1,711	1,540	6,426
Skim-milk consumed	"	2,266	2,200	1,891	1,364	891	8,612
Roots consumed	"	672	341	341	1,123	891	3,368
Hay consumed	"	.....	57	87	90	70	304
Meal eaten per pound gain	"	1·43	2·44	3·24	4·49	4·48	3·16
Skim-milk eaten per pound gain	"	5·62	5·30	3·86	3·58	2·59	4·24
Roots eaten per pound gain	"	1·67	0·82	0·70	2·95	2·59	1·66
Hay eaten per pound gain	"	.....	0·14	0·18	0·24	0·20	0·15
Total cost of feed	$	18 73	27 39	37 94	40 35	35 26	159 67
Cost of feed per head	$	1 73	2 49	3 45	3 67	3 21	14 52
Cost of feed per head per day	cts.	5·77	8·30	11·50	12·23	10·70	9·68
Cost of feed per pound gain	cts.	4·65	6·60	7·74	10·59	10·25	7·85

STATEMENT OF RETURNS

Cost of 11 pigs at weaning at $3.25 per head	$ 35 75
Total cost of feed for 150 days	159 67
Cost of pigs when finished	195 42
Value of 2,425 pounds of pork at $12.50 per cwt., March 1930	303 12
Profit over cost of feed for 11 pigs	107 70
Average profit per pig	9 79

DEDUCTIONS.—As may be noted in the above table the average gain for the first thirty days was 36·64 pounds at a cost of 4·65 cents per pound gain. In the last period the average gain was 31·27 pounds costing 10·25 cents per pound, or a cost of 7·85 cents per pound for the 150 days. It will be noted by the two foregoing tables, giving the results of feeding spring and fall litters for pork production, that the cost to produce a pound of pork is very nearly the same, the only difference being 0·08 of a cent in favour of the fall litters.

It will be noted in the returns of the above two experiments that the fall litters, that were farrowed in August, 1929, and finished and sold in March, 1930, made a profit of $9.79 per pig, and those that were farrowed in March, 1930, and sold in September, 1930, only made a profit of $3.47 each. There are two items that make the difference in this profit, namely, the young pigs at weaning of the fall litters cost 72 cents less each to start with, and the difference of two cents per pound in the selling price.

FIELD HUSBANDRY

At the present time, the work in field husbandry consists of some twenty-five main projects in each of which various problems are dealt with from different angles and in as thorough a manner as possible. Since 1922, a rather extensive lay-out of rotation experiments has been in operation and is now giving average results, which are of a fairly reliable nature, where recommendations for suitable rotations to fill the varying needs of different types of farming are under consideration. For nine years cost of production studies have been carried on from which a fund of information has been collected as to the cost per acre of producing the various crops grown in the district as well as many other economic questions in regard to crop production incidental to such an investigation. Cultural and fertilizer experiments have been in operation for a period of eight years, in which many lines of investigation have been followed. In preparing sod land for corn, results of experiments tend to favour spring ploughing for the corn crop. Ploughing land four inches deep has given as good or better results with corn, oats, clover and timothy than has ploughing seven inches deep. In an experiment as to dates of seeding grass seed, it has been demonstrated that seeding the crop later than August does not tend to insure a crop of hay for the following year. In preparing sod land for grain it has been found that various treatments such as spring and fall ploughing, summer ploughing and top working, and ploughing, top working and ribbing, do not show any decided increase in yield from any one treatment. It is true, however, that summer ploughing and top working serves as a very efficient method of weed eradication, especially in the case of couch grass. Applications of ground limestone have resulted in decided increases in crop yields. Applications of nitrate of soda and superphosphate on the hay crop have not produced economic increases in yield. The addition of muriate of potash to the mixture during the past year showed up to advantage. The ploughing down of green manure crops such as clover, buckwheat and fall rye have demonstrated that where the soil is very low in fertility, it is very difficult to build it up by green manuring. It is possible soil fertility may be maintained by this practice, but any attempt to build up "run down" soil by this method is of doubtful economy. Commercial fertilizers have been proven almost essential for the production of good potatoes. A drainage experiment conducted over a period of nine years shows that under conditions where natural surface drainage is more or less in evidence, nothing is to be gained by the installation of a thorough system of tile drains. Oats and corn have given slightly higher yields on the drained area, whereas, clover and timothy have been better on the undrained land. Tractor studies show that the machine may be used to advantage, and at a great saving of time and expense. The breaking of new land has been given a good deal of study, and the difficulties met in carrying out this line of work make it a venture requiring a large amount of labour, and therefore comparatively high expenditure of capital. Meteorological data have been recorded for a period of sixteen years. While pasture studies have been under observation for some five years, the work was extended in 1929 to include a grazing test on fertilized and unfertilized pasture, with small paddocks fenced off in each area on which clippings are made with a lawn mower at one-week and three-week intervals and one plot cut for hay. The grazing consists of the pasturing of young beef animals and the results are based on the unit carrying capacity of areas with different treatments, as well as the actual gain in weight of the animals. The first year has shown nothing of a conclusive nature in the grazing experiment. The clippings, however, have shown considerable increases due to fertilizing on all three clippings and the total production of green material from the three clippings is ranged in order from the highest yield down as follows:

First, cut for hay; second, three weekly clippings, and third, weekly clipping. Areas have been provided to start in 1931, a system of rotational grazing (a modification of the Hohenheim System) in comparison with continuous grazing. A fairly extensive layout of plots for pasture investigations has been installed and it is hoped that in a few years some valuable information will be available, in regard to pasture renovation and management.

Following is a more or less detailed presentation of the results of some of the experiments carried on by the Field Husbandry Division.

COST OF PRODUCTION

In periods of economic depression, when the price of all commodities are at their "low", producers of agricultural materials, as well as those engaged in other industrial enterprises, are forced to accept a low price for their product. Inasmuch as agricultural workers, at any time, have very little, if anything, to do in setting a price for their produce, it is necessary for them to concentrate on the cost of production and endeavour to keep this cost as low as possible. This is doubly important in times of low values, similar to those experienced during the past year. Even with the most judicious use of labour and machinery, the planting of seed of the most suitable grade and variety, the selection of soil best adapted to the crop grown, and the most modern and scientific methods of fertilization and soil culture, it is very difficult to keep the cost per ton or per bushel of any crop lower than the market value of the same, in such times as these. High yields per acre produced with a minimum expenditure of labour and money is the only key to a balance on the right side of the agricultural ledger.

We publish in this report an itemized account of nine years' average results, in regard to the cost of producing the various crops most extensively grown in the district, together with the results for 1930.

The cost charges and return values used in 1930 are as follows:—

Cost Charges

Rent of land—interest on investment and taxes	$ 4 86 per acre
Manure	1 50 per ton
Fertilizer—	
Nitrate of soda	52 00 "
Superphosphate	17 00 "
Muriate of potash	47 00 "
Lime	5 00 "
Seed—	
Oats	1 42 per bushel
Peas	2 95 "
Vetches	4 10 "
Corn	2 65 "
Barley	1 40 "
Sunflowers	0 14 per pound
Red clover	0 22½ "
Alsike	0 20½ "
Timothy	0 12 "
Swedes	0 70 "
Twine	0 12½ "
Threshing	0 05 per bushel
Manual labour	0 21 per hour
Horse labour	0 10 "
Tractor labour (Tractor only)	0 60 "

Return Values

Hay	$ 11 00 per ton
Oats	0 50 per bushel
Barley	0 55 "
Corn (silage), Sunflowers (silage), O.P.V. (silage)	There being no actual market price for these crops they have been given a value based on the price of hay on the basis of 300 pounds silage being equal to 100 pounds of hay when the silage contains 25 per cent dry matter. If the dry matter is low, it accordingly requires more silage to equal 100 pounds of hay.

Swedes.....Are given a value on the basis that their dry matter is worth 25 per cent more than the dry matter in corn. Roots containing 10 per cent dry matter would, therefore, be valued on the basis that 600 pounds of roots would be equal to 100 pounds of hay.

COST OF PRODUCING CORN

The production of corn in most sections of the Eastern Townships of the province of Quebec is carried on under more or less unfavourable conditions. The growing season is comparatively short, and cool, damp weather in spring and early summer prohibit the profitable growing of the crop. Corn, if it is to be harvested before the early fall frosts, must be cut when very immature and, therefore, a dry matter content of more than 15 to 18 per cent is quite rare. With the return value of the crop based on its dry matter content in comparison with the dry matter in hay, this low per cent of dry matter sets a low value per ton on corn, which fact, in addition to the very low yield of green material obtained, makes it practically impossible to grow the crop at a profit.

The following table shows the cost of production, return value for the crop, and the loss per acre.

Cost of Producing an Acre of Corn at Lennoxville in 1930

Item	Statement	Amount
		$
Rent of land	Interest and taxes	4 86
Manure	6·4 tons at 0 $1.5per ton	9 60
Seed	½ bushel at $2.65 per bushel	1 32
Twine	3¾ pounds at 12½ cents per pound	0 47
Machinery (including ensiling outfit)		5 85
Manual labour	45·9 hours at 21 cents per hour	9 64
Horse labour	59·7 hours at 10 cents per hour	5 97
Tractor labour	1·02 hours at 60 cents per hour	0 61
Total cost per acre		38 32
Yield per acre	tons	10·98
Cost per ton	$	3 49
Value per acre	10·98 tons at $2.08 per ton $	22 84
Loss per acre	$	15 48

COST OF PRODUCING OATS

The yield of oats in 1930 was about average. The market price of the grain was, however, considerably lower than has been received for many years, which fact was instrumental in lowering the total value of the crop. For this reason the crop, this year, on the present basis of costs, was produced at a loss. This is rather unusual as a crop of oats in this district can usually be depended upon to show a profit. An itemized statement of cost of production, return values and loss per acre follows:—

COST OF PRODUCING OATS AT LENNOXVILLE IN 1930

Item	Statement	Amount
		$
Rent of land	Interest and taxes	4 86
Manure	4·8 tons at $1.50 per ton	7 20
Seed	2½ bushels at $1.42 per bushel	3 55
Twine	3¼ pounds at 12½ cents per pound	0 41
Machinery		2 85
Manual labour	18 hours at 21 cents per hour	3 78
Horse labour	28·1 hours at 10 cents per hour	2 81
Tractor labour	0·8 hours at 60 cents per hour	0 48
Threshing charges	45·6 hours at 5 cents per bushel	2 28
Total cost per acre		28 22
Yield per acre	Grain bush.	45·6
	Straw tons	1·06
Cost per bushel (considering value of straw)		0 52
Value per acre	45·6 bushels grain at 50 cents per bushel	22 80
	1·06 tons straw at $4 per ton	4 24
	Total value	27 04
Loss per acre		1 18

COST OF PRODUCING HAY

Hay is apparently less affected by falling markets than other farm crops. While the price of all other crops has dropped to almost disastrously low levels, the market value of hay remains practically unchanged or showing a very slight decline. The crop never requires as high an expenditure for labour or machinery as most other crops, may be adapted to produce a good crop under more varying conditions of soil and climate, and is a crop which can hardly be excluded from any live stock ration, whether for high production or maintenance. For these reasons, hay in most cases shows a profit over cost of production. This year the yield of hay was exceptionally good and fairly substantial profits were obtained as is shown in the following table:—

COST OF PRODUCING AN ACRE OF HAY AT LENNOXVILLE IN 1930

Item	Statement	Amount
		$
Rent of land	Interest and taxes	4 86
Manure	2·4 tons at $1.50 per ton	3 60
Seed	½ of 10 pounds timothy at 12 cents per pound	0 60
	8 pounds clover at 22½ cents per pound	1 80
	2 pounds alsike at 20½ cents per pound	0 41
Machinery		2 85
Manual labour	14·1 hours at 21 cents	2 96
Horse labour	8·3 hours at 10 cents	0 83
Total cost per acre	$	17·91
Yield per acre	tons	2·59
Cost per ton	$	6 91
Value per acre	2·59 tons at $11 per ton $	28 49
Gain per acre	$	10 58

YIELD AND COST OF ROOTS AND SILAGE CROPS

A project was started in 1924 with the object of determining the relative value of corn, sunflowers, turnips, a mixture of corn and sunflowers and a mixture of oats, peas and vetches as succulent roughage crops.

In the following table will be found a summary of costs per acre, yield per acre and cost per ton both on a green weight and dry matter basis for the five crops in 1930, as well as the average for the period:—

YIELD AND COST OF PRODUCING ROOTS AND SILAGE CROPS

Item	Corn		Sunflowers		Oats, peas and vetches		Swedes		Corn and sunflowers	
	1930	Seven-year average	1930	Seven-year average	1930	Seven-year average	1930	Seven-year average	1930	Three-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 32	1 25	1 40	1 03	6 07	5 56	2 10	1 97	1 69	1 64
Twine	0 47	0 56	0 47	0 60	0 41	0 06	.....	.....	0 47	0 56
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	7 92	10 77	8 76	12 79	4 43	7 16	41 29	27 87	8 76	14 45
Horse labour	5 44	6 91	5 44	7 49	3 00	5 19	5 30	8 15	5 44	5 06
Tractor labour	0 36	0 36	0 36	0 36	0 36	0 36	0 36	0 36	0 36	0 36
Total cost	35 82	40 16	36 74	42 58	34 58	38 64	66 36	55 66	37 03	42 88
Yield per acre green weight...tons	7·59	9·07	7·92	13·82	7·95	7·76	9·15	20·48	6·49	11·79
Cost per ton green weight.....$	4 72	4 43	4 64	3 08	4 35	4 98	7 25	2 72	5 71	3 64
Yield per acre dry weight....tons	1·00	1·21	1·24	1·74	2·12	1·99	1·00	1·66	1·04	1·65
Cost per ton dry weight.....$	35 82	32 54	39 63	24 00	16 31	19 00	66 36	33 26	35 61	25 99

With the exception of oats, peas and vetches, all the crops in the test produced an abnormally low yield in 1930. Climatic conditions were unfavourable, both to the crop, in the case of sunflowers, corn and turnips, and also to the particular type of soil upon which the experiment was conducted. Cool, wet weather does not favour corn, and due to the fact that the subsoil in this field was of a clayey nature, it was quite impervious to water and, therefore, the water table was kept at a high level in the earlier part of the season.

Climatic conditions prevailing in this district make the growing of corn practically prohibitive. Sunflowers, roots and O.P.V. can usually be depended upon to produce favourable yields, although 1930 was an exception to this statement. Everything considered, O.P.V. is probably the most reliable crop for the production of ensilage. It has produced a higher average dry matter yield than any of the other silage crops. The dry matter has been produced at a much lower cost per acre and per ton. Only about one-half the amount of manual labour is necessary to produce the crop and considerably less horse labour. In addition an excellent quality of silage is produced. The cost of seed for this crop, however, is rather high.

Turnips, although a very desirable succulent feed, are produced at a very high cost for labour.

COST OF OPERATING A TRACTOR

For seven years a tractor has been in use at this Station. During this period records have been kept as to the amount of fuel and oil used, cost of repairs and repair work and other incidental expenses entering into the operating of the machine. In the following table is shown a detailed statement of costs for 1930, and for the seven-year period:—

DETAILS OF COST OF OPERATING A TRACTOR

Item	Seven-year average	1930	—	Seven-year average	—
		$	$	$	$
Yearly fixed cost—					
Depreciation 10 per cent on initial cost		50 30		50 30	
Interest—6 per cent on ½ initial cost		15 09		15 09	
Repairs—parts		35 46		29 49	
Work—home 60 hours at 30 cents	44·6 hrs.	18 00		13 37	
Total fixed cost			118 85		108 25
Yearly fuel and oil costs—					
Gasolene 950 gallons at 23 cents	630·7 gals.	218 50		144 08	
Oil 292 quarts at 20 cents	267·3 qts.	58 40		56 94	
Grease		0 56		0 56	
Total fuel and oil costs			277 46		201 58
Tractor operator costs—					
544 hours at 30 cents		163 20	163 20	129 73	129 73
Total yearly costs			559 51		439 56
Total number days worked (10 hours each)		54·4		43·2	
Daily fixed cost		2 18		2 47	
Daily fuel and oil cost		5 10		4 60	
Daily operator cost		3 00		3 00	
Total daily operating cost		10 28		10 07	
Cost per hour		1 03		1 01	

It may be seen that the statement is divided under three headings. There are certain fixed charges which occur each year, which are not governed actually by the operation of the machine. These charges go on whether the tractor is used much or little or not at all. The fuel and oil charge of course varies with the work done. While the operator is a factor in a measure separate from the machine, the machine is useless without an operator so the two must be calculated together, to arrive at the actual cost of operating. The tractor at this Station is used, according to the seven-year average, 43·2 ten-hour days each year. In 1930, it was used 11·2 days more than the average. The cost per day of operating the tractor is $10.07, which is the seven-year average cost. It may be of value to compare this rate with the cost of doing the same work with horses. Of course this $10.07 per day rate is the average charged for all work done. For some work the cost would be higher and some lower depending on the power required. For instance, in 1930, the cost of disking and cultivating was approximately $10.46 per day, while threshing cost only $9.36 per day for power. Threshing does not require as much power and, therefore, does not use as much fuel. Silo filling, on the other hand, requires considerably more power and the filler must be kept running at a very high rate of speed. The cost of power for this operation in 1930 was $10.50 per day, which is almost the same as for the drawbar work. However, for purposes of comparison, the seven-year average rate of $10.07 for all work will be used. From a table in the Dominion Department of Agriculture Bulletin 115, by Hopkins, Gosselin and Armstrong, we find the following average acreages covered by various outfits doing different operations:—

ACREAGES COVERED PER TEN-HOUR DAY

Operation	Horses		Tractor
	Two-horse team	Three-horse team	Two-plough tractor
Ploughing	1·5	2·0	5·2
Disking	7·0	9·0	16·3
Cultivating	8·0	10·0	18·1
Harrowing	13·0	17·0	25·5

At these rates the tractor will plough as much in one day as two two-horse teams and one three-horse team. Charging $1 per day for horse labour and $3 for man labour ploughing with the horses would cost $16 to do the same work as a tractor at $10.07. Similarly, to do the same amount of work as a tractor, disking would require approximately one two-horse and one three-horse team at a cost slightly over $11. Cultivating and harrowing are in about the same proportion. It would appear, therefore, that where sufficient work can be provided an investment in a tractor is a sound economic venture. Furthermore, while the tractor needs some attention in the way of cleaning, repairing and keeping in shape, it does not require as much daily all the year round attention as a horse. It may also be used for belt work, threshing, silo filling, grinding grain and other similar work for which a horse is of no value.

CROP ROTATION EXPERIMENTS

In spite of the fact that the value of crop rotation has been emphasized for many years, a large number of farmers, in so-called mixed farming districts, do not practise any systematic sequence in growing their crops for live stock feed or a cash crop. A practice very generally followed in this district is to plant a crop of oats and at the same time "seed down" a hay mixture. Several crops of hay may be cut from this seeding. In fact, hay is often cut long after all trace of clover and timothy has disappeared and the crop is made up chiefly of couch grass, June grass and other natural grasses which produce a very low-grade of hay, especially for cattle feed. After cutting hay for a number of years, the field might be pastured for a further period and then, when the spirit moves, it is again reseeded to oats and hay. This reseeding may be done a considerable time after the field has ceased to produce sufficient growth of grass for economical pasture or hay, and still the haphazard system of rotation goes on. The carrying capacity and the total production on these farms could be increased by a considerable margin if the intelligent following of some system of rotation, best adapted to the needs of the particular line of farming, was practised.

In order to provide some basis upon which to work out suitable systems of rotations, a project was started in 1921, in which various crops were combined into five different arrangements or sequences. The chief object in view in these test rotations was to determine, if possible, the rotation most suitable for the district, and also the system or systems which might be used most satisfactorily for the special needs of various types of agriculture. Careful records have been kept in regard to cost of labour, cost of seed, amounts and cost of manure applied, rent, interest on investment and other incidental expenses in connection with the production of the crops. The value of the crops has also been determined, based on average market prices, which gives us a method of comparing the different treatments on a dollar and cents basis. Manure has been applied at the rate of four tons per acre for each crop in the rotation. Thus a four-year rotation would receive 16 tons, five-year rotation 20 tons, six-year 24 tons, and so on. The cost of the manure is distributed over the various crops in a rotation as follows:—

THREE-YEAR ROTATION—	
First-year crop	50 per cent
Second-year crop	30 per cent
Third-year crop	20 per cent
FOUR-YEAR ROTATION—	
First-year crop	40 per cent
Second-year crop	30 per cent
Third-year crop	20 per cent
Fourth-year crop	10 per cent

FIVE-YEAR ROTATION—

First-year crop	40 per cent
Second-year crop	25 per cent
Third-year crop	20 per cent
Fourth-year crop	10 per cent
Fifth-year crop	5 per cent

SIX-YEAR ROTATION—

First-year crop	40 per cent
Second-year crop	25 per cent
Third-year crop	20 per cent
Fourth-year crop	10 per cent
Fifth-year crop	5 per cent
Sixth-year crop	0 per cent

In the following tables are shown yields, value of crops, cost of producing crops and the profit or loss per acre for 1930, as well as a nine-year average for corn, an eight-year average for barley and timothy, and a seven-year average for oats and clover.

ROTATION "A" (FIVE YEARS' DURATION).

Rotation year	Crop	1930				Average				
		Yield	Value	Cost	Profit or loss	Years	Yield	Value	Cost	Profit or loss
			$	$	$			$	$	$
1	Corn	11·73 tons	19 87	40 51	−20 64	9	12·28 tons	25 17	45 72	−20 55
2	Barley—grain	21·7 bush.	16 13	26 87	−10 74	8	29·2 bush.	31 35	29 82	1 53
	straw	1·05 tons					1·09 tons			
3	Clover	2·90 tons	31 90	20 83	11 07	7	2·67 tons	28 11	21 47	6 64
4	Timothy	3·09 tons	33 99	15 62	18 37	8	2·49 tons	26 42	16 94	9 48
5	Oats—grain	41·1 bush.	24 87	22 59	2 28	7	40·7 bush.	30 08	22 95	7 13
	straw	1·08 tons					1·03 tons			
	Total for rotation		126 76	126 42	0 34			141 13	136 90	4 23
	Average per acre		25 35	25 28	0 07			28 23	27 38	0 85

N.B.—Minus sign (−) denotes loss.

In this five-year rotation the total value of crops is very low, both in 1930 and on the average basis. Corn, which is a low-yielding crop in this district, is not a profitable crop to grow and is largely responsible for the low profits from this rotation. The other crops usually show a profit. In 1930, however, barley did not do well and was grown at a loss of $10.74 per acre.

ROTATION "B" (FOUR YEARS' DURATION)

Rotation year	Crop	1930				Average				
		Yield	Value	Cost	Profit or loss	Years	Yield	Value	Cost	Profit or loss
			$	$	$			$	$	$
1	Corn	11·52 tons	21 89	38 11	−16 22	9	10·96 tons	22 43	42 55	−20 12
2	Oats—grain	51·9 bush.	31 07	28 83	2 24	7	54·6 bush.	39 85	30 70	9 15
	straw	1·28 tons					1·27 tons			
3	Clover	2·54 tons	27 94	19 63	8 31	7	2·30 tons	24 26	19 82	4 44
4	Timothy	2·34 tons	25 74	15 02	10 72	8	2·45 tons	25 78	16 31	9 47
	Total for rotation		106 64	101 59	5 05			112 32	109 38	2 94
	Average per acre		26 66	25 40	1 26			28 08	27 34	0 73

N.B.—Minus sign (−) denotes loss.

This rotation comprises a lower percentage of grain than the five-year rotation. The value of grain in 1930 was considerably lower than for many

years previous, and while the yield was only slightly below average the value was considerably lower and hence the profit from the crop is also reduced. Hay in 1930 produced exceptionally high yields and in each case in this rotation gave decidedly increased profits. The average profit from the rotation is much the same as for the previous five-year rotation.

ROTATION "C" (THREE YEARS' DURATION)

Rotation year	Crop	1930				Average				
		Yield	Value	Cost	Profit or loss	Years	Yield	Value	Cost	Profit or loss
			$	$	$			$	$	$
1	Corn	10·07 tons	18 23	37 51	−19 28	9	10·42 tons	20 94	41 65	−20 71
2	Oats.....grain	43·3 bush.	25 85	26 60	− 0 75	7	50·1 bush.	36 58	28 05	8 53
	straw	1·05 tons	.....	.....	.....	.....	1·10 tons	.....	.....	.....
3	Clover	2·18 tons	23 98	19 03	4 95	7	2·25 tons	23 70	20 20	3 50
	Total for rotation	.....	68 06	83 14	−15 08	.....	.....	81 22	89 90	−8 68
	Average per acre	.....	22 69	27 71	−5 03	.....	.....	27 07	29 97	−2 89

N.B.—Minus sign (−) denotes loss.

This rotation is operated at a considerable loss. The corn crop makes up a large per cent of the total crop area, and, being such an unsatisfactory crop, affects the average for the rotation very materially, and is quite largely responsible for the loss, which over the average period, has been $2.89. Although no very great profits have been made on any of the rotations, this is the only one in which the average of all the crops shows a loss.

ROTATION "D" (SIX YEARS' DURATION)

Rotation year	Crop	1930				Average				
		Yield	Value	Cost	Profit or loss	Years	Yield	Value	Cost	Profit or loss
			$	$	$			$	$	$
1	Corn	10·81 tons	22·70	39·31	−16 61	9	9·97 tons	21 21	43 78	−22 57
2	Barley.....grain	17·8 bush.	13 75	25 78	−12 03	8	29·0 bush.	31 09	28 63	2 46
	straw	0·99 tons	.....	.....	.....	.....	1·03 tons	.....	.....	.....
3	Clover	2·93 tons	32 23	19 43	12 80	7	2·74 tons	28 75	19 46	9 29
4	Timothy	3·23 tons	35 53	19 62	15 91	8	3·12 tons	32 94	21 77	11 17
5	Timothy	3·03 tons	33 33	16 62	16 71	8	2·78 tons	29 58	18 02	11 56
6	Oats.....grain	46·6 bush.	26 98	23 77	3 21	7	51·0 bush.	37 13	24 55	12 58
	straw	0·92 ton	.....	.....	.....	.....	1·20 tons	.....	.....	.....
	Total for rotation	.....	164 52	144 53	19 99	.....	.....	180 70	156 21	24 49
	Average per acre	.....	27 42	24 09	3 33	.....	.....	30 12	26 03	4 08

N.B.—Minus sign (−) denotes loss.

This rotation, made up as it is of five-sixths grain and hay and only one-sixth corn, shows some profit. The grain and hay are both cash crops, whereas the corn has no actual market value, but must be marketed through live stock. It is, therefore, necessary to put a value on corn based on its feeding value compared with hay. Hay, being a marketable commodity, has a definite market price. From this price then, a value is placed on corn proportionate to the feeding value of the two crops.

ROTATION "E" (FOUR YEARS' DURATION)

Rotation year	Crop	1930				Average				
		Yield	Value	Cost	Profit or loss	Years	Yield	Value	Cost	Profit or loss
			$	$	$			$	$	$
1	Oats.....grain	31·3 bush.	19 53	27 80	— 8 27	7	43·6 bush.	32 99	30 01	2 98
	straw	0·97 ton	.....	.....	.....	.....	1·22 tons	.....	.....	.....
2	Clover.....	3·34 tons	36 74	19 43	17 31	7	2·85 tons	30 12	19 46	10 66
3	Timothy.....	3·31 tons	36 41	19 62	16 79	8	2·84 tons	30 04	21 78	8 26
4	Timothy.....	2·20 tons	24 20	17 22	6 98	8	2·37 tons	24 81	18 76	6 05
	Total for rotation.....	.....	116 88	84 07	32 81	.....	.....	117 96	90 01	27 95
	Average per acre.....	.....	29 22	21 02	8 20	.....	.....	29 49	22 50	6 99

N.B.—Minus sign (—) denotes loss.

The rotation is made up of oats and three years' hay, all of which are cash crops, and the rotation over the average period shows much higher profits than any of the others. The crops are produced with much less labour, and it is a rotation which has many points in its favour. It does not, however, provide a succulent feed such as corn, which, although a high-costing feed, is very valuable in feeding live stock. Moreover, there is no hoed or cultivated crop which makes weed eradication more of a problem. It is more typical of the general type of rotation followed in the district, except that in most cases in the district the hay crop is left down much longer. The crops, however, are much the same and such a systematic rotation could be practised to advantage on many farms where labour is scarce.

In summing up the results from all the rotations, it would seem that a rotation of corn, barley, clover, timothy, timothy and oats, as in rotation "D", is perhaps the most practicable for all general purposes. It is desirable from a feed standpoint, as well as a cash crop. Although such a rotation has not been systematically tried, at this Station, it would seem logical to assume that this rotation "D" might be improved by replacing corn with a mixture of oats, peas and vetches for silage. This does away with a hoed crop, but provides for early cultivation after the crop is off, as well as cutting the weeds before the seeds have ripened, which is as good or better than a hoed crop, especially if the hoed crop is not hoed, which happens in many instances. The O.P.V. silage may be produced at lower cost and produces a higher grade of feed than the immature corn grown in this district.

Rotation "E" oats, clover, timothy, timothy, is also a good rotation and under some conditions might be more suitable than "D". It affords a splendid opportunity for conservation of labour and produces high yields of good cash crops. Weeds could perhaps be controlled by early ploughing of the fourth-year hay-ground and thorough after-harvest cultivation. A hay crop, inasmuch as it is cut early, provides for the cutting of weeds, in most cases, before the seeds have ripened. This also prevents the spread of the weeds. The rotation, however, does not produce such a variety of crops and would not provide such a well-balanced ration for live stock.

USE OF LIME

The practice of applying lime to the soil is referred to with favour in popular and scientific writings of some hundred years ago, and is a practice which becomes more popular and more valuable as the knowledge of soil culture and fertilization advances. For eight years a project has been under way at this Station, in which limed soil has been compared with unlimed soil

in its ability to produce various crops. In this particular experiment, two sets of four plots each are seeded to a four-year rotation of corn, oats, clover, timothy. One set of plots receives an application of two tons of ground limestone per acre applied to the oat crop at seeding time. Both rotations are manured at the rate of 16 tons per acre applied to the corn crop. This procedure is followed on duplicate areas, and the average yields from these duplicate plots are shown in the following table:—

Crop Yields from Limed and Unlimed Plots

	Unlimed		Limed	
	1930	Eight-year average	1930	Eight-year average
Corn.....tons	9·65	11·29	16·11	14·58
Oats.....bush.	37·9	39·2	55·3	51·2
Clover.....tons	1·35	0·88	2·07	1·50
Timothy.....tons	1·17	1·00*	1·51	1·74*

* Seven-year average.

These results show crop yields from limed soil decidedly superior to those received from soil to which no lime was applied. Corn shows an eight-year average increase of 3·29 tons per acre on the limed soil, as compared with unlimed. Oats have yielded, over the eight-year period, an average of 12·0 bushels more when lime has been applied, while clover and timothy yielded an increase of 0·72 of a ton and 0·74 of a ton more respectively on the limed plots. The yields have been consistently higher for each crop on the limed soil every year since the experiment was begun.

All crops show a tendency toward higher yields as the years under experimentation increase. This is especially true of corn, but is also quite marked in the case of hay and slightly so with oats. It may also be noticed that the trend of increase is greater on the limed plots than on the unlimed plots in the case of corn and oats. This would seem to indicate that the influence of the lime tends to become more effective in proportion to the time in which its corrective action has a chance to operate, within certain limits, of course. It also indicates the need for more than two tons of lime per acre, per rotation. Two tons per acre is applied every four years to the oat crop in the rotation cycle. Thus, at the end of four years another two tons would be applied, bringing the total to four tons, which extra amount, if needed to correct the soil, would have a tendency to further increase the yield. In regard to clover and timothy, while the limed soil has consistently produced higher yields in the case of the clover, the crop increase from unlimed soil has been in almost the same proportion as from the limed, while with timothy the increase has been at a slightly higher rate on the unlimed. This might be explained in case of the clover by the fact that the crop usually winter-kills badly and there is not enough of a stand left to produce good yields on either plot. In connection with timothy, the plant is more acid tolerant than some of the other crops, and is probably not affected by treatments of lime to such an extent. It has been proven that lime acts in a number of ways in the soil, all of which may work together in promoting more efficient crop growth and, therefore, higher yields. Besides the effect of actually correcting soil acidity, which latter is detrimental to most crops, it may also in a number of different ways liberate certain elements and render them available as plant food. This may be accomplished by base exchange and also perhaps more particularly by its action in making conditions more

favourable for the development of desirable soil organisms. This especially applies to the development of nitrifying bacteria. In the type of "podsol" soil found in this section, with its high content of unavailable nitrogen, this is extremely important and would seem to explain some of the conditions observed in this experiment. Nitrogen, it has been demonstrated, acts quite largely in the promotion of leaf growth in the plant; it also plays a considerable part in the promotion of chlorophyl, which gives to the plant the green, healthy appearance. Nitrogen leads to the development of larger dark-green leaves and more succulence. In grain crops it retards ripening and tends toward the production of straw.

Some of these conditions have apparently been produced in the crops on the limed soil in the particular experiment under discussion. The corn, in the last two or three years, especially on the limed plots, has been a healthy, deep green colour as compared with the crop on the unlimed area, which was of a somewhat sickly, yellowish colour. A great deal more growth was produced on the limed soil and the crop was more vigorous and succulent throughout.

The oat crop has also exhibited growth characteristics, which would seem to indicate the presence of more available nitrogen on the limed plots. This was especially noticeable in the 1930 crop when the straw yield on the lime-treated soil was 1,020 pounds per acre heavier than on the area which received no lime. Another observation was the fact that ripening was retarded on the limed plot seven to ten days as compared with the no-lime area. In fact, this ripening process was held up to such an extent on one of the replications as to make it less disease-resistant at a time when probability of rust infestation was most prevalent, and, as a result, the crop was so badly infested with rust as to decrease the yield below that on the untreated plot. This seems fairly conclusive proof of more nitrogen being indirectly rendered available by the lime, and suggests the necessity of applying further supplemental dressings of phosphorus and potash with lime on these soils, to offset this available nitrogen increase, and produce a more desirable balance of plant food nutrients.

In order to determine if the increase in crop yield due to liming is produced economically, accurate records have been kept each year of the cost of the lime and the value of the crops grown. These crop values have been based on the average market price paid to the farmer in the province or district for the year. Corn, having no actual market price, has been given a value based on its feeding value in comparison with hay. The value of the crops, after deducting the cost of the lime, is shown in the following table:—

VALUE OF CROPS AFTER DEDUCTING COST OF LIME

Year	Corn		Oats		Clover		Timothy	
	Limed	Unlimed	Limed	Unlimed	Limed	Unlimed	Limed	Unlimed
	$	$	$	$	$	$	$	$
1923	24 97	24 30	36 06	24 07	6 68	2 42	.....	.....
1924	44 86	40 41	32 58	31 10	16 40	8 47	10 79	3 41
1925	41 64	36 32	29 08	28 52	10 71	10 83	15 51	8 56
1926	46 47	34 86	32 14	21 83	10 45	11 84	15 60	14 65
1927	26 68	28 00	45 74	42 20	9 25	6 40	11 65	11 70
1928	29 49	25 60	27 69	26 74	14 25	7 10	12 85	6 20
1929	40 60	30 16	34 45	27 17	15 78	12 20	27 76	16 95
1930	30 53	20 65	29 91	21 67	20 27	14 85	14 11	12 87
Total value	285 24	240 30	267 65	223 30	103 79	74 11	108 27	74 34
8-year average value	35 65	30 04	33 46	27 91	12 97	9 26	15 47*	10 62*

* Seven-year average.

This table shows quite conclusively that the increase in the value of the crop has more than paid for the lime. The average price paid for ground limestone in this eight-year period was $5.79. Based on present prices of this material, the value increase of the crop would be greater still. As it is, we notice $5.62 higher value of corn crop produced on the lime area. Oats show an increase of $5.55 and clover and timothy $3.83 and $4.85 respectively. It may be assumed, therefore, that it pays to lime under conditions such as exist in this experiment.

COMMERCIAL FERTILIZERS FOR POTATOES AND OTHER CROPS

The value of commercial fertilizers as a means of increasing the economical production of crops is being more and more recognized. Crops must be fed as well as animals, and they require a "balanced ration" just as surely as do animals. In order to determine what proportion of certain plant nutrients constitute the most favourable mixture for profitable crop production, a project was started in 1923, in which manure or commercial fertilizer, or a mixture of the two, was applied to potatoes in a rotation of potatoes, oats, clover and timothy. This project has now been in operation for eight years and the following table shows the yields of the four crops following various treatments:—

YIELDS FROM FERTILIZER TREATMENTS FOR POTATOES AND OTHER CROPS IN ROTATION

Treatment	Potatoes		Oats		Clover		Timothy	
	1930	Average 8 years	1930	Average 8 years	1930	Average 8 years	1930	Average 8 years
	bush.	bush.	bush.	bush.	tons	tons	tons	tons
100 pounds nitrate of soda, 300 pounds superphosphate, 50 pounds muriate of potash	165·2	149·0	45·3	46·6	1·11	1·24	0·66	1·15
200 pounds nitrate of soda, 600 pounds superphosphate, 100 pounds muriate of potash	218·0	192·7	53·4	48·3	1·20	1·28	0·76	1·17
400 pounds nitrate of soda, 600 pounds superphosphate, 200 pounds muriate of potash	262·7	231·9	61·3	50·2	1·80	1·39	1·21	1·30
16 tons manure	262·0	207·0	53·5	46·2	2·65	1·46	1·53	1·37
100 pounds nitrate of soda, 300 pounds superphosphate, 50 pounds muriate of potash, 10 tons manure	254·0	218·2	55·6	47·2	2·01	1·40	1·69	1·61
No manure, no fertilizer	70·5	103·0	15·8	23·5	0·61	0·85	1·33	1·06

The above yields are the average from duplicate treatments. Potatoes, being the crop to which the initial treatment is applied, would naturally respond more directly to variations in the applications. From the eight-year average results, it will be noticed that the heavy treatment of 1,200 pounds of commercial fertilizer has produced the highest yields of any in the test. This is followed by the treatment with 10 tons of manure supplemented with 450 pounds of commercial fertilizer which shows 13·7 bushels lower yield. Following this treatment, the plot treated with manure alone produced only 11·2 bushels less potatoes. This is followed by the 900 pounds application of commercial fertilizer and the 450 pounds respectively. It might be mentioned that in the two years the plot treated with manure alone has given decidedly favourable yields,

in fact, in 1930, it was second in production and only 0·7 of a bushel less than the heavily fertilized crop. It would appear, however, that the potato crop responds to treatments of fertilizer and where manure is plentiful, it would seem to be advisable to use some of it for potatoes, but it would also be wise to supplement it with a light dressing of commercial fertilizer. Where manure is scarce the crop will produce as high yields or even higher yields from applications of commercial fertilizer alone.

In connection with the other crops the average results are not so conclusive. The oat crop shows very little response in favour of any one particular treatment. In the five treatments, the widest variation in yield is only 4 bushels. All the treatments, however, have produced yields practically double that received from the check. It would appear, therefore, that considerable fertility is carried over to the second year at least, both on the manure-treated plots and those plots treated with commercial fertilizer only. In regard to the hay crop, the yields tend to be higher on the manured plots than on those plots treated with commercial fertilizers. The manure must of course be decomposed and broken down into available plant food and naturally this process takes considerable time and the carry-over from year to year is greater than is the case with the more readily available and more easily leached commercial fertilizers. The catch of clover on the manured plots seems to grow with more vigour than on the commercial fertilizer treatments, and the crop is thus apparently better able to withstand the rigours of local climatic conditions in winter.

In order to ascertain if the increase in yields are high enough to justify the manure or fertilizer applications, records have been kept of the cost of the fertilizers and manure as well as the return value of the crops. The average return values for the crops, after deducting the cost of the manure or fertilizer for 1930, and the eight-year average, are shown in the following table:—

RETURN VALUE OF CROPS AFTER DEDUCTING COST OF FERTILIZER

Treatment	Potatoes		Oats		Clover		Timothy	
	1930	Average 8 years	1930	Average 8 years	1930	Average 8 years	1930	Average 8 years
	$	$	$	$	$	$	$	$
Light application of fertilizer	112 16	137 84	24 47	30 73	11 58	11 37	6 95	10 97
Medium application of fertilizer	145 64	176 24	27 78	30 68	11 94	11 61	7 74	10 97
Heavy application of fertilizer	169 97	203 81	28 77	29 29	17 28	12 05	12 07	11 98
16 tons manure	177 00	184 80	26 95	28 14	25 45	11 78	15 23	12 39
Manure and fertilizer	170 32	198 07	27 78	28 38	19 48	12 13	17 28	15 56
No manure, no fertilizer	49 35	101 27	9 06	16 86	6 71	9 42	14 63	12 10

Under conditions such as exist in this experiment, the application of large amounts of fertilizers has proven to be a profitable investment. The heavy application has given returns above the cost of fertilizer higher than any of the other treatments the first year of the rotation. All treatments produce returns a good deal higher than the check considered from the standpoint of the eight-year average. Considering all the crops in the rotation the eight-year average results total as follows:—

Heavy application of fertilizer	$ 257 13
Manure and fertilizer	254 14
16 tons manure	237 11
Medium application of fertilizer	229 50
Light application of fertilizer	190 91
No manure, no fertilizer	139 15

The returns from the treatment giving the most profit, shows an increase of $117.98 over the check which received no fertilizer treatment but was handled the same in every other way. This shows a per acre increase in return value for the rotation of $29.49 from the heavy fertilization after deducting the cost of the fertilizer. It is evident, therefore, that money invested in fertilizers is a sound economic proposition under some conditions.

FORAGE CROPS

ENSILAGE CROPS

CORN

Although crop failures with ensilage corn are increasingly common, the acreage planted in the Eastern Townships to this crop remains about constant from year to year. It is still the most commonly grown crop for ensiling, and, owing to the dependable quality of the ensilage made from it, farmers are apparently inclined to permit this feature to outweigh its uncertainty from the standpoint of production. On most of the land at this Station, low yields of corn are almost invariably obtained. Under exceptionally favourable conditions, however, as on light well-drained soil in a high state of fertility, or on very fertile loam also well drained, good crops are usually obtained. In much of the eastern portion of the district served by this Station, the profitable production of ensilage corn is only possible on such favourable sites. In the western portion of the district, climatic conditions are, however, more favourable, and satisfactory yields may be expected, with suitable varieties and good cultural practice, on practically all types of productive soil. Following are the results obtained with varieties tested in 1930:—

ENSILAGE CORN—TEST OF VARIETIES, 1930

Variety	Source	Height	Stage of maturity	Yield per acre	
				Green weight	Dry matter
		ft. in.		tons	tons
White Cap Yellow Dent	Steele-Briggs	7 10	Silk	20·27	3·150
Burr Leaming	Geo. S. Carter	7 6	Tasselled	21·50	3·032
Canada Leaming	Geo. S. Carter	7 2	Starting to silk	20·40	2·800
Longfellow	J. O. Duke	6 8	Silk	18·55	2·647
Hybrid	Wimple	7 0	Silk	19·35	2·642
Wisconsin No. 7	J. O. Duke	7 6	Starting to silk	20·10	2·610
Yellow Dent	Wimple	7 0	Silk	19·02	2·607
Quebec No. 28	Macdonald College	6 0	Early dough	16·70	2·465
Golden Glow	J. O. Duke	7 3	Silk	17·80	2·415
Northwestern Dent	Macdonald College	7 0	Kernels formed	17·22	2·332
North Dakota	Steele-Briggs	6 6	Silk	16·12	2·270
Amber Flint	Wimple	6 0	Kernels formed	14·25	1·932
Northwestern Dent	Exp. Farm, Brandon	5 3	Early dough	11·10	1·752
Average				17·88	2·512

In the following table an eight years' average of results is shown with seven varieties, that have been tested each year since 1923:—

ENSILAGE CORN—AVERAGE OF RESULTS 1923-1930

Variety	Height	Yield per acre	
		Green weight	Dry matter
	ft. in.	tons	tons
Northwestern Dent, M.C	7 2	18·053	3·061
Wisconsin No. 7	8 7	22·534	3·056
Golden Glow	7 10	19·775	3·039
Longfellow	7 9	20,873	3·046
White Cap Yellow Dent	7 8	18·699	2·991
North Dakota	7 4	19·405	2·900
Quebec No. 28	6 4	16·908	2·826

In previous tests, the highest yields of dry matter have been obtained with Compton's Early. In 1930 the seed obtained of this variety failed to germinate satisfactorily and the crop obtained was of no comparative value. It is, however, the most satisfactory variety that has been tested at this Station and is recommended for the eastern portion of the district served by this Station. As a second choice, Northwestern Dent, M.C. should prove satisfactory. For most of the area west of Lake Memphremagog and the St. Francis river such varieties as Wisconsin No. 7 and Golden Glow are in all probability more suitable.

SUNFLOWERS

As a crop, sunflowers are well suited to the soil and climatic conditions throughout the Eastern Townships. Under similar conditions, the crop is more dependable and productive than corn, and, higher-yielding than grain mixtures for ensilage. In 1930 the variety tests of corn, grain mixtures and sunflowers were conducted on land which received similar treatment, and was unusually uniform in all respects. Following is the yield of green material and dry matter obtained with each crop:—

COMPARISON OF CROPS FOR ENSILAGE, 1930

Crop	Number of varieties or mixtures	Yield per acre	
		Green weight	Dry matter
		tons	tons
Sunflowers	5	21·87	3·241
Corn	13	17·88	2·512
Grain mixtures	22	8·67	2·470

LIST OF VARIETIES.—The five regional strains and varieties tested in 1930 have each been tested for three years. Following is an average of the results obtained:—

SUNFLOWERS, AVERAGE OF RESULTS, 1928 TO 1930

Variety	Source	Height	Yield per acre	
			Green weight	Dry matter
		ft. in.	tons	tons
Mammoth Russian	Local Seedsmen	8 7	27·797	3·981
Ottawa No. 76	Exp. Farm, Ottawa	6 5	23·627	3·410
Mammoth Russian	Dakota Imp. Seed Co.	8 5	21·707	3·267
Manchurian	McKenzie	6 7	19·497	3·239
Mennonite	Exp. Station, Rosthern	4 8	15·688	2·594

As a general rule, the tall-growing strains of Mammoth Russian are the most satisfactory for this district. In a normal season, the crop of this variety will reach three-quarters bloom by about the end of the first week in September. At this stage, sunflowers make the most desirable ensilage. As the growing season for such crops is usually at its end by September 15, later varieties would not prove satisfactory. Ottawa 76 which has also proven high-yielding is somewhat earlier, usually being ready to cut by the last of August.

GRAIN MIXTURES FOR ENSILAGE

Experiments with different grain mixtures as ensilage crops have been conducted at this Station annually for the past six years. In all a total of twenty-four mixtures have been grown consisting of various combinations of oats, wheat, barley, spring rye, peas, vetch and millet. In the following statement the results obtained in 1930 are shown:—

GRAIN MIXTURES FOR ENSILAGE, 1930

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
11	Gold Rain	Oat	2 bush.	Late milk	70·0	9·15	2·97
	Chancellor	Pea	½ bush.	Dough	22·5		
	Vetch		¼ bush.	Pods forming	7·5		
9	Victory	Oat	2 bush.	Late milk	80·9	10·42	2·86
	Chancellor	Pea	½ bush.	Dough	9·6		
	Vetch		¼ bush.	Pods forming	9·5		
10	Laurel (hulless)	Oat	50 lb.	Dough	73·4	8·98	2·79
	Chancellor	Pea	½ bush.	Dough	17·7		
	Vetch		¼ bush.	Pods forming	8·9		
22	Gold Rain	Oat	1 bush.	Late milk	74·7	8·96	2·79
	Huron	Wheat	¾ bush.	Late milk	7·6		
	O.A.C. 181	Pea	1 bush.	Dough	17·7		
20	Gold Rain	Oat	2 bush.	Late milk	92·4	9·42	2·77
	O.A.C. 181	Pea	1½ bush.	Dough	7·6		
17	Banner	Oat	1 bush.	Early dough	25·3	8·66	2·77
	Feeder	Barley	1 bush.	Late dough	36·7		
	Golden Vine	Pea	4 lb.	Early dough	21·5		
	Vetch		15 lb.	Pods forming	16·5		
19	Gold Rain	Oat	2 bush.	Late milk	73·4	10·46	2·71
	O.A.C. 181	Pea	¾ bush.	Dough	20·2		
	Vetch		¼ bush.	Pods forming	6·4		
21	Gold Rain	Oat	2 bush.	Early dough	80·0	9·02	2·71
	O.A.C. 181	Pea	1½ bush.	Dough	20·0		
8	Banner	Oat	2 bush.	Late milk	88·6	9·18	2·56
	Chancellor	Pea	½ bush.	Dough	7·6		
	Vetch		¼ bush.	Pods forming	3·8		
5	Legacy	Oat	2 bush.	Early dough	83·7	8·16	2·54
	Arthur	Pea	1 bush.	Dough	16·3		
2	Banner	Oat	2 bush.	Late milk	87·15	9·76	2·49
	Arthur	Pea	1 bush.	Dough	12·5		
3	Banner	Oat	2 bush.	Late milk	90·0	9·22	2·48
	Golden Vine	Pea	1 bush.	Early dough	10·0		
12	Longfellow	Oat	2 bush.	Late milk	75·0	8·30	2·46
	Chancellor	Pea	½ bush.	Dough	17·5		
	Vetch		¼ bush.	Pods forming	7·5		

GRAIN MIXTURES FOR ENSILAGE, 1930—*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
7	Legacy.....Oat..... 2 bush.	Early dough....	75·9	7·63	2·45
	Chancellor.....Pea..... ½ bush.	Dough.....	7·6		
	Vetch..... ¼ bush.	Pods forming...	16·5		
18	Millet..... 9 lb.	Bloom.....	1·3	9·54	2·44
	Golden Vine.....Pea.....40 lb.	Early dough....	52·5		
	Banner.....Oat..... 1 bush.	Late milk.....	37·7		
	Vetch..... ¼ bush.	Pods forming...	7·5		
4	Banner.....Oat..... 2 bush.	Late milk.....	82·3	9·14	2·42
	Mackay.....Pea..... 1 bush.	Early dough....	17·7		
1	Banner.....Oat..... 2 bush.	Late milk.....	96·1	8·72	2·38
	Chancellor.....Pea..... ¾ bush.	Dough.....	3·9		
6	Banner.....Oat..... 2 bush.	Late milk.....	98·0	8·32	2·37
	Alaska.....Pea..... 1 bush.	Late dough.....	2·0		
15	Banner.....Oat.....51 lb.	Late milk.....	80·0	9·20	2·27
	Spring rye.....30 lb.	Nearly ripe.....	5·0		
	Chancellor.....Pea.....30 lb.	Dough.....	6·0		
	Vetch.....15 lb.	Pods forming...	9·0		
16	Feeder.....Barley.....1½ bush.	Ripe.....	40·7	6·56	1·86
	Golden Vine.....Pea.....40 lb.	Early dough....	41·7		
	Vetch.....15 lb.	Pods forming...	17·6		
14	Spring rye.....1½ bush.	Nearly ripe.....	24·5	7·06	1·85
	Chancellor.....Pea..... ½ bush.	Late dough.....	46·8		
	Vetch..... ¼ bush.	Pods forming...	28·7		
13	Spring rye.....1¼ bush.	Nearly ripe.....	25·3	4·88	1·43
	Chancellor.....Pea..... ¾ bush.	Late dough.....	74·7		
	Average.....	.....	.....	8·67	2·47

Of the mixtures listed in the foregoing table a number have now been tested for six years. Following is a six-year average of the results obtained with ten of these that have proven most satisfactory:—

GRAIN MIXTURES FOR ENSILAGE—AVERAGE OF RESULTS, 1925 TO 1930

Mixture and seeding per acre	Yield per acre	
	Green weight	Dry matter
	tons	tons
Gold Rain.....Oat..... 2 bush. Chancellor.....Pea..... ½ bush. Vetch..... ¼ bush.	9·82	3·216
Laurel, Ottawa 477.....Oat.....50 pounds Chancellor.....Pea..... ½ bush. Vetch..... ¼ bush.	8·95	3·030
Victory.....Oat..... 2 bush. Chancellor.....Pea..... ½ bush. Vetch..... ¼ bush.	10·07	2·965
Banner, Ottawa 49.....Oat..... 2 bush. Golden Vine.....Pea..... 1 bush.	9·54	2·861

GRAIN MIXTURES FOR ENSILAGE—AVERAGE OF RESULTS, 1925 TO 1930—*Concluded*

Mixture and seeding pe acre			Yield per acre	
			Green weight	Dry matter
			tons	tons
Banner, Ottawa 49	Oat	1½ bush.	9·53	2·711
Spring Rye		½ bush.		
Chancellor	Pea	½ bush.		
Vetch		¼ bush.		
Banner, Ottawa 49	Oat	2 bush.	9·44	2·676
Chancellor	Pea	1 bush.		
Banner, Ottawa 49	Oat	2 bush.	9·51	2·629
Mackay	Pea	1 bush.		
Banner, Ottawa 49	Oat	2 bush.	9·32	2·620
Chancellor	Pea	½ bush.		
Vetch		¼ bush.		
Banner, Ottawa 49	Oat	2 bush.	9·08	2·575
Arthur	Pea	1 bush.		
Spring rye		1½ bush.	7·22	2·252
Chancellor	Pea	½ bush.		
Vetch		¼ bush.		

From the foregoing tables, it may be noted that there is a substantial difference in the value of different varieties of the same species in combining to form a mixture. For instance, the Gold Rain oat has proven the most satisfactory to combine with Chancellor pea and vetch. In this respect it is much superior to Banner and spring rye, and slightly superior to Victory and Laurel. Higher yields have also been obtained with Golden Vine pea when combined with the same variety.

Referring to the statement of results for 1930, it may be noted that vetch, although seeded in the various mixtures at the rate of one-quarter bushel per acre, actually forms a very small part of the crop of forage. In view of the comparatively high price of the seed of this plant, it is doubtful if its use in such mixtures is advisable.

As stated in previous reports from the Station, the value of a grain mixture as an ensilage crop depends, to some extent, on its ability to remain standing until a satisfactory stage of maturity has been reached. If the crop lodges badly while still quite green, pea and vetch vines rot quickly. If much of the crop is in this condition it will usually make an ensilage of comparatively poor quality with a disagreeable odour. Occasionally this odour is very pronounced, and, in some instances, milk produced in stables, where such ensilage is fed, has been badly tainted. Accordingly, it is important that grain mixtures, when grown for ensilage, should be cut and ensiled as soon after lodging as possible, regardless of the stage of maturity. It is also advisable to use varieties that are comparatively stiff-strawed in mixtures. So far mixtures containing either Gold Rain or Victory oats have proven quite satisfactory in this respect. On the other hand, mixtures containing Banner oats, peas and vetch almost invariably lodge while quite green. If, however, one-half bushel of spring rye is substituted for a like quantity of Banner oats in the seeding of the mixture, the crop will usually remain standing until a satisfactory stage of maturity has been reached. For the past two years, wheat has been tried for the same purpose with excellent results.

ROOT CROPS

MANGELS

Owing to unfavourable weather during the second and third week in May, seeding of mangels was delayed until June 3, which is about three weeks later than usual. The remainder of the season was, however, decidedly favourable and good average yields were obtained. In the following table the results obtained with the varieties tested in 1930 are listed:—

MANGELS—TEST OF VARIETIES, 1930

Variety	Source	General type and colour	Yield per acre	
			Green weight	Dry matter
			tons	tons
Giant White Sugar	Moore	White, Intermediate	27·85	3·430
Sludstrup	Steves	Yellow, Intermediate	24·70	3·202
Stryno Barres	Hartman	Yellow, Intermediate	28·82	3·152
Eclipse	McKenzie	Yellow, Tankard	24·37	3·042
Mammoth Long Red	Sutton	Red, Long	23·95	3·040
Eckendorffer, Yellow	Hartman	Yellow, Tankard	26·07	2·960
Red Intermediate	Exp. Station, Lennoxville	Red, Intermediate	25·30	2·950
Red Eckendorffer	General Swedish	Red, Tankard	24·37	2·907
Elvetham Mammoth	Hartman	Red, Long	24·40	2·875
Yellow Intermediate	Exp. Farm, Ottawa	Orange, Intermediate	21·40	2·867
Fjerritslev Barres	Hartman	Yellow, Intermediate	24·67	2·767
Sludstrup Barres	Hartman	Yellow, Intermediate	22·70	2·742
Barres Half Long	General Swedish	Yellow, Intermediate	21·80	2·732
Giant White Half Sugar	Ewing	White, Long	20·57	2·730
Danish Sludstrup	McDonald	Orange, Intermediate	21·80	2·632
Yellow Globe	McKenzie	Yellow, Globe	25·34	2·612
Danish Sludstrup	Ewing	Orange, Intermediate	17·12	2·597
Rosted Barres	Hartman	Orange, Intermediate	22·05	2·592
Barres Oval	General Swedish	Yellow, Intermediate	23·05	2·532
Giant Rose Half Sugar	Ewing	Rose, Intermediate	18·17	2·492
Yellow Eckendorffer	General Swedish	Yellow, Tankard	23·17	2·485
Long Red Mammoth	Ewing	Red, Long	18·75	2·455
Red Eckendorffer	Hartman	Red, Tankard	24·32	2·347
Giant Yellow Globe	Ewing	Yellow, Globe	23·92	2·192
Giant Yellow Intermediate	Ewing	Orange, Intermediate	18·75	2·122
Red Globe	Ewing	Red, Globe	18·27	1·932
Averages			22·91	2·707

A number of varieties have now been included in the tests for the past eight years. Following is an average of results obtained during the period with eight varieties, the seed of which is obtainable from Canadian seedsmen:—

MANGELS—AVERAGE OF RESULTS, 1923 TO 1930

Variety	Source	General type and colour	Yield per acre	
			Green weight	Dry matter
			tons	tons
Yellow Intermediate	Exp. Farm, Ottawa	Orange, Intermediate	28·718	3·360
Giant Rose Intermediate	Ewing	Rose, Intermediate	24·595	3·102
Danish Sludstrup	McDonald	Orange, Intermediate	30·348	2·078
Danish Sludstrup	Ewing	Orange, Intermediate	25·632	2·666
Long Red Mammoth	Ewing	Long, Red	21·615	2·648
Red Globe	Ewing	Red, Globe	23·461	2·338
Giant Yellow Globe	Ewing	Yellow Globe	25·248	2·148
Giant Yellow Intermediate	Ewing	Orange, Intermediate	20·993	2·132

Although other varieties frequently give higher yields for a single season, the strain of Yellow Intermediate developed at the Central Experimental Farm, Ottawa, has produced the best crop when averaged over the eight-year period. The roots of this variety are a true intermediate in shape and of medium size. They are not difficult to pull and keep well in storage.

Excellent results have been obtained for the past three years with a strain of Giant White Sugar obtained from Moore. This is a White Intermediate variety, the roots of which are quite uniform in size, shape and colour, and of relatively high dry-matter content.

SWEDE TURNIPS

The season of 1930 was particularly favourable for swede turnips and large yields were quite general throughout the district.

TEST FOR RESISTANCE TO CLUB ROOT.—Where club root had been present in 1929, throughout the district, it was again in evidence in 1930, although loss of crop due to the disease was comparatively small.

Seed of a number of varieties believed to possess marked resistance to this disease was obtained by the Division of Forage Plants, Central Experimental Farm, Ottawa, and forwarded to this Station for trial. It was sown on land on which a crop of swede turnips had been quite generally infected with club root the previous year. It was also decidedly acid in reaction. The seed of all varieties germinated well and a complete and uniform stand was obtained throughout. The crop also made excellent progress until the plants were about three inches high. At that time, it was observed that a number were infected with club root. The infection was general and not in any way predominate on any one variety. From then on, the disease spread rapidly and by the middle of September, practically every plant in the area had been killed by it. From the experience, it would seem that the resistance of so-called club root resistant varieties is actually very slight, and, that on land known to be infested with the disease some other crop than swede turnips should be grown. It is also believed that correcting soil acidity will control the disease.

TEST OF VARIETIES.—Following are the results obtained with thirty-six varieties tested in 1930:—

SWEDE TURNIPS—TEST OF VARIETIES, 1930

Variety	Source	General type and colour	Yield per acre	
			Green weight	Dry matter
			tons	tons
New Empire	Webb	Bronze Top, Globe	30·60	3·402
Good Luck	Steele-Briggs	Purple Top, Globe	30·12	3·362
Hall's Westbury	McDonald	Purple Top, Globe	29·90	3·232
Resistant Bangholm	Exp. Station, Kentville	Purple Top, Globe	24·30	3·170
Ditmars	Exp. Station, Lennoxville	Bronze Top, Globe	30·70	3·135
Ne Plus Ultra	Dupuy & Ferguson	Bronze Top, Globe	30·05	3·125
Favourite	Dupuy & Ferguson	Purple Top, Globe	31·37	3·122
Mammoth Clyde	Dupuy & Ferguson	Purple Top, Globe	26·15	3·090
Stirling Castle	Drummond	Bronze Top, Globe	25·90	3·010
Derby Green Top	Bruce	Bronze Top, Globe	26·47	3·000
Imp. Lord Derby	Sutton	Bronze Top, Globe	30·01	2·985
Imp. Bronze Top	Drummond	Bronze Top, Oval	27·65	2·982
Perfect Model	Kelway's	Bronze Top, Globe	26·37	2·965
Hazard's Improved	Steele-Briggs	Bronze Top, Tankard	25·65	2·932
Imp. Lathian	Drummond	Purple Top, Globe	25·60	2·922
Elephant or Monarch	McKenzie	Purple Top, Globe	25·72	2·912
Canadian Gem	Bruce	Bronze Top, Globe	25·50	2·902
Kangaroo	Steele-Briggs	Bronze Top, Tankard	23·97	2·897
Hartley's Bronze Top	Bruce	Bronze Top, Globe	26·52	2·880
Imp. Lord Derby	Steele-Briggs	Bronze Top, Globe	26·24	2·840

SWEDE TURNIPS—TEST OF VARIETIES, 1930—*Concluded*

Variety	Source	General type and colour	Yield per acre	
			Green weight	Dry matter
			tons	tons
New Buffalo	Webb	Purple Top, Globe	25·80	2·840
Magnum Bonum	McDonald	Purple Top, Globe	27·22	2·812
Majestic	Sutton	Purple Top, Globe	26·27	2·807
Bangholm 8312, M.C.	Macdonald College	Purple Top, Globe	24·08	2·700
North Western	McKenzie	Purple Top, Globe	24·40	2·690
Canadian Gem	Steele-Briggs	Purple Top, Globe	23·90	2·652
Sutton's Champion	Ewing	Purple Top, Globe	23·82	2·650
Kangaroo	Ewing	Bronze Top, Tankard	24·02	2·640
Danish Queen	McDonald	Purple Top, Globe	24·42	2·592
Bangholm (Lyngby Sludsgard)	D.L.F.	Purple Top, Globe	21·95	2·552
Bangholm	Exp. Farm, Nappan	Purple Top, Globe	20·22	2·450
Champion, P. T.	Sutton	Purple Top, Globe	23·20	2·537
Perfection	Dupuy & Ferguson	Bronze Top, Globe	22·15	2·447
Breadstone	McKenzie	Green Top, Globe	15·95	2·442
Laing's Improved	Dupuy & Ferguson	Bronze Top, Globe	21·80	2·387
Elephant or Monarch	Bruce	Purple Top, Globe	21·22	2·177
Average			25·53	2·840

Owing to a general infection of club root in 1929 and a partial crop failure in 1928, an average of results including these years may prove misleading. In general, however, it has been found that the variety Ditmars is the most dependable of those tested over a period of several years. Good Luck, Hall's Westbury and the better strains of Bangholm have also proven quite satisfactory.

FIELD CARROTS

Although field carrots are relatively unimportant as a field crop in the Eastern Townships, small areas are grown annually, on the majority of farms throughout the district. Accordingly, a few varieties of this crop are tested each year. Following is an average of results from 1923 to 1930 obtained with six varieties:—

FIELD CARROTS—AVERAGE OF RESULTS, 1923 TO 1930

Variety	Source	General type and colour	Yield per acre	
			Green weight	Dry matter
			tons	tons
Mammoth Intermediate White	Bruce	White, Intermediate	20·57	2·106
Danish Champion	Exp. Farm, Ottawa	Yellow, Intermediate	17·63	1·882
White Belgian	Ewing	White, Long	18·37	1·823
Yellow Intermediate (new)	Ewing	Yellow, Intermediate	18·07	1·747
White Belgian	Dupuy & Ferguson	White, Long	16·07	1·651
Long Orange	Bruce	Orange, Long	14·89	1·551

Of the varieties listed Mammoth Intermediate White is the most satisfactory, as it is not only high-yielding, but produces roots that are uniformly smooth and well-shaped. Roots of the long varieties are less satisfactory, as they break easily in handling and are usually harder to pull.

HAY CROPS

ALFALFA

Although the results of experiments conducted with alfalfa, at this Station, for the past nine years have been somewhat conflicting and unsatisfactory,

attempts to grow the crop have been increasingly successful. In general where seed of a hardy variety has been sown without a nurse-crop on well-drained fertile soil, slightly alkaline or neutral in reaction, good stands have been obtained. Also good stands of alfalfa have, with very few exceptions, wintered satisfactorily and produced excellent crops of hay for several years. On one area, a half-acre in extent, Ontario Variegated alfalfa seeded in 1924 has proven quite hardy and two good cuttings per season have been obtained each year since 1925. On the other hand, when seeded with a nurse-crop of barley or oats, either alone or in combination with grass and clover, very few plants survive the first winter. Those that do survive, however, develop normally during the following season, and have been observed to persist for several years, even in heavy stands of timothy and other grasses.

From the experience with the crop, thus far, it would seem that under the conditions prevalent at this Station, and in the immediate district, alfalfa plants cannot successfully compete with other plants during the first season. If, however, the first season's growth is sufficient to produce strong vigorous plants, wintering will be satisfactory the first year and for several years thereafter. This necessitates seeding alone, with the consequent loss of one year's crop, from the land, by the omission of the nurse-crop. A vigorous and persistent stand of alfalfa is, however, a valuable asset on any farm where live stock is fed, and will repay a reasonable amount of trouble and expense entailed in the securing of it. Furthermore, although attempts to grow the crop may not at first prove successful, it is quite probable that good stands could be eventually obtained, on many sites throughout the district served by this Station.

Test of Varieties.—Nine varieties and regional strains of Variegated alfalfa were tested in 1930. The seed was sown without a nurse-crop in well-prepared land on June 18, 1929, each variety being sown in duplicate 1/100-acre plots. Germination of seed and growth throughout the first season was satisfactory, and all plots entered the winter with a growth from six to nine inches high. Wintering was also satisfactory and no actual winter-killing could be observed in the spring of 1930.

Two cuttings were made on each plot, the first on June 17 and the second on August 18. A further growth of from eight to ten inches was made during the remainder of the season, but was left uncut as a partial winter protection for the roots.

In the following table the average yields of green crop, and actual dry matter, obtained with each variety are shown:—

Alfalfa—Test of Varieties, 1930

Variety	Source	Yield per acre					
		First cut		Second cut		Total	
		Green weight	Dry matter	Green weight	Dry matter	Green weight	Dry matter
		tons	tons	tons	tons	tons	tons
Ontario Variegated	Peel County, Ont.	8·30	1·68	4·47	1·03	12·77	2·71
Grimm	Brooks, Alta.	6·63	1·41	3·25	0·85	9·88	2·26
Hardigan	Michigan	6·40	1·33	6·05	0·77	12·45	2·10
Baltic	Dakota Imperial Seed Co.	6·43	1·35	3·18	0·73	9·61	2·08
Grimm, No. 451	Carlton, Sask.	6·23	1·17	3·45	0·76	9·68	1·93
Grimm	Steele-Briggs	5·88	1·29	2·90	0·63	8·78	1·92
Cossack	Paramount Seed Co.	5·00	1·04	2·45	0·57	7·45	1·61
Cossack	Dakota Imp. Seed Co.	4·78	1·22	1·83	0·38	6·61	1·60
Grimm	A. B. Lyman	5·61	0·90	2·83	0·63	8·44	1·53
Averages		6·14	1·26	3·38	0·71	9·52	1·97

Although all varieties tested were apparently uniformly hardy, and the stand of crop quite uniform throughout, there is a decided difference in the yield of the various varieties. In general, it has been noted from previous experiments that Ontario Variegated from Peel County, Ont., and Grimm from Brooks, Alta., are strong-growing productive varieties.

RED CLOVER

TEST OF VARIETIES.—The variety test of red clover for 1930 comprised nine varieties, and regional strains, from European sources, two from Quebec and one from Ontario. The test was conducted in duplicate plots of one-hundredth acre each. Following are the results obtained:—

RED CLOVER—TEST OF VARIETIES, 1930

Variety	Source	Dates cut	Yield per acre					
			First cutting		Second cutting		Total crop	
			Green weight	Dry matter	Green weight	Dry matter	Green weight	Dry matter
			tons	tons	tons	tons	tons	tons
Trefle violet du Nord	France	June 26, Aug. 15	6·13	1·00	4·45	1·09	10·58	2·09
Kiev No. 4	U.S.S.R.	June 26, Aug. 14	6·33	1·29	4·13	0·77	10·46	2·06
Ufa No. 1	U.S.S.R.	July 10	12·95	1·98	.....	.....	12·95	1·98
Mammoth Red	Oxdrift, Ont.	July 5	12·63	1·95	.....	.....	12·63	1·95
Biisk No. 3	U.S.S.R.	July 9	13·05	1·93	.....	.....	13·05	1·93
Perm No. 2	U.S.S.R.	July 9	12·00	1·84	.....	.....	12·00	1·84
Common Red	St. Clet, Que.	June 26, Aug. 15	8·58	1·25	2·38	0·44	10·96	1·69
Common Red	Chateauguay, Que.	June 26, Aug. 15	6·93	1·12	1·75	0·35	8·68	1·47
Trefle violet du Sud de la Loire	France	June 26, Aug. 15	5·70	0·85	2·63	0·61	8·33	1·46
Late Swedish	Svaloff, Sweden	July 9	7·75	1·24	.....	.....	7·75	1·24
Early Swedish	Svaloff, Sweden	June 26, Aug. 15	3·88	0·55	2·78	0·60	6·66	1·15
Trefle violet de l'Ouest	France	June 26, Aug. 15	3·75	0·59	1·58	0·35	5·33	0·94
Average			.....	.....	.....	.....	9·95	1·65

Owing to comparatively favourable conditions during the winter of 1929 and 1930, and the spring of 1930, very little winter-killing occurred. As a result varieties, the seed of which was obtained from France and the central portion of the Soviet Republic, produced higher yields than Canadian and Swedish varieties. Such results are unusual and could not be expected under average conditions. In variety tests conducted in 1923, 1924 and 1925, varieties from sources in Quebec and Northern Ontario proved hardier and higher-yielding than those of European origin.

FACTORY SUGAR BEETS

Each year a few varieties of factory beets are grown at this Station. Representative specimens of each variety are forwarded annually to the Dominion Chemist for analysis, who has reported them to be of high sugar content and of good quality generally. Yields have also proven quite satisfactory.

Following are the results obtained in 1930:—

FACTORY SUGAR BEETS—TEST OF VARIETIES, 1930

Variety	Yield per acre	Sugar in juice	Coefficient of purity
	tons	p.c.	p.c.
Rabbethge & Giesecke	11·02	20·55	92·17
Dippe	10·87	21·25	91·07
Fredericksen	10·55	20·76	91·75

CEREALS

OATS

Of more than one hundred so-called varieties of oats that have been grown at this Station in small observation plots and rod-row tests, those listed in the following statement were grown in quadruplicate one-hundred-and-twentieth-acre plots in 1930:—

OATS—TEST OF VARIETIES, 1930

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.
Victory	109	4·75	51·75	37·0	72·35	1,971·2
Legacy, Ottawa 678	99	7·25	46·40	37·0	71·22	1,852·5
Star	104	6·33	46·00	35·0	69·53	1,773·0
Banner, Ottawa 49	88	3·00	48·00	36·0	65·60	1,672·8
Gold Rain	107	9·50	52·40	37·5	64·41	1,653·4
Brome, Macdonald College	105	3·25	50·40	35·0	63·07	1,683·5
Banner 44, Macdonald College	109	5·33	51·80	34·0	60·78	1,549·8
Banner, Lennoxville	108	7·83	50·50	32·0	60·56	1,523·8
Brant, Macdonald College	99	2·50	50·80	36·5	60·00	1,591·2
La Salle, Macdonald College	110	5·50	50·00	34·5	57·35	1,530·7
Cartier, Macdonald College	94	8·25	43·40	37·5	48·65	1,307·5
Alaska	98	7·25	43·25	36·5	47·35	1,248·1
O.A.C. No. 3	100	7·00	44·50	35·5	43·53	1,095·1
Laurel, Ottawa 477	104	9·83	43·00	52·0	Hulless	1,215·0
Average						1,547·7

Nine of the varieties, listed in the foregoing table, have been included in the one-hundred-and-twentieth-acre plot tests for the past five years. Following is an average of the results obtained:—

OATS—AVERAGE OF RESULTS, 1926 TO 1930

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	8·57	42·5	86·08	2,153·7
Banner, Ottawa 49	103·0	8·00	48·2	81·24	2,000·2
Victory	106·8	8·00	48·4	80·48	1,966·2
Gold Rain	99·0	8·80	47·8	78·38	1,893·9
La Salle, Macdonald College	110·0	8·00	49·0	71·45	1,849·3
Banner 44, Macdonald College	108·0	7·70	47·8	70·08	1,745·2
O.A.C. No. 3	94·0	8·30	41·4	60·25	1,632·2
Alaska	93·7	8·80	39·6	60·49	1,606·4
Laurel, Ottawa 477	104·6	9·60	42·9	Hulless	1,555·8

In addition to being five days earlier than Banner, Ottawa 49 and Victory, the variety Legacy, when averaged over the five-year period, has also produced a larger yield of both total grain and kernel. From the results obtained with this variety in test plots and on larger areas, as a farm crop at this Station, it is apparently more suitable for much of the Eastern Townships, than the varieties now commonly grown. It is one of the many varieties originated at the Central Experimental Farm, Ottawa, and since it is comparatively new, has not yet been registered. Accordingly, seed is not available at present. When, however, seed is available to farmers throughout this district, it would seem probable that the variety will largely replace both Banner and Alaska, the two available varieties, which are at present considered the most suitable.

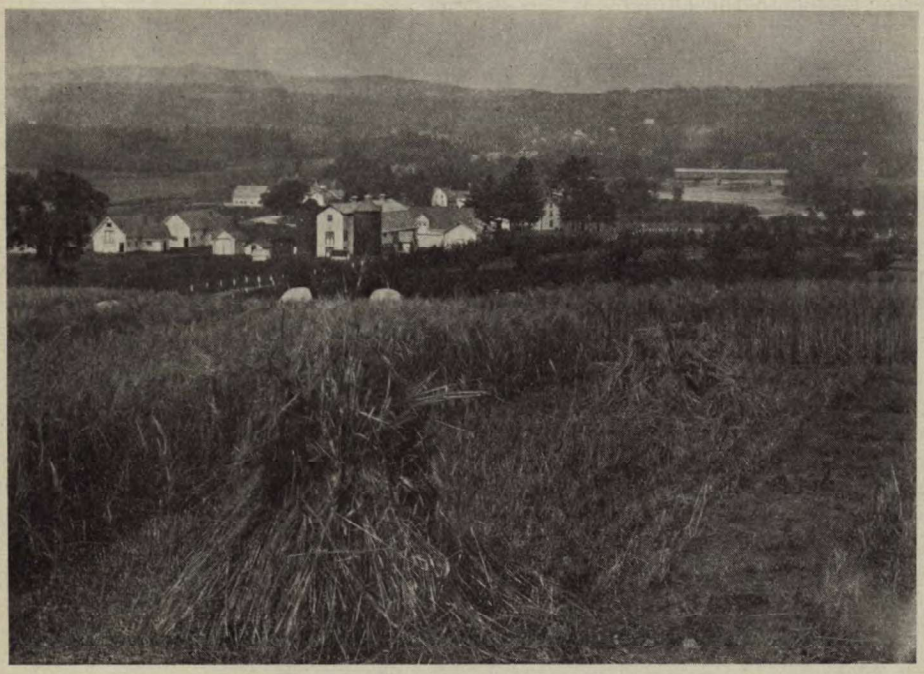
BARLEY

Although oats are the most commonly grown cereal in this district, barley will, under average conditions, produce higher yields of grain. Furthermore, the most suitable varieties of barley are also earlier than the highest-yielding varieties of oats, and, in the average season, can usually be harvested in better condition.

Although a test of varieties has been conducted with barley at this Station each year since 1923, the project was enlarged in 1929, by the addition of several promising varieties. In order to show the results obtained from these, the following table includes only varieties which have been tested during the past two years:—

BARLEY—AVERAGE OF RESULTS, 1929 AND 1930

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.
Gold (Swedish)	6-rowed	95·0	8·0	35·6	55·50	59·20
Trebi	6-rowed	94·5	7·3	34·7	50·00	58·06
Bearer, Ottawa 475	6-rowed	96·0	8·2	42·6	46·75	57·22
Star	6-rowed	84·5	9·0	30·1	51·00	55·38
Charlottetown 80	2-rowed	100·0	7·6	37·4	53·50	54·76
Pontiac, Macdonald College	6-rowed	91·0	8·2	42·4	50·00	53·88
Manchurian, Cap Rouge 14	6-rowed	90·0	8·7	40·6	49·00	53·66
O.A.C. 21	6-rowed	87·5	8·8	40·7	52·00	51·75
Hannchen	2-rowed	95·0	6·0	39·5	55·50	50·51
French Chevalier	2-rowed	94·0	8·5	49·6	55·20	50·06
Mensury, Ottawa 60	6-rowed	87·5	8·8	40·5	50·00	48·76
Duckbill 207, Macdonald College	2-rowed	100·0	8·3	40·6	52·75	47·52
Himalayan, Ottawa 59	Hulless	83·5	9·4	30·6	62·75	44·89
Plumage-Archer	2-rowed	103·0	9·2	37·5	53·00	41·81
						51·96



Partial view of barley experiments in 1930.

Previous to 1929, the highest yields of grain have been obtained with Mensury, Ottawa 60, heretofore known as Chinese, Ottawa 60, and O.A.C. 21. Both are tall-growing six-rowed varieties well suited to the climatic conditions of the Eastern Townships. The varieties Gold and Trebi, although several days later in maturing, are otherwise satisfactory, and may prove very useful for this district.

SPRING WHEAT

While wheat is not an important crop in the Eastern Townships, small areas are grown annually on many farms. In general the yields obtained are fairly high and the quality of the grain satisfactory.

Following are the average results obtained with four varieties that have been tested at this Station for the past six years:—

WHEAT—AVERAGE OF RESULTS, 1925 TO 1930

Variety	Number of days maturing	Height	Strength of straw on scale of 10 points	Yield per acre
		in.		bush.
Huron, Ottawa 3	107·5	44·1	9·20	31·46
Pringle's Champlain 207, Macdonald College	110·9	44·6	8·90	29·87
Garnet, Ottawa 625	100·2	41·1	9·25	28·98
Marquis, Ottawa 15	105·1	43·9	9·90	27·57

So far, the variety Huron, Ottawa 3, has proven the most satisfactory variety tested at this Station. While not decidedly superior to Pringle's Champlain in yield and quality of grain, it is a few days earlier and, therefore, better suited to the climate in this district.

FALL WHEAT

Although the winter of 1929 and 1930 was generally favourable for the wintering of clovers and alfalfa, considerable winter-killing occurred with practically all varieties of fall wheat, included in the tests for 1930. One variety, however, Kharkov 1312, Macdonald College, escaped serious injury and produced a crop of thirty-three bushels per acre. It has now been grown at this Station for the past seven years and during that time has proven both hardy and productive. On suitable sites, the variety should prove satisfactory throughout the district served by this Station.

FIELD PEAS

In general, the climate and soil of the Eastern Townships are suitable for field peas, and, under average conditions, comparatively high yields of this crop are obtained. In view of good market demand, as well as the high feeding value, the crop could be profitably grown on many farms throughout the district.

Following are the average results obtained with six varieties that have been tested at this Station for the past six years:—

FIELD PEAS—AVERAGE OF RESULTS, 1925 TO 1930

Variety	Number of days maturing	Weight per measured bushel	Yield per acre
		lb.	bush.
O.A.C. 181	94	55·6	28·27
Arthur, Ottawa 18	96	44·7	26·93
Mackay, Ottawa 25	103	54·4	26·70
Cartier, Ottawa 16	94	51·6	26·13
Chancellor, Ottawa 26	96	53·3	26·13
Prussian Blue	105	58·1	22·01

At Lennoxville, the season usually experienced is characterized by frequent showers during late August and early September. Accordingly, early varieties of field peas are more satisfactory than the later sorts. Under average conditions, if ripening of the crop is delayed beyond the middle of August, difficulty will be experienced in getting it dry enough to thresh. Also the frequent turning of the pulled crop, necessary in showery weather, will usually result in considerable loss. Such varieties, therefore, as O.A.C. 181 and Arthur, Ottawa 18, which are both early and high-yielding, are better suited to the climate and have proven the most satisfactory.

FIELD BEANS

When grown on soil in a fair state of fertility, suitable varieties of beans have produced excellent yields at this Station. It has also been observed that excellent crops are usually obtained from the comparatively small areas grown throughout the district. Field beans are an excellent cash crop and a substantial increase in their production in this portion of the country would add materially to the farm income.

Following is a six-year average of the results obtained with four of the leading varieties tested during that period:—

FIELD BEANS—AVERAGE OF RESULTS, 1925 TO 1930

Variety	Number of days maturing	Height of plant	Yield per acre
		in.	bush.
Red Kidney	110·7	15·2	39·99
Navy, Ottawa 711	104·3	12·8	36·30
Robust	114·2	17·2	32·54
Improved Yellow Eye	109·6	14·7	29·13

For strictly commercial purposes, Navy, Ottawa 711 is probably the most satisfactory variety. The beans are white, medium in size and of excellent cooking quality. The variety is also early maturing and comparatively high-yielding.

Red Kidney, which has produced the largest yield of all varieties tested during the past six years, is an excellent variety for home use and possibly local sale. The beans of this variety are quite large, red in colour and of excellent cooking quality. The variety, however, is rarely offered for sale in this district, and, owing to its distinct difference in appearance to that of beans usually sold, is not readily salable at present.

GRAIN MIXTURES

By growing suitable varieties of different species of grain together in a mixture, very satisfactory yields may be obtained. Furthermore, a mixture composed of oats and barley will, since barley contains more digestible nutrients than oats, produce grain of higher feeding value than oats alone. Similarly, a further increase in feeding value may be obtained by using wheat or peas, or both species in mixture. Usually an increase in the feeding value of a mixture is accompanied by a decrease in yield of grain, although there may also be an increase in total digestible nutrients produced. In the following statement, the results obtained with the various grain mixtures tested in 1930 are shown:—

GRAIN MIXTURES, 1930

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	Digestible nutrients
			in.			lb.	lb.
Charlottetown 80	Barley 36 pounds	106	42·0	.....	47·0	.....	.....
Huron, Ottawa 3	Wheat 30 "	101	45·5	.....	6·5	.....	.....
Banner, Ottawa 49	Oats 51 "	104	49·2	6·5	46·5	3,360	2,528·7
Charlottetown 80	Barley 1 bushel.	96	39·5	.....	50·0	.....	.....
Legacy	Oats 2 bushels	95	43·7	7·0	50·0	3,060	2,291·9
Charlottetown 80	Barley 36 pounds	106	39·5	.....	46·0	.....	.....
Garnet	Wheat 30 "	92	35·0	.....	4·8	.....	.....
Banner, Ottawa 49	Oats 51 "	104	50·0	5·0	49·2	3,024	2,268·2
Duckbill, Ottawa 57	Barley 36 "	102	40·7	.....	15·5	.....	.....
Huron, Ottawa 3	Wheat 30 "	105	45·5	.....	8·5	.....	.....
Banner, Ottawa 49	Oats 51 "	102	51·7	7·0	76·0	3,120	2,265·7
Duckbill, Ottawa 57	Barley 36 "	98	38·5	.....	18·0	.....	.....
Pringle's Champlain	Wheat 30 "	102	45·2	.....	7·0	.....	.....
Banner, Ottawa 49	Oats 51 "	104	50·5	6·0	75·0	3,084	2,242·0
Charlottetown, 80	Barley 1 bushel.	106	42·0	.....	46·0	.....	.....
Banner, Ottawa 49	Oats 2 bushels	104	49·2	7·0	54·0	3,000	2,136·2
Mensury, Ottawa 60	Barley 1 bushel.	102	38·5	.....	46·0	.....	.....
Banner, Ottawa 49	Oats 2 bushels	105	51·0	7·0	54·0	3,000	2,136·2
Mensury, Ottawa 60	Barley 1 bushel.	93	39·0	.....	58·0	.....	.....
Alaska	Oats 2 bushels	91	48·7	5·7	42·0	2,760	2,087·1
Duckbill, Ottawa 57	Barley 30 pounds	102	41·5	.....	17·5	.....	.....
Huron, Ottawa 3	Wheat 25 "	105	46·5	.....	5·0	.....	.....
Banner, Ottawa 49	Oats 45 "	102	50·2	.....	64·5	.....	.....
Arthur	Peas 30 "	.....	48·0	6·0	13·0	2,820	2,064·6
Duckbill, Ottawa 57	Barley 1 bushel.	102	44·0	.....	23·0	.....	.....
Banner, Ottawa 49	Oats 2 bushels	105	52·5	5·6	77·0	2,784	2,017·6
O.A.C. 21	Barley 1 bushel.	96	36·5	.....	62·5	.....	.....
Alaska	Oats 2 bushels	91	46·0	7·2	37·5	2,604	1,979·6
Mensury, Ottawa 60	Barley 1 bushel.	93	39·5	.....	45·0	.....	.....
Daubeny	Oats 2 bushels	91	48·5	6·7	55·0	2,580	1,920·8
Duckbill, Ottawa 57	Barley 1 bushel.	104	40·2	.....	23·5	.....	.....
O.A.C. 72	Oats 2 bushels	105	54·5	7·1	76·5	2,484	1,801·3
Duckbill, Ottawa 57	Barley 1½ bushels	102	41·5	.....	57·0	.....	.....
Huron, Ottawa 3	Wheat 1 bushel.	105	46·7	9·4	43·0	2,064	1,610·4
Banner, Ottawa 49	Oats 2 bushels	102	51·0	.....	87·5	.....	.....
Arthur	Peas 30 pounds	97	47·5	7·0	12·5	2,160	1,536·3
Duckbill, Ottawa 57	Barley 48 pounds	102	45·0	.....	60·5	.....	.....
Huron, Ottawa 3	Wheat 30 "	105	44·0	.....	15·5	.....	.....
Arthur	Peas 30 "	97	43·0	6·25	24·0	1,620	1,275·6
Averages		.....	.....	.....	.....	2,720	2,010·1

Of the mixtures tested in 1930, a number have been included in similar tests for four years. Following are the average results obtained during that period:—

GRAIN MIXTURES—AVERAGE OF RESULTS, 1926, 1927, 1929 AND 1930

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	Digestible nutrients
				in.			lb.	lb.
Charlottetown 80	Barley	36 pounds	102·2	40·9	.....	43·25	.....	.....
Huron, Ottawa 3	Wheat	30 "	105·0	45·6	.....	12·65	.....	.....
Banner, Ottawa 49	Oats	51 "	103·5	47·2	9·15	44·1	3,118	2,354·7
Charlottetown 80	Barley	1 bushel.	102·2	41·4	.....	48·0	.....	.....
Banner, Ottawa 49	Oats	2 bushels	103·5	46·9	8·3	52·0	3,064	2,288·5
Charlottetown 80	Barley	1 bushel.	102·2	39·2	.....	49·0	.....	.....
Legacy, Ottawa 678	Oats	2 bushels	101·7	41·1	9·2	51·0	2,977	2,228·1
Banner, Ottawa 49	Oats	2 bushels	102·2	50·5	.....	88·6	.....	.....
Arthur	Peas	0·5 "	101·0	53·1	8·1	11·4	2,767	2,145·4
Duckbill, Ottawa 57	Barley	30 pounds	103·2	42·5	.....	17·4	.....	.....
Huron, Ottawa 3	Wheat	25 "	105·9	46·1	.....	10·8	.....	.....
Banner, Ottawa 49	Oats	45 "	102·2	48·5	.....	56·8	.....	.....
Arthur	Peas	30 "	102·0	49·3	6·85	15·0	2,821	2,084·2
Duckbill, Ottawa 57	Barley	36 "	103·5	41·0	.....	30·2	.....	.....
Huron, Ottawa 3	Wheat	30 "	105·9	40·8	.....	12·2	.....	.....
Banner, Ottawa 49	Oats	51 "	102·9	47·0	6·6	57·6	2,749	2,042·5
Mensury, Ottawa 60	Barley	1 bushel.	90·0	42·0	.....	39·5	.....	.....
Banner, Ottawa 49	Oats	2 bushels	103·7	48·4	8·5	60·5	2,721	2,012·3
O.A.C. 21	Barley	1 bushel.	93·2	42·0	.....	51·8	.....	.....
Alaska	Oats	2 bushels	92·9	44·6	8·6	48·2	2,591	1,944·8
Chinese, Ottawa 60	Barley	1 bushel.	92·2	41·1	.....	49·6	.....	.....
Alaska	Oats	2 bushels	93·7	44·4	8·4	50·4	2,556	1,921·6
Mensury, Ottawa 60	Barley	1 bushel.	93·2	42·0	.....	47·3	.....	.....
Daubeny	Oats	2 bushels	92·9	44·4	6·25	52·7	2,561	1,911·8
Duckbill, Ottawa 57	Barley	1½ "	103·5	42·8	.....	55·5	.....	.....
Huron, Ottawa 3	Wheat	1 bushel.	105·75	46·6	9·6	44·5	2,283	1,792·4
Duckbill, Ottawa 57	Barley	1 "	103·5	42·2	.....	54·4	.....	.....
Huron, Ottawa 3	Wheat	0·5 "	106·0	45·5	.....	19·2	.....	.....
Arthur	Peas	0·5 "	100·7	49·0	7·2	26·4	1,963	1,545·7

Although the highest yield of digestible nutrients has been obtained with a mixture of Banner oats, Charlottetown 80, barley and Huron wheat, it is not an entirely satisfactory mixture. The variety of barley used is, as may be noted, somewhat shorter than either the wheat or oats. Accordingly, when cut with a binder, the heads of barley are quite close to the band, and, during showery weather, dry much more slowly than those of the oats and wheat. This, in unfavourable harvest weather, may result in damaged grain with a corresponding decrease in the value of the crop. By using Legacy oat in combination with Charlottetown 80 barley, very satisfactory results have been obtained. Both varieties are approximately the same height, mature within a day or two of each other and produce a comparatively high yield of grain. Where an early-maturing crop is required, a mixture composed of O.A.C. 21, or Mensury, Ottawa 60, barley will be found very satisfactory.

HORTICULTURE

VEGETABLES

POTATOES

With a favourable climate, suitable soil, and a comparatively short distance to large consuming centres, the Eastern Townships offer an excellent opportunity for large-scale potato production. There are, however, very few commercial growers who operate on a large scale in the district, the bulk of the crop being produced on small areas for home consumption and local sale. On such small areas, the most efficient machinery cannot be economically used, and, as a consequence, production costs are relatively high. Also, as the potato crop is of minor importance, in comparison with other lines of work carried out on Eastern Township farms, it seldom receives sufficient attention, with the result that yields are low.

Although fairly efficient hand-driven spray pumps and dusters are now comparatively common, the greatest lack of attention seems to be in the control of the Colorado potato beetle and the potato blights. Frequently the materials used are unsuitable, as in the common practice of using Paris green and water only, which, although efficient in killing beetles, is injurious to the potato plant. This injurious effect can be counterbalanced by using about two pounds of hydrated lime to each pound of Paris green. Such a mixture, however, is not a fungicide and will not control blights. It has also been observed that where suitable materials are used, they are seldom applied frequently enough, and when applied are used too sparingly.

Experiments in the dusting and spraying of potatoes have been conducted at this Station for the past eight years. The results from this work have shown that in the average season four or five sprayings or dustings are necessary to obtain satisfactory results.

Of the various sprays tried, the most satisfactory and economical is the Bordeaux, calcium arsenate mixture. This is composed of five pounds of copper sulphate, nine pounds of hydrated lime, one and a half pounds of calcium arsenate, and forty gallons of water. To make five sprayings, beginning when the potato plants are about four inches high, each acre of crop will require approximately 175 gallons of the mixture.

Practically all of the dusts now obtainable commercially are satisfactory, if used properly. To obtain satisfactory control with the average dust, approximately 100 pounds of material will be required, per acre, for five applications.

GARDEN PEAS

The climatic conditions usually experienced in this district are very favourable for garden peas. Not only are large yields frequently obtained but, as a result of the well-distributed rainfall, some of the better varieties will, when properly handled, produce satisfactory pickings over a period of three or four weeks.

Test of Varieties.—Each year since the establishment of this Station a large number of varieties of peas have been tested annually. Of varieties, the seed of which has been obtained from commercial sources, the best yields have been produced by the variety Telephone. It is, however, a very tall-growing variety and requires brushing. For the commercial grower it is, therefore, not entirely satisfactory, as the cost of brushing will usually be too great to permit a profit from the crop. For the home or kitchen garden, it is the best late variety available. Varieties which have proven satisfactory for commercial purposes, and under average conditions will not require brushing, are in order of season: Blue Bantam, Gradus, and Stratagem.

During the past two years, a number of new varieties originated in the Experimental Farm system have been tested along with the principal commercial sorts. Some of these have given excellent results, and should, when seed is available in commercial quantities, prove excellent varieties for the district. Following is an average of the results obtained with these and the three most satisfactory commercial varieties for the seasons of 1929-30:—

PEAS—AVERAGE OF RESULTS, 1929-30

Variety	Source	Season	Height		Size of pod	Yield of unshelled peas from one 30 foot row	
			ft.	in.		lb.	oz.
Bruce	Exp. Station, Invermere	July 16–Aug. 8	5	6	Large	35	15
Telephone	Exp. Station, Lennoxville	July 15–Aug. 14	8	0	Large	34	8
Gradus x English Wonder	Exp. Farm, Ottawa	July 12–Aug. 12	6	0	Medium	33	5
Gradus	Exp. Station, Lennoxville	July 2–Aug. 4	5	3	Medium	31	7
Stratagem	Graham Bros.	July 18–Aug. 18	4	6	Large	26	0
Director	Exp. Station, Invermere	July 12–Aug. 6	5	3	Large	25	4
Kootenay	Exp. Station, Invermere	July 14–Aug. 9	7	0	Large	24	3
Gradus	Graham Bros.	July 7–Aug. 1	5	3	Medium	24	0
Gregory Surprise x English Wonder	Exp. Farm, Ottawa	July 16–Aug. 1	6	6	Small	22	12
Lincoln	Exp. Station, Invermere	July 12–Aug. 4	3	0	Medium	22	12
Blue Bantam	Graham Bros.	July 7–July 25	1	6	Medium	13	4

TOMATOES

The season of 1930 was without exception the most favourable for tomatoes that has so far been experienced at this Station. It was also the longest, for although the thermometer registered 32 degrees F. on the night of September 11, the forenoon of the following day was cloudy and tomato vines escaped injury. From then, until October 2, when the first killing frost occurred, excellent ripening weather prevailed. As a result, very high yields of ripe tomatoes were obtained from varieties which in the usual season are only beginning to bear when the plants are killed by frost.

TEST OF VARIETIES.—Twelve varieties were tested in 1930, of these the largest crop was produced by the variety Herald, the seed of which was obtained from the Horticultural Division, Central Experimental Farm, Ottawa. The fruit of this variety is of fair size, smooth and of good quality. The variety is, however, later than those usually most satisfactory in this district, and, in a more normal season, would probably prove less productive. The earliest crop was obtained from a cross-bred variety. Alacrity x Earlibell, the seed of which was also supplied by the Horticultural Division, Central Experimental Farm. It produces smooth medium-sized fruit of good quality, but the yield was comparatively low. Very satisfactory crops were obtained from the Lennoxville selections of Bonny Best and Alacrity.

BEANS

TEST OF VARIETIES.—As stated in previous reports from this Station, the only varieties of beans that may be depended upon to produce satisfactory crops in this district are those that possess a high degree of resistance to pod spot, or anthracnose. This disease was again quite prevalent during the past season, and the crop from the majority of the varieties included in the variety test at this Station was badly damaged. Several varieties have, however, proven

fairly resistant to the disease and produced comparatively clean crops each year. Of these Pencil Pod Black Wax and Round Kidney Wax are the most satisfactory yellow-podded varieties. Refugee 1000-1 and Masterpiece have proven very satisfactory green-podded varieties.

Of various pole varieties that have been tested during recent years, Golden Cluster has produced the largest crops, which have also been of the best quality. Kentucky Wonder Wax has proven slightly inferior to this variety in all respects.

LETTUCE

TEST OF VARIETIES.—Sixteen varieties of lettuce were included in the test of varieties for 1930, and, although there were several among these that were grown for the first time at this Station, the previously recommended varieties proved to be the most satisfactory. In this district there is a splendid demand for good head lettuce, but so far no really satisfactory variety has been tested at this Station. Iceberg, the most readily salable variety, scalds easily and usually bolts into seed stalks before the heads have fully developed. The same has been experienced with the varieties All Heart, Prize Head and Tom Thumb. Salamander, although not subject to scald, rarely forms well-developed heads. Big Boston scalds badly, and, although occasionally producing large compact heads, is not readily marketable on account of its smooth leaf. The variety New York is apparently well suited to the climatic conditions of the district, but, on account of its dark green colour and thick leaf, cannot be easily marketed. The quality, however, is quite good, and it is probable that when the variety becomes better known by consumers in this district, it will largely replace Iceberg.

Of the many varieties of the leaf or open head group that have been tested, none have proven superior to either Grand Rapids or Black Seeded Simpson.

CABBAGE

TEST OF VARIETIES.—Owing to a general infection of club root, no results of comparative value were obtained from the variety test of cabbage in 1930. Throughout the season, each of the twenty-two varieties included in the test was examined from time to time, but in so far as could be determined, no particular variety seemed to possess marked resistance to the disease.

From the results obtained from former trials, the most satisfactory varieties are: early, Golden Acre and Copenhagen Market; mid-season, Succession; late, Ex Amager Danish Ballhead.

DIFFERENT DATES OF SEEDING.—On the area where this experiment was conducted, the club root attack was less severe than on the variety test area, and fairly satisfactory results were obtained.

The varieties used in this work are: Golden Acre, Copenhagen Market and Ex Amager Danish Ballhead. The first seedings are made in the hotbed, early in April, the next about two weeks later, in the first cold frame, and the remainder, at intervals of two weeks, in the open garden, until the middle of July. For the past two years, Golden Acre has proven superior to Copenhagen Market in all seedings, the heads developing better during hot weather and producing larger crops from late seedings. With this variety, good marketable heads have been obtained for the past two years, with seedings during the first week in July. In 1930, more than half of the plants, from the middle of July seeding, developed into satisfactory heads. Ex. Amager Danish Ballhead cannot be depended upon to produce a satisfactory crop from seedings later than the middle of June.

CAULIFLOWER

TEST OF VARIETIES.—Of the varieties tested in 1930, Early Snowball was the most satisfactory early sort. This variety has now been included in the tests for ten years, and in each season has produced the best crop of early cauliflower.

Of the later varieties, Danish Perfection, tested for the first time in 1930, proved superior to Danish Giant, Veitch Autumn Giant and Large Late Algers.

DIFFERENT DATES OF SEEDING.—Although there is a tendency in this district for plants from very early seedings to bolt or form seed stalks instead of satisfactory heads, the weather during the season of 1930 was particularly favourable and very little bolting was observed. Accordingly, excellent heads were obtained from all seedings of both Dwarf Erfurt and Early Snowball up to the middle of July. Usually, however, the early seeding of Dwarf Erfurt is unsatisfactory and late seedings produce small heads. The variety Snowball has, however, proven very satisfactory from both early and late seedings.

ONIONS

TEST OF VARIETIES.—Although the season was practically ideal for the onion crop the yields secured at this Station were slightly below average as the result of a severe attack of root maggot. Fairly effectual control was obtained by the use of the Bordeaux Oil Spray, otherwise the crop would have been, like many in the district, a complete failure. Of the varieties which have been tested for the past six years, the best results have been obtained with those listed in the following statement:—

ONIONS—AVERAGE OF RESULTS, 1926 TO 1930

Variety	Colour	Shape	Yield from two thirty-foot rows	
			lb.	oz.
Ailsa Craig	Yellow	Oval	25	3
Red Wethersfield	Red	Slightly flat	24	4
Extra Early Flat Red	Red	Flat	23	8
Giant Prizetaker	Yellow	Oval	23	6
Yellow Globe Danvers	Yellow	Oval	23	0
Southport Red Globe	Red	Globe	21	6
Southport White Globe	White	Globe	20	0
Southport Yellow Globe	Yellow	Globe	19	0
White Portugal	White	Flat	16	13

As the market preference throughout this district is decidedly in favour of a red, slightly flat onion of medium size, Red Wethersfield is the most suitable for commercial purposes. Extra Early Flat Red, although quite productive, is often very ununiform in size and the onions do not keep well in storage. For home use, Ailsa Craig is very satisfactory. White Portugal has proven very useful for early bunching and pickling.

GARDEN BEETS

TEST OF VARIETIES.—During the five years previous to 1930, a comparatively large number of varieties were tested. In 1929 a total of sixteen were grown. As most of these varieties have consistently proven inferior to those previously recommended, namely, Detroit Dark Red and Crosby Egyptian, they were dropped from the test and replaced in 1930 by varieties heretofore untried at this Station. Of these, Improved Dark Red, the seed of which was obtained from Webb, was superior in both quality and yield to Detroit Dark Red. The deepest colour and best quality were, however, obtained with Crosby Egyptian.

DIFFERENT DATES OF SEEDING.—Owing to the very favourable season, beets of good bunching size were obtained from all seedings of Detroit Dark Red, up

to the middle of July. Such results are, however, unusual as in the average season beets of bunching size are rarely obtained from seedings made later than the last week in June.

GARDEN CARROTS

TEST OF VARIETIES.—Of the nine varieties of garden carrots tested in 1930, the largest crop was obtained with the variety Chantenay. Early Scarlet Horn, which has been grown at this Station for two years, produced carrots of the finest quality. Although somewhat less productive than Chantenay, the carrots of this variety attain a fair size. For early bunching, and general use throughout the summer, it is apparently an excellent variety. For winter storage, or where bulk of crop is desired, Chantenay will prove more satisfactory.

DIFFERENT DATES OF SEEDING.—During seven of the eight years that this project has been conducted, carrots of bunching size have been obtained each year from all seedings of the variety Chantenay up to the middle of June. In 1930, however, carrots of excellent size were harvested on October 1, from a seeding made on July 15. Such results are, however, exceptional, as in the average season, about 105 days are required from the time late seedings are made until carrots of bunching size are available. Accordingly, seedings later than the middle of June cannot be depended upon to produce a marketable crop.

CELERY

Although the celery crop at this Station was sprayed eleven times with Bordeaux mixture, during the past season, only four of the twelve varieties included in the variety test escaped serious injury from celery blight. Of these Easy Blanching is apparently the best commercial variety. It is a tall, early variety, pale yellow in colour and, as its name implies, comparatively easy to blanch. Rose Ribbed and Evans Triumph, which are not suitable as market varieties on account of their colour, are apparently more resistant to blight than all other varieties tested at this Station. For home use, for late celery and storage, either one should prove very satisfactory. Fairly effective control of blight has also been obtained with the variety White Plume, which, on account of its small size, is not a good market sort. Its quality, however, is excellent.

SWEET CORN

TEST OF VARIETIES.—As a result of the very favourable season, all of the twelve varieties tested in 1930 produced a maximum crop, every ear reaching the boiling stage before the first killing frost in the fall. Such results are, however, unusual as in the average season only the very earliest varieties are likely to prove satisfactory. Of these Banting has proven superior to all other varieties tested at this Station. It is very early, the ears are of fair size, and the kernels yellow, deep and of excellent quality. For the past three years a small block of this variety has been grown for seed, and the seed obtained distributed to gardeners throughout the district. The reports received have been very encouraging and plantings of the variety are increasing rapidly each year.

TREE FRUITS

APPLES

VARIETY ORCHARD.—The entire year of 1930 and the fall of 1929 were the most favourable for apple trees so far experienced at this Station. As a result very little winter-killing was observed and trees made a strong, vigorous growth during the season. In the dry warm weather of early fall, this growth matured thoroughly and all trees entered the winter in excellent condition.

For the first time at this Station, an infection of fire blight occurred throughout the orchard, largely in the form commonly known as twig blight. All diseased limbs were pruned out as soon as observed, and the cuts thus made disinfected with a solution made up of one-quarter ounce of mercuric cyanide, one-quarter ounce of mercuric chloride, two quarts of water and two quarts of glycerine. A few fire blight cankers were also found on the larger limbs. These were cut out and the wounds disinfected. Later in the season all large cuts and wounds were painted over with a paint composed of white lead and raw linseed oil.

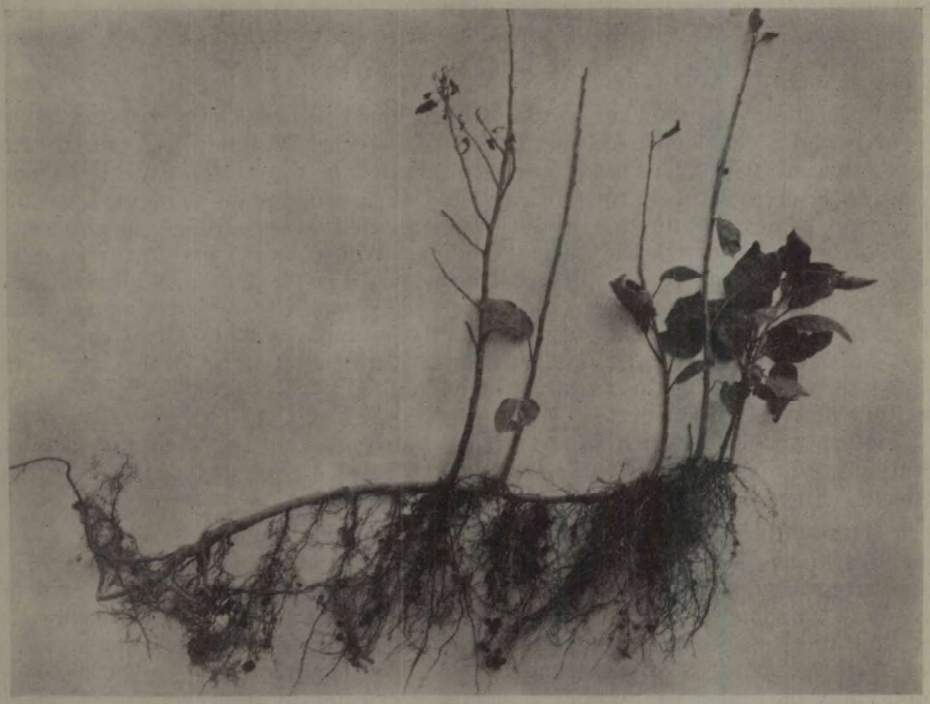
In addition to promising varieties, mentioned in previous reports as having fruited at this Station, three small trees of the variety Linda, set out in 1926, bore fruit in 1930. This variety was originated in the Horticultural Division, Central Experimental Farm, Ottawa, and is a seedling of Langford Beauty. The fruit is of medium to large size and attractive appearance, being largely crimson, splashed or washed on pale yellow. Well-coloured specimens have the appearance of being practically solid crimson. The flavour is a pleasant sub-acid and the flesh firm, crisp and juicy. The fruit ripened during the third week in September and the keeping quality is apparently excellent. It is the best apple of good keeping quality grown at this Station to date. If it continues to prove hardy, the variety will undoubtedly be of great value for many sections of Western Quebec.

Other varieties which have proven hardy and of good quality at this Station are in order of season as follows: Galetta, Melba, Joyce, Lobo, Winton, Donald, Mendel and Lawfam.

Hardy Root Stock Production.—Although the importance of using root stock of known hardiness, upon which to graft or bud varieties of apples, is not generally recognized by nurserymen in Eastern Canada, there is ample evidence available to show that in the portion of the province of Quebec, served by this Station, root hardiness is a necessary factor. Under average conditions experienced in the apple-growing sections of this district, apple trees, grown on tender roots, may do well for a number of years. Occasionally, however, an extremely unfavourable winter occurs, with the result that winter-killing is more or less general. Following such winters, it has been observed at the Central Experimental Farm, Ottawa, at this Station and by several growers in the vicinity of Montreal, that trees growing on roots of known hardiness are less susceptible to winter-killing than the same variety growing on the French crab roots, which are commonly used by many nurserymen.

In general seedling root stock raised from hardy parents, such as the hardy Russian varieties and native crabs, is comparatively hardy. Experiments conducted at this Station in the production of such stock have, however, shown that the degree of hardiness is decidedly variable. Owing to the comparative severity of the climate at Lennoxville, the opportunity for determining hardiness of root-stock is in a way unique. With a view towards taking advantage of this opportunity, seed of available hardy varieties has been planted each autumn for the past three years on a site fully exposed to the prevailing winds. Early the following season, the seedlings are thinned to about one inch apart in the row. Throughout the season, the soil is kept well cultivated, and if growth is not vigorous, nitrate of soda is applied as a side dressing along the rows. Accordingly the seedlings are kept in a green and growing condition until late in the season, a condition unfavourable for satisfactory wintering. So far on the sites used, most of the snow which has fallen during winter has blown off, thus permitting the ground to freeze freely. Furthermore, on these sites, the ground has thawed and frozen several times in the spring, before the snow has melted from less exposed areas. In this way the seedlings are subjected to a test which is much more severe than if they were grown under average field conditions. When growth has started the following spring, a count is made to

determine the per cent of winter injury. The hardy seedlings are then left in the rows until the close of the season, and those of satisfactory size and vigor sold to nurserymen for grafting or budding. Such stock, although not a pure line, is comparatively uniform in both size and hardiness. Nurserymen, who have used it, have so far pronounced it easy to work and of good vigour.



Vegetative production of apple root stock. A layered seedling of Transcendent Crab, showing strong root development on new shoots.

In the following statement, the hardiness and size of the stock, for the past three years, obtained from seedings of several varieties of known hardiness is shown:—

TEST OF HARDINESS IN APPLE ROOT STOCKS—AVERAGE OF RESULTS, 1928–1930

Parent variety	Total number of seedlings in test	Per cent winter-killed	Per cent of commercial grades of root stock in hardy seedlings		
			No. 1	No. 2	Small
Pyrus Baccata	403	9·6	22·3	43·6	34·1
Bode	606	18·3	37·1	33·3	29·6
Vargul	524	11·6	43·6	29·7	26·7
Trail	603	8·3	47·6	32·1	20·3
McMahan White	727	18·4	63·9	24·1	12·0
Hibernal	493	3·8	49·7	42·3	9·0
Beautiful Arcade	529	11·7	51·3	41·6	6·1
Charlamoff	437	11·2	50·0	20·8	29·2
Red Anis	714	8·6	71·6	24·3	4·1
Garden Sweet	610	18·9	64·2	23·7	12·1
Transcendent (crab)	821	4·5	67·2	24·9	7·9
Piotosh (crab)	703	8·7	61·3	27·8	11·1
Elkhorn (crab)	647	7·7	64·9	26·3	7·6
Columbia (crab)	571	8·1	60·0	28·6	11·4
Martha (crab)	428	7·6	51·3	30·5	22·2
Northern Queen x Rideau	546	12·3	57·1	33·8	19·0

VEGETATIVE REPRODUCTION OF HARDY ROOT STOCK.—As stated in the description of the foregoing project, apple seedlings grown from seed of available varieties are decidedly uniform. If, however, the propagation of such stock by vegetative methods is practical, pure clonal lines, possessing extreme hardiness and satisfactory vigour, could be developed. With this end in view, a number of the vigourous seedlings, of each variety grown, that have successfully passed one winter, have been layered by several methods, each season, for three years.

In general it has been observed that seedlings of proven hardiness will not propagate readily by layering. Several seedlings of McMahan White, Red Anis and Transcendent Crab have, however, proven fairly satisfactory, and one line from each variety is being propagated and tested. Preliminary tests, in the grafting of this stock with the varieties Melba and McIntosh, made at this Station and by Mr. R. Thomson at St. Paul de Abbotsford, P.Q., have shown it easily workable and of good vigour.

CO-OPERATIVE EXPERIMENTS IN COMMERCIAL APPLE ORCHARDS

The results obtained during the season of 1930 from the co-operative experiments conducted at St. Paul de Abbotsford, P.Q., and Chateauguay Basin, P.Q., were similar to those previously obtained. Details of this work will be found in the report from this Station for the year 1929.

At St. Paul de Abbotsford a further increase in crop has been obtained with the varieties Wealthy and Fameuse by the use of phosphorous and potassium, in conjunction with nitrogen, as a fertilizer application to trees growing in sod. With the variety Wealthy, the yields, when averaged over a five-year period from 1926 to 1930, show a 30·4 per cent increase in crop from the trees where superphosphate and nitrate of soda were applied, over those where nitrate of soda only was used. A further increase in crop of 8·1 per cent has also been obtained by using a complete fertilizer, composed of nitrate of soda, superphosphate and muriate of potash. Similar results have also been obtained with the variety Fameuse.

As the soil where these experiments are being conducted is typical of large areas of orchard soils in the province of Quebec, it would seem probable that, in many orchards, better results would be obtained from the use of a complete fertilizer, than from nitrogen alone, which is the general custom at the present time.

At both St. Paul de Abbotsford and Chateauguay Basin slightly higher yields have been obtained from the use of sulphate of ammonia, than from nitrate of soda. At St. Paul de Abbotsford, where a number of the newer synthetic fertilizers have been used for the past two years on young Fameuse trees, no noticeable difference has been observed between the effect of such materials on the trees, than that produced by the older and less concentrated forms. Although the results from such experiments, over a two-year period, cannot be considered as conclusive, those obtained would indicate that highly concentrated fertilizers, such as urea and nitrophoska may be safely used on apple trees.

PEARS

In 1924, ninety-three seedling pear trees were received from the Dominion Horticulturist and planted on a very exposed but otherwise favourable site. During the first two years, twenty-one of the trees succumbed to winter injury. The remainder, however, have proven quite hardy and have developed into fair sized vigorous trees. In 1930, two trees blossomed and bore fruit. On one the pears were small and hard, but of fair quality. The other tree produced a medium-sized early pear of good average quality. Both trees appear worthy

of propagation, as these two sorts should prove hardy in many sections of the Eastern Townships, where, owing to the severity of the climate, other varieties of pears cannot be grown.

SMALL FRUITS

STRAWBERRIES

The season of 1930 and the winter of 1929-30 were on the whole favourable for strawberries in this district, and satisfactory yields were obtained generally. During June and the first part of July, the weather was particularly favourable, frequent rainfall alternating with bright clear days. Under these conditions, strawberries attained a good size and the picking season was somewhat longer than usual. At this Station, the first ripe fruit was obtained on June 26 and the last picking was made on July 18.

TEST OF VARIETIES.—During the season of 1930, eighteen varieties were included in the variety test. Of these, a number have been tested for several years. Following is a statement showing the average results obtained during the past five-year period with the leading varieties:—

STRAWBERRIES—AVERAGE OF RESULTS, 1926 TO 1930

Variety	Average season	Yield per acre		
		First year	Second year	Average yearly yield
		qts.	qts.	qts.
Marvel	July 9–July 28	10,148	12,042	11,095
Senator Dunlap	July 6–July 25	8,957	7,917	8,437
Cordelia	July 7–July 26	7,973	7,352	7,662
Valeria	July 6–July 21	7,603	7,435	7,519
Cassandra	July 7–July 25	6,594	7,265	6,925
Portia	July 8–July 26	5,988	7,323	6,655
Howard	July 7–July 26	7,521	5,762	6,641
Pocomoke	July 7–July 26	5,973	6,269	6,121
Lavinia	July 9–July 26	5,302	5,630	5,466
Parson Beauty	July 8–July 26	5,854	4,725	5,289

From the foregoing statement it may be noted that when averaged over a period of years there is little difference in the season of different varieties of strawberries. Usually, at this Station, the ripening of the berries is delayed by cool wet weather in June. As a rule, this is followed by warm, dry days early in July, which seem to bring all varieties into production at about the same time. It has, however, been noted that normally late varieties, such as Portia and Marvel, maintain the size of berry throughout the season and yield well in the first picking, but produce very small berries in the later part of the season. With Parson Beauty, Cassandra, Lavinia and Howard, the berry size is well maintained throughout the season, but the majority of the crop is obtained in the first few pickings.

From a commercial standpoint, the most valuable varieties are Senator Dunlap and Portia. Portia is, however, an imperfect sort and must have a perfect variety planted with it, as a pollenizer. For this purpose Senator Dunlap is quite satisfactory.

The variety Marvel, although very productive, is of comparatively poor quality. It is, however, firm-fleshed and has proven fairly satisfactory for canning and preserving.

Valeria and Cordelia, although fairly high-yielding, produce small and rather soft berries.

ORNAMENTAL GARDENING

HEDGES

In 1916, a number of hedges sixty feet long were set out in the ornamental grounds, for the purpose of comparing the value of various species and varieties for this purpose. During the past sixteen years, a few of these, that have winter-killed badly or proven unsatisfactory, have been discarded and replaced by others. There are now, however, fourteen different hedges which have proven hardy for a number of years and have become well-established.

Of these, the most satisfactory evergreen is the common cedar. It thrives well under a great variety of conditions in the Eastern Townships, makes a compact strong hedge and can be trimmed to almost any desired shape. The ordinary white spruce also makes a fairly good hedge, but unless trimmed regularly, the bottom branches will die, thus giving the hedge a very untidy appearance. Another common tree which forms a very satisfactory hedge is tamarack. It is very hardy and will stand trimming almost as well as cedar. During the early part of the season, the colour of the young foliage is very attractive, being a delicate pale green. Later, when the foliage is fully developed, the colour is a deep green, which is also very pleasing.

Among the several deciduous species that have been tried, the best hedge has been obtained with Buckthorn *(Rhamnus cathartica)*. This species, when grown in a hedge, is in many respects similar to Privet in general appearance. Being very strong growing, it can also be trimmed to almost any desired size or shape.

A very strong, quick-growing hedge can be obtained with Chinese Lilac. It, however, will not stand severe pruning as well as buckthorn, and in fertile soil difficulty will be experienced in keeping it at a comparatively small size. For a large hedge, six to eight feet high and four to six feet through, it has proven very satisfactory.

The common native hawthorn is almost ideal as a hedge plant, for the conditions prevalent throughout the district. It forms a compact, strong hedge of pleasing appearance, and can be used to replace fences, as when well-developed, it will prevent the passage of animals equally well. Its chief disadvantage is that it is slow growing and will not attain a desired size as rapidly as the other species mentioned.

FLOWERS

Roses.—Owing to the very favourable season, the collection of roses, which has been gradually accumulated at this Station, produced a very fine show of bloom in 1930. This collection consists of several varieties each of hybrids, hardy roses and hardy climbing roses.

The most satisfactory hybrids were: Frau Karl Bruschki, General Jacqueminot, Mrs. John Laing and Ulrich Brunner.

Of the hardy roses the most outstanding was the variety Agnes, originated at the Central Experimental Farm, Ottawa. This is a strong growing, double yellow rose, free blooming and quite hardy. Other satisfactory hardy roses are: Harison Yellow, F. J. Grootendorst and Rosa Rugosa.

Among the several climbing roses, excellent results were obtained with: Dorothy Perkins, Dr. Van Fleet and Excelsa:

PERENNIALS

In addition to the many species and varieties of perennials, grown at this Station, a collection, twelve varieties of lilies, was obtained from the Horticultural Division, Central Experimental Farm, Ottawa, and planted in 1928 and 1929. All made satisfactory growth and a number produced bloom in 1930. Of these the following proved very satisfactory: *Lilium regale, Lilium tenuifolium, Lilium tigrinum splendens* and *Lilium Willmottae.*

POULTRY

An exceptionally cold, damp spring, especially during the month of April, made conditions very unfavourable for the breeding stock throughout this locality. As a result, farmers did not hatch many early chicks, and a great scarcity of pullets suitable for egg production was experienced in the autumn. As a result of this scarcity of pullets, fresh eggs were scarce during the early winter months and the price of eggs was high. While the hatching at the Station was started at the same time as previous years, a lower percentage of hatch resulted in fewer chicks being produced than during previous years. All young stock was given free range adjoining an oat field at the south of the Administration building. This proved an ideal place, and the chicks were reared in good health.

The Station flock consists entirely of Barred Plymouth Rocks, there being on hand at the beginning of 1930, 213 pullets, 113 breeding hens, 3 old males and 12 young males. All females were trap-nested during the year and accurate records were kept of each individual.

Since the poultry plant was started in 1916, the policy has been to select for breeding stock, hens one year old or over which had produced the highest number of eggs in their pullet year. These selected hens have been mated in the breeding pens with registered cockerels also from the highest producing hens. Of late years particular attention has also been paid to egg-size in the selection of the breeding stock. As a result a gradual improvement has been noticed from year to year in production as well as egg-size. Thus the flock in the plant of the Experimental Station is being built up and in addition the stock, in the way of day-old chicks and also cockerels which are sold throughout the district, is also greatly improved each year. This should, therefore, provide a means whereby many of the flocks in the district may be built up.

In the following four tables are shown the first-year production of all hens selected for breeding stock during the past year and in the comments the breeding of the males used as sires in each of the pens is also given, together with the hatching records of the eggs from the matings. The best producers of the progeny from these matings will be used as breeding stock in 1932. Eighteen breeding hens were housed in each of the four pens and mated with one cockerel.

HENS USED IN PEN A 13 SHOWING THEIR EGG-RECORD AS PULLETS

Hen No.	Pullet record		Hen No.	Pullet record	
	Winter	Year		Winter	Year
	eggs	eggs		eggs	eggs
C.J. 151	87	282	C.F. 173	90	249
C.J. 158	76	222	C.F. 175	57	243
C.I. 141	94	291	J 697	78	230
C.I. 148	45	219	J 761	71	241
C.H. 183	76	269	J 810	67	227
C.H. 185	31	237	M 315	58	232
C.G. 113	51	203	M 330	76	250
C.G. 116	84	226	M 420	86	242
C.G. 127	60	214	M 429	80	227

Eleven of the 18 hens used in pen A 13 were registered hens, which had qualified for registration in the Quebec Western Egg-Laying Contest. The total 18 females had an average winter record (November, December, January and February) of 70·3 eggs each and an average year's record of 239·1 eggs each in their pullet year, with an average egg-size of 24·7 ounces per dozen. These birds were mated to a registered cockerel, Drew 34 G, which was from a registered dam with an official egg-record of 225 eggs, averaging 26 ounces per dozen, and a registered grand-dam with an official egg record of 200 eggs. From this

pen 380 eggs were set during the hatching season, which proved 83·6 per cent fertile, but unfortunately only 32·55 per cent of the fertile eggs hatched.

HENS USED IN PEN B 12 SHOWING THEIR EGG-RECORD AS PULLETS

Hen No.	Pullet record		Hen No.	Pullet record	
	Winter	Year		Winter	Year
	eggs	eggs		eggs	eggs
J 640	80	209	M 364	58	200
J 685	79	211	M 367	53	202
I 571	49	231	M 383	54	250
H 310	49	205	M 384	69	222
H 319	63	222	M 410	64	206
M 279	24	206	M 414	66	223
M 281	69	215	M 468	68	217
M 311	74	208	M 488	71	205
M 329	47	242	M 497	88	242

These 18 females had an average winter egg record of 62·5 eggs each, and an average year's record of 217·5 eggs each in their pullet year, with an average egg-size of 24·6 ounces per dozen. These birds were mated to a registered cockerel, Drew 35 G, a full brother to the male used in pen A 13. From this pen 469 eggs were set during the hatching season, which proved 86·7 per cent fertile and 44·7 per cent of the fertile eggs hatched.

HENS USED IN PEN C 11 SHOWING THEIR EGG-RECORD AS PULLETS

Hen No.	Pullet record		Hen No.	Pullet record	
	Winter	Year		Winter	Year
	eggs	eggs		eggs	eggs
I 501	78	217	M 392	72	215
J 658	47	201	M 441	84	225
J 704	52	223	M 487	96	238
J 746	93	223	M 413	74	241
J 775	97	205	M.L. 212	102	229
K 854	65	201	M.L. 218	85	224
K 991	46	211	M.L. 231	64	213
M 292	45	205	M.L. 233	67	218
M 375	61	213	M.L. 237	52	216

These 18 females had an average winter egg record of 71·1 eggs each, and an average year's record of 217·6 eggs each in their pullet year, with an average egg-size of 23·4 ounces per dozen. These birds were also mated to a registered cockerel, Drew 28 G, a full brother to the males used in pens A 13 and B 12.

HENS USED IN PEN D 10 SHOWING THEIR EGG-RECORD AS PULLETS

Hen No.	Pullet record		Hen No.	Pullet record	
	Winter	Year		Winter	Year
	eggs	eggs		eggs	eggs
M 257	87	214	M 424	75	242
M 258	66	231	M 425	86	241
M 262	64	213	M 449	83	230
M 322	56	221	M 451	77	232
M 334	59	235	M 453	48	213
M 354	53	210	M 454	84	229
M 399	75	224	M 465	95	232
M 401	66	250	M 498	88	228
M 419	92	270	M.L. 204	68	215

The 18 females used as breeders in this pen had an average winter egg record of 73·4 eggs per bird and an average year's record of 230·5 eggs each in their pullet year. These birds were mated to a cockerel eligible for registration, Drew H 457, which was from a registered dam, Drew 1 E, with an official

record of 229 eggs, and a registered grand-dam with an official record of 200 eggs. From this pen 477 eggs were set during the hatching season, which proved 79·03 per cent fertile, and 49·8 per cent of the fertile eggs hatched.

INCUBATION

The incubators were started March 15, and were continued until May 24, the 2,440-egg Buckeye and a 240-egg Miller being the only two machines used. The following table gives the hatching results for the season:—

HATCHING RESULTS OF TOTAL EGGS SET

Year	Total eggs set	Number fertile	Per cent fertile	Number of chicks	Per cent total eggs hatched	Per cent fertile eggs hatched	Number of chicks alive when wing banded	Per cent chicks alive when wing banded	Number of eggs required for 1 chick hatched	Number of fertile eggs required for 1 chick hatched
			p.c.		p.c.	p.c.		p.c.		
1930.....	4,118	3,360	81·3	1,311	31·8	35·9	790	90·2	3·14	2·56
9-year average.	4,267	3,649	85·51	1,793	42·01	49·13	880	90·14	2·3	2·03

A number of chicks are sold each year as day-old chicks. The number of chicks alive when wing-banded is based only on those retained on the farm plant. Due partly to unfavourable weather conditions, the 1930 hatching results do not compare very favourably with the nine-year average. Of the total eggs set 81·3 per cent were fertile, but the cold, damp weather conditions apparently caused a weakness of egg germ and only 35·9 per cent of the fertile eggs hatched. The following table gives the hatching results by the month:—

As was the case in connection with table 1, due to the fact that many of the chicks were sold as day-old chicks, the per cent alive, when wing-banded, was based only on those retained on the farm plant. Furthermore, 1930 was the only year in which records were kept for each month, of the number of chicks alive when wing-banded. It is impossible, therefore, in the nine-year average to show the monthly record in this connection.

It would appear from these results, that the most satisfactory period for hatching is during the months of April and May, with May giving on a nine-year average 27·47 per cent more chicks from the fertile eggs than did the month of April. The greater hatchability in May than in March or April might be due to various causes. During the early years of the experiment the furnace, which supplies heat to the poultry building and which is in the same room as the incubators, was kept in operation during the months of March and April. With the arrival of warmer weather in May, however, it was not necessary to heat the building and the fire was allowed to go out. The coal gases, which escaped from the furnace, may have affected the hatchability of the eggs, and may perhaps be one reason for the lower hatchability during March and April.

The fact that the hens were confined to their laying quarters entirely during March and April and were allowed to range outside in the runs during May might also have had some effect. Both hens and cockerels may have been, due to more exercise and freedom, in a more healthy condition during May. It would necessarily follow that the germ of the egg would be healthier and stronger and, therefore, the hatchability might be increased. It is probable that variations in climatic conditions in the three months may have had considerable effect on the hatchability.

All the May hatched chicks were hatched before May 15, so as to have the pullets in laying condition when the egg market is at its highest in the fall. The hatching results from hens and pullets for the year 1930 are as follows:—

HATCHING RESULTS FOR SETTINGS BY THE MONTH

Year	Time set	Total eggs set	Number fertile	Per cent fertile	Number of chicks	Per cent total eggs hatched	Per cent fertile eggs hatched	Number of chicks alive when wing-banded	Per cent chicks alive when wing-banded	Number of eggs required for 1 chick hatched	Number of fertile eggs required for 1 chick hatched
				p.c.		p.c.	p.c.		p.c.		
1930	March	1,452	1,121	77·2	341	23·48	30·41	255	83·7	4·25	3·28
9-year average	March	1,438	1,112	77·32	420	29·10	37·83	.....	.....	3·4	2·7
1930	April	2,182	1,815	83·04	762	33·40	41·07	425	96·3	2·71	2·38
9-year average	April	2,204	2,039	92·43	993	45·03	48·68	.....	.....	2·2	2·05
1930	May	484	430	88·84	208	42·97	48·37	110	94·01	2·31	2·06
9-year average	May	625	499	79·76	380	60·07	76·15	.....	.....	1·6	1·3

HATCHING RESULTS FROM HENS AND PULLETS

Year	Eggs	Total eggs set	Number fertile	Per cent fertile	Number of chicks	Per cent total eggs hatched	Per cent fertile eggs hatched	Number of chicks alive when wing-banded	Per cent chicks alive when wing-banded	Number of eggs required for 1 chick hatched	Number of fertile eggs required for 1 chick hatched
				p.c.		p.c.	p.c.		p.c.		
1930	Hens	2,374	1,811	76·31	699	29·44	38·59	659	94·2	3·39	2·59
9-year average	Hens	2,665	2,306	86·46	1,247	46·78	54·08	.....	.....	2·13	1·84
1930	Pullets	1,744	1,555	89·16	612	35·09	39·35	112	86·0	2·74	2·54
9-year average	Pullets	1,602	2,343	83·85	546	34·03	40·63	.....	.....	2·93	2·44

Again the number of chicks alive when wing-banded in 1930 is not taken from the total chick hatch, but from the number put in the brooder house. The average results show a much higher per cent of total eggs hatched and of fertile eggs hatched on the part of the hens, than from the pullets. It would appear, therefore, that eggs from hens are much more reliable for incubation than those from pullets.

COST OF FEEDING GROWING CHICKS

An accurate account was kept of the feed required to grow chickens to six months of age, this being considered the average time required to mature a pullet of the heavy breeds. The cost of feed alone amounted to 80 cents per bird. As a rule, the sale of young stock for broilers and roasters, and the disposing of male birds for breeding purposes, will more than pay the total cost of rearing the flock, thus allowing the pullets as a profit over cost for the summer.

BROODING COST

An average has been taken of ten years' costs for fuel to operate the brooder stoves used at this Station, during the brooding season. The average cost per chick was 2⅝ cents when brooded in average lots of 300 chicks under one brooder.

COST OF FEEDING LAYING PULLETS

The following table gives the average cost, for eleven years, of feeding laying pullets from October 1, the time they are transferred to their laying quarters until September 30, of the following year. The feed is charged at prevailing prices in this locality:—

Cost of Feeding Laying Pullets

1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	Average
$	$	$	$	$	$	$	$	$	$	$	$
3 12	2 50	1 83¼	2 05¾	2 13	2 51¼	2 43½	2 53	2 86½	2 29	2 49¼	2 43

On a basis of the eleven-year average, the cost of feed amounted to $2.43 per year.

EGGS REQUIRED TO PAY COST OF FEED PER BIRD

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 tables give 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 to cover feed cost for the whole year.

Eggs Required to Pay Cost of Feed per Bird (Winter Months)

1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930
16	16	13	16	14	16	16	14	17	14	14

EGGS REQUIRED TO PAY COST OF FEED PER BIRD FOR A YEAR

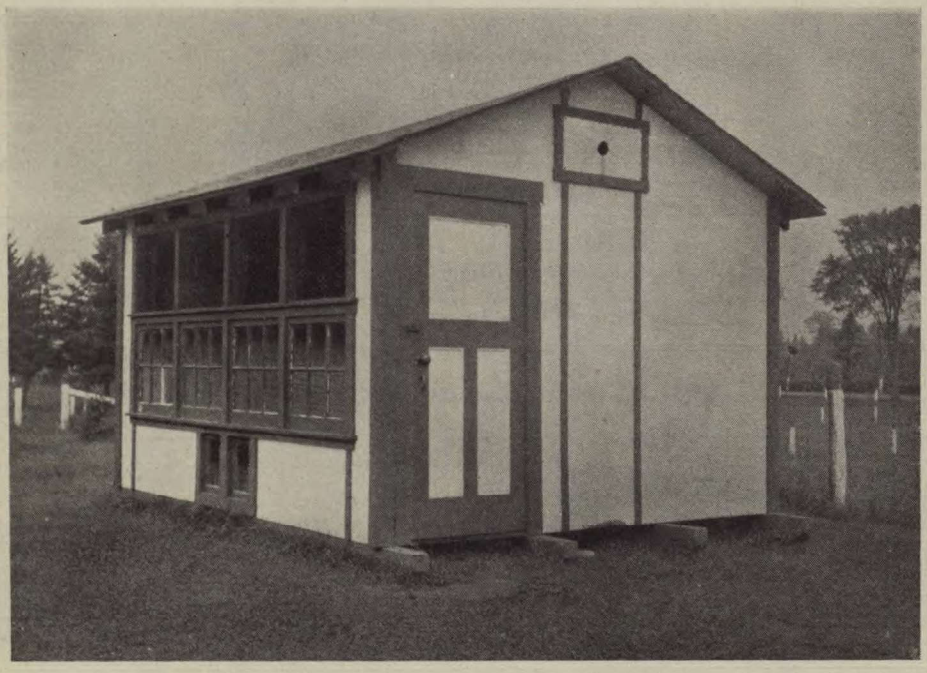
1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930
53	54	50	54	57	63	58	59	69	57	61

The number of eggs required to cover the cost of feed for a year, from an average of eleven years' results, is 57·7 eggs.

BUILDINGS

A colony house, 10 by 12 feet, built entirely of Ten-Test, was used during the spring as a brooder house. This building proved very satisfactory for this purpose, due to the fact that an even temperature could be maintained under all weather conditions.

Later in the season the building was used for housing cockerels. It proved to be very suitable for this purpose, but it was found that due to the Ten-Test being a material which is somewhat soft, and apparently attractive to the birds, they picked it a great deal and considerable damage was done to the walls, in fact several holes were picked through the material. During the year many complaints were received at the Station, in regard to this same difficulty. The Ten-Test company recommend boarding the inside of the building high enough to prevent the birds from picking at the material. This would entail considerable expense. Several other methods of overcoming the difficulty were tried at



The Ten-Test poultry house.

this Station and it was finally found that a mixture of 50 per cent of finely-ground limestone and 50 per cent of cement mixed with water to form a thick paste, and applied with a brush, will form a hard durable surface which the birds will not touch, and no further trouble has been experienced from the birds destroying the material. Furthermore, the hard coating makes the walls more easily washed and the house can, therefore, be kept in a cleaner and more sanitary condition.

EGG-LAYING CONTEST

The contest completed in 1930 was the eighth Quebec Western Egg-Laying Contest to be conducted at the Lennoxville Experimental Station. This contest commenced on November 1, 1929, was carried on for fifty-one weeks and finished on October 23, 1930. The breeds of poultry represented were eight pens of Barred Plymouth Rocks, seven pens of Single Comb White Leghorns, two pens of White Wyandottes, one pen of White Plymouth Rocks, and one pen of Single Comb Rhode Island Reds.

As all standings of pens and individuals are determined on the number of points awarded, based on egg-size instead of by the number of eggs produced, it is interesting to note the improvement each year of the egg-size. More birds were registered during the 1930 contest than has been the case in any of the previous contests conducted at this Station. The ten highest pens according to points are as follows:—

HIGHEST PENS ACCORDING TO POINTS

Pen No.	Breed	Highest pens according to points	Points
3	S.C.R.I.R.	A. G. Sim, Farnham, P.Q.	2,371·8
5	S.C.W.L.	C. D. Calder, Cowansville, P.Q.	2,339·9
20	B.P.R.	Experimental Station, La Ferme, P.Q.	2,259·2
15	B.P.R.	L. J. Scott, Sawyerville, P.Q.	2,239·3
18	B.P.R.	H. R. Drew, North Hatley, P.Q.	2,130·8
13	B.P.R.	L. A. Gnaedinger, Valleyfield, P.Q.	2,047·8
1	W.W.	Miss R. G. Knight, Beebe, P.Q.	1,997·1
11	W.R.	P. L. Green, Sherbrooke, P.Q.	1,901·5
17	B.P.R.	W. A. Carr, Ste. Agathe des Monts, P.Q.	1,901·0
10	S.C.W.L.	Riverside Poultry Farm, Bishop's Crossing, P.Q.	1,886·9

The ten highest pens according to eggs are as follows:—

HIGHEST PENS ACCORDING TO EGGS

Pen No.	Breed	Highest pens according to eggs	Eggs
3	S.C.R.I.R.	A. G. Sim, Farnham, P.Q.	2,245
15	B.P.R.	L. J. Scott, Sawyerville, P.Q.	2,116
20	B.P.R.	Experimental Station, La Ferme, P.Q.	2,071
5	S.C.W.L.	C. D. Calder, Cowansville, P.Q.	2,025
13	B.P.R.	L. A. Gnaedinger, Valleyfield, P.Q.	1,978
10	S.C.W.L.	Riverside Poultry Farm, Bishop's Crossing, P.Q.	1,967
1	W.W.	Miss R. G. Knight, Beebe, P.Q.	1,953
19	B.P.R.	Experimental Station, Lennoxville, P.Q.	1,904
17	B.P.R.	W. A. Carr, Ste. Agathe des Monts, P.Q.	1,886
18	B.P.R.	H. R. Drew, North Hatley, P.Q.	1,836

HIGHEST INDIVIDUALS ACCORDING TO POINTS

Bird No.	Breed	Highest individuals	Points
K. 99	W.L.	Frank Wattier, Abord a Plouffe, P.Q.	301·5
K. 52	W.L.	C. D. Calder, Cowansville, P.Q.	289·6
K. 60	W.L.	C. D. Calder, Cowansville, P.Q.	286·8
K. 39	R.I.R.	A. G. Sim, Farnham, P.Q.	279·5
K. 38	R.I.R.	A. G. Sim, Farnham, P.Q.	273·3
K.114	W.P.R.	P. L. Green, Sherbrooke, P.Q.	268·7
K.122	B.P.R.	Victor E. Nablo, South Cayuga, Ont.	268·0
K.154	B.P.R.	L. J. Scott, Sawyerville, P.Q.	267·4
K.127	B.P.R.	Victor E. Nablo, South Cayuga, Ont.	267·0
K.188	B.P.R.	H. R. Drew, North Hatley, P.Q.	264·2

HIGHEST INDIVIDUALS ACCORDING TO EGGS

Pen No.	Breed	Owner and address	Eggs
K. 38	R.I.R.	A. G. Sim, Farnham, P.Q.	269
K.104	W.L.	Riverside Poultry Farm, Bishop's Crossing, P.Q.	257
K. 77	W.L.	O. Moring, Dorval, P.Q.	257
K. 39	R.I.R.	A. G. Sim, Farnham, P.Q.	256
K. 99	W.L.	Frank Wattier, Abord a Plouffe, P.Q.	253
K.135	B.P.R.	L. A. Gnaedinger, Valleyfield, P.Q.	253
K.103	W.L.	Riverside Poultry Farm, Bishop's Crossing, P.Q.	249
K.172	B.P.R.	W. A. Carr, Ste. Agathe des Monts, P.Q.	249
K.154	B.P.R.	L. J. Scott, Sawyerville, P.Q.	248
K.140	B.P.R.	L. A. Gnaedinger, Valleyfield, P.Q.	248

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

Owners who had birds registered in the eighth contest are as follows:—

OWNERS OF BIRDS REGISTERED

Pen No.	Breed	Owner and address	Number of birds registered
1	W.W.	Miss R. G. Knight, Beebe, P.Q.	4
2	W.W.	R. A. Robertson, Brigham, P.Q.	2
3	R.I.R.	A. G. Sim, Farnham, P.Q.	8
5	W.L.	C. D. Calder, Cowansville, P.Q.	6
9	W.L.	Frank Wattier, Abord a Plouffe, P.Q.	5
10	W.L.	Riverside Poultry Farm, Bishop's Crossing, P.Q.	6
11	W.P.R.	P. L. Green, Sherbrooke, P.Q.	4
12	B.P.R.	Victor E. Nablo, South Cayuga, Ont.	2
13	B.P.R.	L. A. Gnaedinger, Valleyfield, P.Q.	3
15	B.P.R.	L. J. Scott, Sawyerville, P.Q.	6
16	B.P.R.	S. C. Billing, Sherbrooke, P.Q.	3
17	B.P.R.	W. A. Carr, Ste. Agathe des Monts, P.Q.	6
18	B.P.R.	H. R. Drew, North Hatley, P.Q.	4
19	B.P.R.	Experimental Station, Lennoxville, P.Q.	4
20	B.P.R.	Experimental Station, La Ferme, P.Q.	6
		Total	69

Twenty-seven of the birds registered were daughters of registered hens.

The following table gives the egg production of the birds in the eighth contest and the average per cent production for the various breeds:—

EIGHTH QUEBEC WESTERN EGG-LAYING CONTEST, LENNOXVILLE, P.Q., 1929-30

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 of bird for feed	Average profit per bird over cost of feed	Average eggs per registered bird	Average eggs per birds 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	84	34·5	50·0	50·0	26·1	10·7	20·2	24·8	23·1	3·5	3·4	1 86	2 39	231·4	134·4
White Wyandottes	24	20·8	41·6	58·4	33·3	4·1	25·0	24·9	25·0	4·2	5·6	2 25	2 90	214·1	145·1
Barred P. Rocks	108	13·0	35·2	64·8	39·0	22·2	31·4	24·9	24·2	5·1	5·8	2 12	3 47	222·4	161·9
White Rocks	12	25·0	25·0	75·0	33·3	8·3	33·3	25·1	25·0	6·1	6·3	2 47	2 70	209·5	160·2
Rhode Island Reds	12	16·6	16·6	83·4	75·0	33·3	66·6	24·7	24·7	4·7	4·7	2 53	4 45	227·1	199·2
Average of all birds in contest	240	22·0	39·6	60·4	35·4	16·1	28·7	24·6	23·5	4·7	4·9	2 12	3 04	222·3	165·7

Of the 240 birds entered in the contest, 69 birds, or 28·7 per cent were registered. This is an increase of 5·8 per cent over that of last year. The number of eggs per registered bird is 222·3, as compared with 218 eggs for last year, or an increase of 4·3 eggs per registered bird.

Twenty-two per cent of the total birds entered laid less than 100 eggs as compared with 39·6 per cent for last year.

Poultry raisers are realizing more and more each year the importance of better poultry houses and better breeding stock, especially cockerels. The applications for plans of poultry houses and advice as to breeding, feeding and general care are becoming more numerous each year.

APIARY

The work of the Bee Division is attracting more attention each year. This is no doubt due to the fact that there has been an increase in the production of honey the last two years, which has encouraged farmers and others to pay more attention to their bees. It is a side line which brings immediate cash returns and is, therefore, attractive on this account.

The past season was favourable for honey production. The bees wintered fairly well. They were taken from the cellar on April 12, and began gathering pollen at once. The last of April and first of May were warm and dry, which gave the bees a good start in working freely on the early bloom, such as soft maple, elm and willow. The latter part of May and first of June was rather rainy and cool, which interfered to some extent with the work of the bees, but at the same time, as the rainy weather came just previous to the main honey flow, it promoted the secretion of nectar in the plants. The weather was nice and warm the latter part of June and first of July, and clover bloom being plentiful, the bees worked freely and the best gains were made during that time. During August and September practically no gains were made. Records were taken of the colony on scales, at six o'clock every morning, from May 1 to October 1. The following table gives a summary of the net gains and losses made by an average colony on scales:—

HONEY FLOW, 1930 AND AVERAGE, 1924 TO 1930

—	May	June	July	August	September	Total gain over loss
	lb.	lb.	lb.	lb.	lb.	lb.
Net gain 1930	11·75	86·00	106·75	.....	.....	171·00
Net loss 1930	.....	.....	.....	18·00	15·50	.....
Average net gain 1924 to 1930	5·82	36·35	111·82	.....	.....	139·03
Average net loss 1924 to 1930	.....	.....	.....	5·32	14·75	.....

In comparing the above results with those of previous years, it will be noted that there is quite a variation in the gains and losses for the same months from year to year. The main honey flow lasts, in most cases, the same length of time, which is four to five weeks, in this district. There were seven days, during the height of the honey flow, that the colony on scales made an increase of 13 pounds of honey per day, four of these days were in the last of June. The highest gain of any one day was made on June 30, when 18 pounds was added to the colony.

SOURCES OF NECTAR

Records are kept of various sources of nectar as to the date begun, duration of period and quantity stored. Clovers are the main source of supply, alsike and White Dutch varieties supplying the largest percentage. The early sources of supply, such as willow, dandelion and fruit bloom, although small, are of great benefit in getting the bees in the best of condition for the main honey flow. The following table gives the records for 1930, and the average for six years:—

SOURCE AND DURATION OF HONEY FLOWS, 1930

Source	Begun	Ended	Duration	Average maximum temperature	Average minimum temperature	Total hours of sunshine	Precipitation	Net gain during time of honey flow
			days			hours	in.	lb.
Willows	April 27	May 20	23	64·95	37·52	164·2	2·43	11·25
Dandelion	May 13	June 4	22	63·40	41·86	119·2	5·36	— 0·25
Fruit bloom	May 6	June 6	31	65·74	42·06	209·3	5·39	13·00
Clovers	June 14	Aug. 1	48	77·75	54·87	364·2	6·52	187·50
Golden-rod	Aug. 2	Sept. 12	41	73·78	48·53	305·5	2·52	— 23·75

AVERAGE 1925–1930

	Earliest	Latest	Earliest	Latest						
Willows	April 16	May 11	May 17	June 3	25	61·06	36·95	145·9	2·57	— 0·96
Dandelion	May 11	May 27	June 4	June 18	24	65·39	42·89	130·8	3·25	11·83
Fruit bloom	May 6	May 25	June	June 18	25	65·87	42·92	148·5	3·26	14·42
Clovers	June 8	June 23	Aug.	Aug. 4	46	76·76	52·99	337·2	5·69	145·33
Golden-rod	July 28	Aug. 13	Sept. 2	Sept. 19	35	75·09	50·30	236·9	3·43	8·83

N.B.—(−) minus sign denotes loss.

The above table shows the relation between the honey production and weather conditions. Usually a high temperature denotes an increase in weight of the colony. Precipitation affects its weight in the same manner, if the rain is accompanied with a high temperature. Rain, with a low temperature, has an unfavourable effect.

WINTERING

In the fall of 1929, thirteen colonies were placed in the cellar, a few days after a good cleansing flight, and eight colonies were packed in two quadruple wintering cases outside. One of the colonies in the cellar died during the winter, and another one, being queenless at the first examination, had to be united, as well as one of the colonies wintered outside. Although the bees went into their winter quarters in a very good condition, they did not winter entirely satisfactorily, especially those wintered in the cellar. The following table gives a summary of the records obtained, during the winter, of the colony on the scales in the cellar:—

RESULTS OF CELLAR WINTERING

Years	Average maximum temperature in cellar	Average minimum temperature in cellar	Range	Total loss during winter	Number of combs of bees when colony was put in	Number of combs of bees when colony came out
	°F	°F		lb.		
1925–1926	41·31	35·09	6·22	15·50	9	5
1926–1927	40·73	36·15	4·58	15·75	8	7
1927–1928	43·26	39·42	3·84	14·75	7	7
1928–1929	43·05	37·50	5·55	16·00	8	6
1929–1930	44·09	39·00	5·09	19·00	9	8

The above table shows that it is the variation of temperature that affects the behaviour of the bees more than anything else. During the winter of 1927-28, when the temperature did not vary a great deal, the bees consumed the least stores and came out the strongest, taking into consideration their strength when they went into the cellar. This can be explained by the fact that when the temperature is more or less uneven bees are more agitated, thus wearing themselves out.

COMPARISON OF CELLAR VS. OUTDOOR WINTERING OF BEES

A comparison of cellar versus outdoor wintering of bees was carried on again this year. In the fall of 1929, twelve colonies were prepared for their winter-quarters in the usual manner. Of these, four were placed in the cellar, and eight were packed in two quadruple wintering cases outside. Four of these had a shallow super as a food chamber. The colonies, when prepared for their winter quarters, were as even in strength as it was possible to have them.

CELLAR VS. OUTSIDE WINTERING, 1929–30

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	Average weight of stores fed during fall	Colonies that were queenless at first examination in spring	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 (1 section = 1½ pounds extracted honey) of colonies and swarm	Natural swarm issue	Artificial swarm or nuclei made
						lb.						lb.	lb.	lb.	lb.		
Cellar	10-fr.	4	.....	18·75	7	10·00	.....	.....	4	7·50	4·0	10·25	26·75	2·5	137·62	.....	1
Outdoor	10-fr.	4	.....	16·25	7	14·75	.....	.....	4	10·00	5·5	13·75	30·19	0·62	105·62	1	.....
Outdoor	10-fr.	4	S.S.	22·50	7	10·00	1	1	3	13·87	5·0	22·25	36·75	.....	86·62	1	.....

AVERAGE, 1928–1930

Cellar	10-fr.	8	.....	19·37	7·12	13·75	.....	.....	8	7·62	4·37	7·75	31·03	6·03	124·77	.....	1
Outdoor	10-fr.	8	.....	19·37	6·50	18·87	.....	.....	8	9·75	5·00	12·50	31·21	1·87	130·53	1	.....
Outdoor	10-fr.	8	S.S.	19·75	6·37	13·93	1	1	7	12·81	5·31	16·75	37·56	.....	111·93	2	.....

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

It will be noted by the above table that the four colonies wintered in the cellar consumed, during the fall, winter and spring, an average of 26·75 pounds of stores, and produced 137·62 pounds of honey per colony during the honey flow. The four colonies wintered outside in a quadruple wintering case consumed 30·19 pounds of stores and gave a net production of 105·62 pounds of honey. The four colonies wintered outside in a quadruple wintering case with shallow supers as food chambers consumed 36·75 pounds of stores and gave an average production of 86·62 pounds of honey. These twelve colonies were all in ten-frame Langstroth hives.

FALL FEEDING

As practically no yield of honey was gathered during August and September, a heavy feeding was necessary to bring the colonies to the standard weight to enter winter quarters. The following table gives the standard weight found practical for various types of hives when put into winter quarters:—

Eight-frame Langstroth, without cover, 60 pounds.
Ten-frame Langstroth, without cover, 65 pounds.
Ten-frame Jumbo, without cover, 75 pounds.
Twelve-frame Langstroth, without cover, 75 pounds.

Colonies wintered outside require ten pounds more weight when put into winter quarters than those wintered in the cellar.

Feeding began on October 13 and ended on November 4. This was done in the usual manner, with syrup composed of two parts of sugar and one part of water fed in 10-pound honey pails, which were inverted on top of the frames of the colony to be fed. An average of 22·37 pounds of sugar was fed to the eight-frame Langstroth hive, 17·63 pounds to the ten-frame, 21·75 pounds to the twelve-frame and 10 pounds to the ten-frame Jumbo.

YIELD AND INCREASE

After all colonies were united in the spring, eighteen colonies were left as the spring count. These colonies made a net production of 1,948·75 pounds of honey (one section equals 1½ pounds of extracted honey); or an average of 108·26 pounds of honey per colony. The apiary was increased to twenty-three colonies, which were in a good condition when they were placed in winter quarters.

GENERAL NOTES

Excursions.—On June 7, a party of 4-H Club members, comprising boys and girls and their County Club Agent, Miss Flora Coutts, of Orleans, Vermont, and Mr. L. MacDermid, County Agent for the same county, visited the Station. This group of young people were particularly interested in poultry management and contest work.

A party of sixty-seven agricultural editors from the United States and a few from Canada paid a visit to the farm on June 21. They were shown the various departments, and members of the staff addressed them outlining the work of the different divisions.

The St. Francis District Holstein Club held their annual Field Day at the Station on June 25, when about 200 people were present. Seven calves, donated by members of the club, were sold at auction, and a certain percentage of the

receipts were donated to the club for extension work. The gathering had an opportunity of looking over the animal husbandry work and the work of other divisions at the Station.

Part of the visitors on Farmers' Day at the Lennoxville Experimental Station, August 14, 1930.

On August 14, the sixteenth annual Field Day was held at this Station. This Field Day was exceptionally well patronized, with an estimated attendance of 2,000 people. This day is set aside each year to give the farmers in the district an opportunity to visit the Station in a social gathering, and at the same time affords them a means of getting more closely in touch with the work which is being done. Addresses were given both in French and English on various agricultural topics, the speakers being Dr. E. S. Archibald, Director of Experimental Farms, Ottawa; Dr. W. J. Black, Director of Agriculture and Immigration, Canadian National Railways, Montreal, P.Q.; Mr. S. J. Chagnon, Department of Agriculture, Quebec; and other distinguished guests. A judging competition was held for the boys and the work of the Station was reviewed.

A party of American friends visited the Station on August 22, under the leadership of Miss E. M. Streeter, Home Demonstration Agent for Orleans County, Vermont. This group of ladies were especially interested in the horticultural division and were shown over the experiments in vegetable gardening and floriculture.

Exhibitions.—Educational exhibits were displayed by this Station at the Sherbrooke Poultry Show, the Lennoxville Dahlia and Flower Show, and at the Cookshire and Ayer's Cliff fall fairs. Three exhibits were also staged in various buildings at the Sherbrooke Exhibition. The large central exhibit of the Station, in the direct centre of the industrial building, had three new educational panels put in this year. Transparencies and illuminated pictures gave it a pleasing appearance and the exhibit attracted many people. A flower exhibit was put

up in the horticultural building. A new departure this year was the erection, by the Division of Extension and Publicity, of a water-fowl exhibit in the poultry building. This exhibit received many favourable comments and was a valuable addition to the exhibition work of the Farms.

Members of the staff acted in the capacity of judges at the following fall fairs and exhibitions: Cookshire, Ayer's Cliff, Richmond, Scotstown, L'Avenir, Marbleton and Danville, and also at the exhibition of the Montreal Gardeners' Association at Outremont, the Ayer's Cliff school fair, and assisted with the various judging competitions at Sherbrooke Fair and the Lennoxville Short Course, and part of the judging work for the standing crop competition for Sherbrooke county was handled by the staff.

Assistance was also given at the Sherbrooke Winter Fair, and the Experimental Station again assisted the other organizations in promoting the annual Short Course held at Lennoxville in January.

Group of boys attending the 1931 short course at Lennoxville, sponsored by the Lennoxville Experimental Station.

The Lennoxville Experimental Station co-operated with the Canadian National Railways, the Quebec Department of Agriculture and other agricultural branches, in the organization of the Quebec Soil Improvement Train, which was operated in different sections of the province from September 15 to October 6. Members of the staff accompanied the train the first three days and in addition to assisting in the general educational work, delivered several addresses on soil fertility problems.

A number of agricultural addresses were presented during the year, among which were addresses to the Quebec Pomological Society, the St. Lawrence Valley Fruit Growers' Association at Morrisburg, Ont., the Morrisburg Canadian Club, Ayer's Cliff Farmers' Club and a number of other agricultural associations and service organizations in the district.

Several articles were written for the press during the year, dealing with various phases of agricultural work.

FENCING AND REPAIRS.—There were 380 rods of new wire fence erected during the year. Some of this was attached to cedar posts, but most of it to iron posts, which are much more easily and quickly put in place. A good deal of painting was done on the permanent fences previously erected. A new roof was put on one of the sheds at the Station and painting and general repairs were done on several of the buildings. During the season about fifteen acres of new land were cleared of stone and brush and ploughed ready for immediate cultivation and seeding.

ROADS.—The usual amount of repair work was done to the roads, such as drawing gravel in winter and piling it for resurfacing the roads in summer.

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