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DOMINION OF CANADA
DEPARTMENT OF AGRICULTURE
DOMINION EXPERIMENTAL FARMS

TABLE OF CONTENTS
EXPERIMENTAL STATION

LENNOXVILLE, QUE.

REPORT OF THE SUPERINTENDENT

J. A. McCLARY

FOR THE YEAR 1923



General View of Lennoxville Station Cereal Plots.

OTTAWA
F. A. ACLAND
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1924

TABLE OF CONTENTS

	PAGE
Seasonal Notes.....	5
Animal Husbandry.....	5
Winter Fattening of Steers.....	5
Dairy Cattle.....	8
Horses.....	10
Sheep.....	11
Swine.....	12
Field Husbandry.....	14
Cost of Production.....	14
Comparison of Succulent Roughage Crops.....	21
Commercial Fertilizers.....	22
Horticulture.....	23
Vegetables.....	23
Tree Fruits.....	30
Small Fruits.....	31
Ornamentals.....	32
Cereals.....	34
Forage Crops.....	37
Poultry.....	44
Bees.....	50
Flax for Fibre.....	51
Extension Work.....	52
Projects.....	54

EXPERIMENTAL STATION, LENNOXVILLE, QUE.

REPORT OF THE SUPERINTENDENT, J. A. McCLARY

THE SEASON

The winter of 1922-23 was one of the coldest and longest on record. The heavy snowfall, which came early in December, remained on the ground until the first of April; accordingly, grasses and clovers wintered well. Field work was commenced April 26. Wheat was sown May 4, but seeding did not become general until May 14. Although the summer months were unusually cool, there was abundant rainfall, and such crops as hay, sunflowers, grain, roots, potatoes and pasture grasses did well. Corn made very slow growth and the yield was light. The first frost occurred August 18. The season generally was three weeks later than normal. The autumn months were fine; grain, corn and other crops were harvested in good condition, and the usual amount of ploughing and fall work done.

METEOROLOGICAL RECORDS, 1923

Month	Temperature—F.			Precipitation			Total
	Maximum	Minimum	Mean	Rainfall	Snowfall	Total	Sunshine
				Inches	Inches	Inches	Hours
January.....	39	-35	5.39	0.75	25.50	3.30	77.9
February.....	35	-43	3.38	.....	23.50	2.35	125.9
March.....	47	-36	16.80	0.30	29.00	3.20	117.6
April.....	77	- 5	37.42	3.96	02.00	4.16	154.0
May.....	78	25	49.48	2.99	.....	2.99	232.7
June.....	89	31	59.45	3.43	.....	3.43	208.5
July.....	85	39	61.95	2.87	.....	2.87	225.9
August.....	85	30	59.17	2.33	.....	2.33	237.1
September.....	83	26	56.35	3.24	.....	3.24	171.6
October.....	77	17	44.71	3.64	.....	3.64	139.8
November.....	62	10	33.24	2.49	09.90	3.48	92.2
December.....	55	-11	28.92	1.03	08.00	1.83	48.2
Total.....				27.03	97.90	36.82	1,831.4

ANIMAL HUSBANDRY

WINTER FATTENING OF STEERS

Each year since the inception of the Station it has been the custom to purchase steers locally and carry them through the winter for the spring market. The steers handled during the winter of 1922-23 were mostly grade Shorthorn and Hereford stockers between two and three years of age and ranging from 800 to 1,100 pounds. Of the ninety-two stockers purchased, forty-six of the most promising were put in one barn and divided into lots for experimental work. The following tests were carried on during the winter of 1922-23 and are briefly reported in this issue.

LONG VERSUS SHORT FEEDING PERIODS

Object of Experiment.—To determine the proper time to begin grain feeding of steers in order to get the most economical returns.

Plan of Experiment.—Three uniform lots consisting of six steers each were started out on November 1, on 40 pounds of ensilage per head per day and as much hay as they could eat up clean. Lot 1 was fed meal for the first time on November 15; lot 2 on January 15, and lot 3 on March 1. The meal mixture fed to each lot at the beginning of the grain feeding periods consisted of equal parts ground elevator screenings and bran. This mixture was continued until April 1, when it was changed to cornmeal 4 parts, ground wheat screenings 3 parts, bran 2 parts and oilmeal 1 part. At the beginning of the grain feeding periods each lot received an allowance of 3 pounds of meal per head daily, which was increased until they were receiving 8 pounds of meal per head daily by May 1. As the meal ration increased, the daily ensilage ration was gradually decreased until at the last they were receiving only 25 pounds per head per day. The steers were purchased in the fall for \$5.50 per hundred and marketed May 1, for \$7.10 per hundredweight, after six months of winter feeding.

Results of the Experiment.—The results obtained in this test show that lot 1, which was grain fed from November 15 onward, made an average gain in weight per steer of 247.2 pounds, while the gains made in lots 2 and 3 were 214.8 and 206.8 pounds per steer respectively. However, owing to the fact that lots 1 and 2 required more meal to make the larger gains, lot 3 showed a slightly greater profit over cost of feed than either of the two when all three lots were sold at a flat rate of \$7.10 per hundredweight. However, it was noted that lots 1 and 2 were in a much more finished condition than lot 3. Farmers supplying cattle for the reopened British store cattle trade may winter their steers on hay and ensilage until about March 1, when grain feeding may be begun in order to fit them as short keep stores. Cattle for immediate slaughter require a longer grain feeding period to get them into the proper condition.

WINTER FATTENING OF STEERS IN PENS OR LARGE BOX STALLS VERSUS
WINTER FATTENING IN TIE-UP STALLS IN THE STABLE

Object of Experiment.—To determine the relative merits of the two methods of housing steers during the winter, namely, loose in large box stalls or pens, or in tie-up stalls in the stable.

Plan of Experiment.—Two uniform lots of ten steers each were compared; one wintered in the main stable and the other in a large pen adjoining the stable. Both lots were taken in from the pasture November 1, and fed on hay and ensilage for two weeks. At the beginning of the third week both were fed meal, beginning with 3 pounds per head daily. The meal mixture fed during the greater part of the feeding period consisted of wheat screenings 2 parts and bran 1 part. About one month before the steers were sold, the meal mixture was changed to cornmeal 4 parts, screenings 3 parts, bran 2 parts and oilmeal 1 part. During the winter the daily meal ration was gradually increased until at the end the steers were receiving 8 pounds per head daily.

Results of Experiment.—The average of five years' work shows that the steers wintered in pens made slightly greater, and consequently cheaper, gains than those tied up in the stable. There was also a considerable saving in labour and housing charges on the former, which would be an item worth considering if a large number of steers were to be wintered in this manner.

WHEAT SCREENINGS AS A MEAL RATION FOR FATTENING STEERS

Object of the Experiment.—To ascertain the value of ground elevator screenings as a meal ration for fattening steers.

Plan of Experiment.—Two lots consisting of six steers each were selected in the fall and stabled November 1. For the first two weeks both lots received only hay and ensilage. Beginning November 15, the steers in lot 1 were fed 3 pounds of ground elevator screenings per head daily. Later on the daily meal ration was gradually increased until at the last they were receiving as high as 8 pounds per head per day. Lot 2 was fed a meal mixture made up at first of equal parts screenings and bran. Later on this was changed to equal parts cornmeal, screenings and bran, which was continued up to April 1. During the last month of feeding the meal mixture for lot 2 consisted of cornmeal 4 parts, bran 2 parts and oil-meal 1 part. This was fed at the rate of 8 pounds per head daily until the steers were marketed on May 1. Lot 1 received no finishing ration but were fed on screenings throughout the entire period of six months. The steers cost \$5.50 per hundred November 15, and sold for \$7.10 per hundred on May 1.

Result of Experiment.—Lot 1 fed on wheat screenings made the cheapest gains although the meal fed per steer was 722 pounds as compared with 627 pounds for lot 2. Valued at \$7.10 per hundredweight, live weight, lot 1 realized a profit over cost of feed of \$7.68 per steer, while the profit realized on lot 2 was only \$4.45 per head. This would seem to indicate that screenings are a useful meal for steer feeding. It should be stated, however, that the screenings fed during the winter of 1922-23 were particularly good. Ordinarily, screenings should be mixed with bran or ground oats to render them more palatable and digestible.

FEEDING STEERS FOR EXPORT

In May, 1923, twenty-two grade Shorthorn steers, purchased the previous fall, were selected to form part of a trial shipment of 186 head assembled for export at Montreal from the Experimental Farms. The steers were purchased locally and stabled in November, 1922. They were fed on hay and ensilage until January, when grain feeding was begun at the rate of 3 pounds per head per day and increased until they were getting 8 pounds per head per day. The meal ration fed consisted of a mixture of screenings 4 parts, ground corn 4 parts, bran 2 parts and oilcake 1 part, the oilcake being used for the finishing period. The following statement shows the cost per hundredweight of the steers at the time they were ready for export. Hay is valued at \$10 per ton, ensilage at \$3 per ton and meal at \$28 per ton.

COST OF FEEDING STEERS FOR EXPORT

Number of steers in shipment.....	No.	22
Average initial weight.....	lb.	1,090
Average finished weight.....	"	1,348
Number of days fed in stable.....	days	198
Average gain per head for period.....	lb.	258
Average daily gain per animal.....	"	1.3
Average initial cost at 5½ cents per pound.....	\$	55.05
Meal eaten per steer.....	lb.	891
Hay eaten per steer.....	"	2,376
Ensilage eaten per steer.....	"	5,940
Average cost of feed per steer.....	\$	33.26
Cost of feed per pound gain.....	cts.	12.74
Total cost of steers and feed.....	\$	88.31
Feed cost per hundredweight of producing beef.....	\$	6.55

The steers, when assembled at Montreal, were divided into four lots and marketed as follows:—

- Lot 1—Slaughtered at Montreal and exported as chilled beef.
- Lot 2—Shipped alive and slaughtered thirty-six hours after landing.
- Lot 3—Shipped alive and sold as short keep stockers.
- Lot 4—Shipped alive and sold as grass fed stockers.

The following table gives the results of the four different experimental shipments, compared with the prevailing prices on the Montreal market at that time:—

RESULTS OF TRIAL SHIPMENT OF EXPORT CATTLE COMPARED WITH PREVAILING MONTREAL PRICES

	Cost of steers and feed per hundred-weight		Price realized at farm per hundred-weight		Profit per hundred-weight	Loss per hundred-weight
	May 21, 1923		May 21, 1923			
	\$	cts.	\$	cts.	\$	cts.
Lot 1— Slaughtered at Montreal and exported as chilled beef.....	6	55	3	33		3 22
Lot 2— Shipped alive and slaughtered 36 hours after landing.....	6	55	6	59	04	
Lot 3— Shipped alive and sold as short keep stockers....	6	55	8	22	1 67	
Lot 4— Shipped alive and sold as grass fed stockers.....	6	55	7	00	45	
If sold on the Montreal market May 21, 1923, at prevailing prices, would have brought.....	6	55	6	90	35	

DAIRY CATTLE

AYRSHIRES

The Ayrshire herd at this Station consists of one herd sire, eighteen cows, three two-year-old heifers and two heifer calves. The herd is headed by the young bull "Ottawa Masterpiece" —77928— a son of Burnside Ypres Masterpiece —46637— and out of Belle of Oban —46711—. He is a smooth typey individual and gives promise of developing into a bull of real merit. The records for the last year show a marked improvement in milk production over those of previous years, the outstanding record being that of the three-year-old "Duchess of Fairmount" —64362—, which was 13,571 pounds of milk and 572 pounds of butter fat, produced in 365 days. The herd passed the yearly test for the accreditation not long ago, thus maintaining the standard set up in 1922. A rather unusual feature, and one which may retard somewhat the development of the herd, is the fact that nearly all the calves dropped during the past year and a half have been males.

In the accompanying table will be found the best fourteen records produced in the Ayrshire herd at the Station during the past twelve months.

DAIRY RECORDS, 1923—A VESHINES

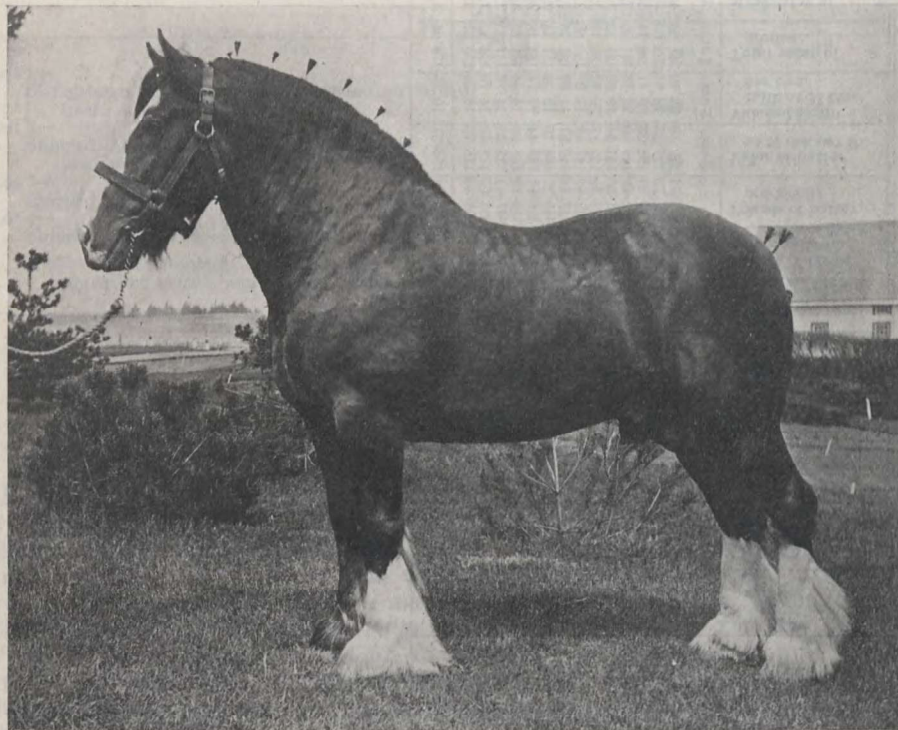
Name of Cow	Registration number	Age at time calf was dropped yrs. m. s.	Days in lactation	Total pounds of milk produced	Daily average yield of milk	Average per cent fat.	Pounds of butter produced.	Pounds of butter fat produced.	Value of butter at 40 cts. per lb. \$ cts.	Value of skim-milk at 25 cts. per cwt. \$ cts.	Total value of product. \$ cts.	Meal eaten at \$1.50 per cwt. lb.	Roots, ensilage and green feed at \$3.00 per ton. qt.	Hay at \$10.00 per ton. lb.	Months pasture at \$1.50 per month.	Total cost of feed \$ cts.	Feed Cost of 100 pounds milk \$ cts.	Cost of feed for lb. butter. cts.	Profit over feed on lb. butter. cts.	Profit over cost of feed per cow. \$ cts.
Duchess of Fairmount.	64362	3-5	365	13,571-0	37-18	4-3	572-00	672-94	269-18	32-50	301-68	4-913	9-015	1-050	5-0	99-97	0-73	-150	-250	201-71
Lemoxville Bluebell 3rd.	56094	3-4	362	12,063-7	33-32	3-7	432-35	567-70	227-03	23-95	556-03	5-051	8-480	1-036	5-0	103-72	0-86	-180	-220	152-81
Eva of Avonmore.	58563	10-0	281	10,563-0	36-62	3-7	408-00	430-03	192-03	26-11	178-14	4-536	8-395	1-120	5-0	93-73	0-96	-196	-204	124-41
Lemoxville Rozie.	55804	5-6	340	8,461-7	27-82	3-8	359-54	422-96	169-20	22-76	191-96	2-983	6-370	1-215	4-25	67-54	0-71	-160	-240	124-72
Pearl.	52867	4-6	277	8,173-4	29-50	4-3	343-28	403-86	161-54	19-58	181-12	3-106	6-300	1-460	3-5	68-59	0-83	-170	-230	112-53
Annabel.	52868	4-6	268	7,457-0	30-14	3-3	338-00	398-30	159-32	20-86	180-18	3-966	7-180	1-250	4-5	88-26	1-01	-220	-180	91-92
Lemoxville Marjorie.	57701	3-10	370	7,127-0	29-39	4-4	313-39	366-52	147-53	17-07	164-56	2-906	7-107	1-456	5-5	69-75	0-98	-160	-240	94-78
Lemoxville Mary 3rd.	72701	3-8	351	6,067-1	17-39	4-0	303-61	357-48	142-87	17-74	151-44	2-660	6-045	1-260	4-5	62-87	1-04	-150	-250	101-89
Lemoxville Betty 2nd.	64095	2-8	351	6,067-1	17-39	4-0	303-61	357-48	142-87	17-74	151-44	2-660	6-045	1-260	4-5	62-87	1-04	-150	-250	101-89
Lemoxville Bettina.	64095	2-8	351	6,067-1	17-39	4-0	303-61	357-48	142-87	17-74	151-44	2-660	6-045	1-260	4-5	62-87	1-04	-150	-250	101-89
Lemoxville Susie.	64095	2-8	351	6,067-1	17-39	4-0	303-61	357-48	142-87	17-74	151-44	2-660	6-045	1-260	4-5	62-87	1-04	-150	-250	101-89
Lemoxville Susie.	64095	2-8	351	6,067-1	17-39	4-0	303-61	357-48	142-87	17-74	151-44	2-660	6-045	1-260	4-5	62-87	1-04	-150	-250	101-89
Lemoxville Marjorie 2nd.	71643	2-8	326	6,948-6	21-68	3-4	277-49	320-69	123-29	14-96	144-22	3-264	5-920	1-160	4-5	73-39	1-10	-230	-170	91-82
Lemoxville Dairymaid 2nd.	64958	2-11	324	6,174-0	26-38	4-4	272-49	307-69	123-29	14-96	144-22	3-264	5-920	1-160	4-5	64-22	1-08	-208	-192	73-03
Highland Betsy 2nd.	73846	2-8	274	7,753-1	28-29	3-2	248-10	291-86	116-75	18-76	135-51	3-234	7-988	1-430	5-0	75-46	0-97	-250	-130	60-05
Average.			292	8,236-5	28-20	4-1	338-50	399-28	159-31	19-75	179-06	3-368	7-088	1-308	4-75	75-00	0-93	-190	-210	104-06

JERSEYS

The Jersey herd at the present time consists of the four-year-old bull "Rower's Golden Maid's Prince" —11841—, four cows, two yearling heifers and two heifer calves. Three of the four cows have R.O.P. records.

HORSES

The horses kept at this Station include the imported Shire stallion "Snelston Topper" (38528), fourteen work-horses, one driver and a three-year-old gelding, which was broken for work during the summer. Three of the idle work-horses were fed almost entirely on hay and ensilage during the winter of 1922-23. They had a covered shed for shelter at night and in bad weather, and a large yard for exercise. In spite of the severe weather, all were in excellent condition when brought to the horse barn in March.



SNELSTON TOPPER (38528)

The Shire stallion presented to the Canadian Government by Mrs. Staunton, Snelston Hall, Ashbourne, England. This splendid specimen of the breed was at stud at the Dominion Experimental Station, Lennoxville, during the season of 1923.

During the summer, two Clydesdale mares, purchased the previous season, were bred to the new Shire stallion "Snelston Topper." As these mares are sound and weigh about 1,600 pounds each, good results may be expected from this cross.

"Snelston Topper," the new Shire stallion, was presented to the Canadian Government by Mrs. Staunton, of Snelston Hall, Ashbourne, England, the

owner of his sire, "Harboro Nulli Secundus," winner of the grand championship at the London Shire Horse Show, London, England, in 1922 and 1923. This splendid individual was imported, along with the shipment of Shire stallions and mares presented to Canada by the Shire Breeders' Association of Great Britain, and is the only one of these horses remaining in Eastern Canada, the others having been sent to the Experimental Station, Lacombe, Alta. Since he is an outstanding individual weighing 2,260 pounds at the present time, and backed by the best breeding, farmers of this section would do well to avail themselves of the opportunity thus offered to improve their heavy draft stock.

COST OF HORSE LABOUR

In order to arrive at the cost of the labour supplied by the horses at the Station, all items pertaining to their upkeep, such as feed, labour, depreciation and interest, had to be considered. Interest and depreciation are charged on the investment on horses, buildings, harness and stable equipment. Statistics show that on the average the farm horse in Eastern Canada is good for twelve years of service, so depreciation on horses is charged at the rate of 8½ per cent. The following statement shows how the cost of horse labour is calculated:—

COST OF HORSE LABOUR

Number of work horses at Station.....	No.	14
Average value of each horse.....	\$	200 00
Total hours work done during year by 14 horses.....	hrs.	26,424
Average hours work done during year per horse.....	"	1,887.4
Average 10 hour days worked during year per horse.....	days	188.74
<i>Cost of feed for 14 horses—</i>		
1,044.4 bushels oats at 55 cents per bushel.....	\$	574 42
186.2 cwt. ground corn and oats at \$1.60 per cwt.....	\$	297 92
75.17 cwt. bran at \$1.20 per cwt.....	\$	90 20
38.36 tons hay at \$10 per ton.....	\$	383 60
Total cost of feed for 14 horses for 12 months.....	\$	1,346 14
Average cost of feed per horse for 12 months.....	\$	96 15
Average cost of feed per horse hour labour.....	cts.	5.7
Cost of feed for 14 horses.....	\$	1,346 14
Veterinary fees and medicine.....	\$	31 70
Horse-shoeing.....	\$	98 00
Repairs to harness.....	\$	24 50
Brushes, sweat pads, etc.....	\$	22 00
Stableman's labour, 2,212 hours at 31 cents per hour.....	\$	685 72
Interest on total investment: 7 per cent of \$4,840.....	\$	338 80
8½ per cent depreciation in value of horses.....	\$	175 00
6.7 " " " harness.....	\$	32 83
2.5 " " " buildings.....	\$	43 50
Total charges against horses.....	\$	2,798 19
Less value of manure (127.4 tons at \$1.28).....	\$	163 07
Total cost of 26,424 hours horse labour.....	\$	2,634 12
Average cost per hour of horse labour.....	cts.	9.9

SHEEP

The sheep flock at the Station at the present time consists of the aged Oxford ram, "Bruce" —13130, a yearling Oxford ram, "Johnson D 7" —20429, ten pure-bred Oxford ewes, four pure-bred Oxford ewe lambs. Forty-nine breeding ewes were kept over the winter of 1922-23 and produced sixty-six lambs. Most of the lambs were dropped during April, before the sheep were sent to pasture. Shearing was done the first week in April, the sixty-six fleeces averaging 9.08 pounds—a marked increase over other years. Of the total clip of 599 pounds, 298 pounds were graded as medium staple and 286 pounds as low medium staple. As there was a difference of six cents per pound between the price paid for these two grades, there was, therefore, an average of 54.5 cents lost on every

fleece placed in the lower grade. The wool was marketed through the Canadian Co-operative Wool Growers' Association, the 599 pounds netting \$169.74, or an average price per pound of 28.3 cents. Before being sent to pasture the sheep and lambs were dipped, all lambs docked and ram lambs, intended for market, castrated. The lambs were weaned on September 1 and transferred to after-grass pasture. Of the sixty-six lambs saved, four rams were sold to farmers for breeding purposes, sixteen ewe lambs added to the flock and the remainder marketed. The following statement shows the cost of maintaining a flock of forty-nine breeding ewes and one ram for one year:—

COST OF KEEPING A BREEDING FLOCK	
Number of ewes.....	No. 49
Value of ewes at \$12 per head.....	\$ 588 00
Value of ram.....	\$ 40 00
<i>Cost of feed for 49 ewes—</i>	
9.2 tons hay at \$10 per ton.....	\$ 92 00
6.9 tons ensilage at \$3 per ton.....	\$ 20 70
3.6 tons roots at \$3 per ton.....	\$ 10 80
29.5 cwt. whole oats at \$1.60 per cwt.....	\$ 47 20
22.6 tons mixed meal at \$1.50 per cwt.....	\$ 33 90
6 months pasture at 20 cents per head per month.....	\$ 58 80
Total cost of feed for 49 ewes.....	\$ 263 40
Interest on investment; 7 per cent of \$588.....	\$ 41 16
Depreciation or replacement charge; 10 per cent of \$588.....	\$ 58 80
Total charges against ewes.....	\$ 363 36
Average charge per ewe.....	\$ 7 41
Value of wool per fleece; 9.08 lb. at 28.3 cents.....	\$ 2 57
Average cost of keeping ewes (less value of fleece).....	\$ 4 84
Average cost of feed per ewe.....	\$ 5 37
COST OF FEED FOR RAM	
6.6 cwt. hay at 50 cents per cwt.....	\$ 3 30
6.0 cwt. ensilage at 15 cents per cwt.....	\$ 90
1.6 cwt. swede turnips at 15 cents per cwt.....	\$ 24
0.5 cwt. whole oats at \$1.60 per cwt.....	\$ 80
2.2 cwt. meal at \$1.50 per cwt.....	\$ 3 30
5 months pasture at 20 cents per month.....	\$ 1 00
Total cost of feed for ram for one year.....	\$ 9 54
Interest on investment; 7 per cent of \$40.....	\$ 2 80
Depreciation charge; 25 per cent of \$40.....	\$ 10 00
Total charge against ram.....	\$ 22 34
Value of fleece 12 pounds at 28.3 cents.....	\$ 3 40
Cost of keeping ram (chargeable against lambs).....	\$ 18 94
COST OF RAISING LAMBS TO MARKET AGE	
Number of lambs saved by 49 ewes.....	No. 66
Average number of lambs saved per ewe.....	" 1.35
Average weight of lambs at birth.....	lb. 10.4
Average weight of lambs when weaned.....	" 77.1
Average weight of lambs October 31.....	" 104.0
Average value at 9 $\frac{1}{4}$ cents per pound.....	\$ 10 14
Cost of keeping 49 sheep (less value of wool).....	\$ 238 63
Three months pasture for 66 lambs at 20 cents per head per month.....	\$ 39 60
Cost of keeping ram (less value of fleece).....	\$ 18 94
Cost of extra labour at lambing time.....	\$ 26 00
Medicine.....	\$ 5 00
Total cost of raising 66 lambs to market age.....	\$ 328 17
Average cost of raising a lamb to market age.....	\$ 4 97

SWINE

Only one breed of swine, the Yorkshire, is kept at the Station at the present time. The herd of swine consists of the aged Yorkshire boar, "Glenhodson Emperor F."—69124—the young Yorkshire boar "Ottawa Alexander"—932410—six brood sows and forty-two experimental feeders. Four of the seven sows kept during the year had two litters each from which seventy-five pigs were saved. Three young sows had only one litter each and saved twenty young pigs.

Considering the market demand, at the present time, an effort is being made to produce pure-bred pigs of the bacon type and distribute them among the farmers at a reasonable price. From each litter, therefore, the most promising males and females are selected to be sold as breeders, the remainder being used as experimental feeders and sold as market hogs. During the summer the sows and young sucking pigs were kept in a pasture, well supplied with grass and water. This materially helps to lessen the cost of upkeep for the year. While on pasture the sows received an allowance of about 1½ pounds of whole oats per day during July and August and later on, barley and tankage. In winter the sows are kept in yards provided with colony houses, their ration then consisting of screenings 4 parts, bran 2 parts, oats 1 part and barley 1 part, fed at the rate of 1.5 pounds per hundred pounds live weight. Salt, sulphur and charcoal are added at the rate of two pounds of each to 400 pounds of the meal mixture. Roughage is supplied in the form of sliced roots and clover hay.

COST OF RAISING YOUNG PIGS

As young pigs are usually sold when six or eight weeks old, for breeding purposes, it is often useful to know what it costs to raise them to that age. When calculating these costs it is necessary to consider all charges against the sows for one year. The following statement was made up from the records of four Yorkshire brood sows kept at the Station during 1923. Three or four weeks previous to farrowing time the screenings in the sows' ration were replaced by middlings and corn equal parts. Skim-milk was also fed or, when not available, a small quantity of tankage to take its place. The young pigs from three to six weeks of age received ground oats fed in a hopper, and sweet skim-milk in addition to the mother's milk.

COST OF RAISING YOUNG PIGS TO WEANING AGE

Number of sows bred.....	4
Number of litters farrowed per sow during year.....	2
Total number of pigs saved.....	75
Average number of pigs saved per year per sow.....	18.8

COST OF FEED FOR SOWS FOR ONE YEAR AND FOR PIGS FROM BIRTH TO SIX WEEKS

2,144 pounds screenings at \$1.25 per cwt.....	\$ 26 82
950 " middlings " 1.60 "	15 20
1,500 " oats " 1.60 "	24 00
500 " barley " 1.70 "	8 50
105 " oilmeal " 2.50 "	2 63
250 " tankage " 3.50 "	8 75
450 " hay " .50 "	2 25
2.75 tons roots " 3.00 per ton.....	8 25
6,672 pounds milk " .25 per cwt.....	16 68
Charcoal, salt and sulphur.....	2 00
Four months pasture for 4 hogs at 50 cents per hog per month.....	8 00
Total cost of feed eaten by sows and young pigs.....	\$ 123 08

All costs connected with the upkeep of the sows are charged against the young pigs, with the exception of labour and housing charges, which are considered to be offset by the value of the manure. Each sow is valued at \$30 in order to arrive at the interest charge.

Total cost of feed for sows and young pigs.....	\$ 123 08
Extra labour required at farrowing time.....	24 20
Cost of service at \$2 per service.....	16 00
Interest on \$120 for 1 year at 7 per cent.....	8 40
Total cost of raising 75 pigs to weaning age.....	\$ 171 68
Cost per pig at weaning age.....	\$ 2 29

COST OF PRODUCING PORK

As the price of the different concentrates varies so much from time to time, it is often important to know the relative efficiency of the different mill feeds for hog feeding. Corn and middlings are the two feeds most commonly purchased in this section of the country for this purpose, and when they can be bought at a reasonable price are the most economical to use, excepting the home grown grains. Lately, wheat screenings have come on the market and in order to obtain further information as to their value as a feed for hogs, a test was conducted at the Station, in which one lot of pigs was fed largely on this mill feed during the last three months of feeding and the gains compared with those made by two other lots fed, one on a heavy corn ration and the other on a light corn ration. All three lots were taken at weaning time and fed skim-milk and a meal ration made up of oatmeal 45 pounds, middlings 45 pounds and oilmeal 10 pounds. At four months of age the rations were changed in each case, lot 1 getting cornmeal 75 pounds, bran 15 pounds and middlings 10 pounds; lot 2 received cornmeal 50 pounds, ground oats 25 pounds and middlings 25 pounds; lot 3 received screenings 80 pounds, ground oats 10 pounds and bran 10 pounds. All three lots were weaned at the same time and carefully selected so that no one lot of pigs had any advantage over the others.

The following table shows the cost of producing pork with each of the three rations and the average profit per hog made in each lot:—

HOG FEEDING EXPERIMENT

		Lot 1 Heavy corn ration	Lot 2 Light corn ration	Lot 3 Screen- ings ration
Number of hogs.....	No.	8	8	7
Number of days hogs were fed.....	Days	120	116	115
Average weight when weaned.....	Lb.	40	45.3	43.2
Average weight when sold.....	"	198	193	211
Average gain in 120 days.....	"	158	147.7	167.8
Average daily gain.....	"	1.32	1.27	1.46
Feed used per hog—				
Skim-milk.....	"	1,057	1,046.5	1,145
Meal.....	"	582.5	521.6	704
Cost of feed per pound gain.....	Cts.	6.7	6.9	7.3
Cost of feed per hog.....	\$	10.54	10.20	12.22
Cost of young pigs at 10 weeks of age.....	\$	3.00	3.00	3.00
Total cost per hog at market time.....	\$	13.54	13.20	15.22
Average value of hogs at 9 cents per pound.....	\$	17.82	17.37	18.99
Average profit over cost of feed per hog.....	\$	4.28	4.17	3.77

FIELD HUSBANDRY

CROP YIELDS AND COST OF PRODUCTION

As it is usually difficult for the average farmer to keep accurate records of the costs and yields of the crops he produces, the production cost figures appearing in this report may be of use to him. At the Station such records are kept in connection with the general farm rotation, which is the basis used for calculating all production costs. As these cost studies are carried on with large fields, they may be applied to general farm conditions throughout western Quebec.

A four-year rotation consisting of corn, or some other hoed crop, oats and two years' hay is practised over most of the improved land, manure being

applied to the hoed crop, at the rate of 16 tons per acre. On some fields lying at some distance from the barns, the land is left in hay for three years, or sometimes two years in hay and one year pasture. On such areas commercial fertilizers are used, either on the hoed crop or as a top dressing later on, to supplement the manure. The soil is nearly all clay loam, although there are small areas of sandy loam and peat. Practically all the arable land is under-drained and is at the present time in a fair state of fertility.

As shown by the tables all items entering into the cost of producing the different crops are considered. The fixed charge of \$6.60 per acre for rent is obtained by adding the interest and taxes on one acre of land, the value of which is placed at \$75. This may be somewhat low for the land at the Station, but is considered to be a fair average, for improved land, in this district at the present time. Manure is charged at the rate of \$1 per ton, to cover the cost of handling. It may be worth much more, of course, but as there is no cash outlay for it, and as its real value is rather hard to determine, the above charge is considered to be sufficiently high. In a four-year rotation, it is estimated that 40 per cent of the value of the manure is used by the first crop, 30 per cent by the second, 20 per cent by the third, and 10 per cent by the fourth. As the four-year rotation is taken as a basis in all the calculations in this report, the above explanation shows how the charges for manure in each case were obtained. The fixed charge of \$3 per acre for machinery was obtained by adding the interest, depreciation and repair charges for machinery on the average farm in Ontario, and dividing by the number of acres of tilled land. If those charges are less on the average farm in the Eastern Townships it must be remembered that the number of acres of tilled land is also less, so that the charge would be at least \$3. This, of course, does not include threshing and ensiling charges which are based on local conditions and charged separately. Horse labour is charged at a fixed rate of 12 cents per hour, while manual labour is charged at the rate prevailing throughout the district, and includes board. Miscellaneous items, such as seed and twine, are charged at current market prices. All cost of production figures are based on one acre, irrespective of the size of the field on which the records are kept.

COST OF PRODUCING ENSILAGE CORN

The yield of ensilage corn was below the average not only at the Station, but throughout the Eastern Townships generally, owing to the cool summer weather and to frost injury. The records kept for the last eight years show that, in this district, corn cannot be depended on to produce a profitable crop more than three years in four. It is usually safer, therefore, to grow a few acres of a supplementary crop such as sunflowers, roots or a mixture of oats, peas and vetches, which do well during a wet growing season and are not so readily injured by frost.

Corn was grown on fall ploughed timothy sod, manured during the winter at the rate of 16 tons per acre. The soil is a clay loam with a clay subsoil. Planting was done on May 26 in rows 42 inches apart, Compton's Early being the variety used. Soon after the crop appeared above the ground, it was harrowed with a smoothing harrow. For this work the tilting harrow is best as the ordinary kind is apt to pull up too many plants. The crop received one hoeing and several cultivations with the two-horse corn cultivator to control weeds. The corn was very immature when cut on September 17, only a few cobs having formed, and as the air-dry weight was only about 19 per cent of the green weight, there was probably considerable shrinkage in the silo. The average yield from 11 acres was only 10.3 tons per acre. During the eight years that records have been kept at the Station, the highest yield

of ensilage corn was 16.6 tons in 1921, and the lowest 7.2 tons in 1920. The following table shows how the cost of producing an acre of corn is obtained:—

COST OF PRODUCING AN ACRE OF ENSILAGE CORN

Item	Statement	Amount
		\$
Rent.....	Interest and taxes.....	6 60
Manure.....	6.4 tons at \$1 per ton.....	6 40
Seed.....	½ bushel at \$1.75.....	0 88
Machinery.....		3 00
Twine.....	3½ pounds at 15 cents.....	0 49
Manual labour.....	21 hours at 20 cents per hour.....	4 20
Teamster's labour.....	28 " 22 " ".....	6 16
Horse labour.....	65 " 12 " ".....	7 80
Ensiling.....	10.3 tons at 36 cents per ton.....	3 71
Total cost per acre.....		39 24
Yield per acre.....	10.3 tons.	
Cost per ton.....		3 81

As corn ensilage is not a marketable crop it must be compared with a crop such as hay which has a market value, in order to ascertain whether it is grown at a profit or at a loss. Mature ensilage corn that has reached the glazed stage before being cut, contains about 25 per cent dry matter and, ton for ton, has a feeding value approximately three-tenths that of well cured mixed hay. Although samples for dry matter determination were taken, the result of the analysis has not yet been received, but judging from the appearance of the crop when it was cut, the absolute dry weight would not be more than 16 per cent of the green weight. According to statistics furnished the Dominion Bureau of Statistics by rural correspondents, the average value of hay throughout Quebec in November, 1923, was \$10.50 per ton. Taking this price as a basis, good corn ensilage would be worth \$3.15 per ton, and that produced on the above mentioned field \$2.02 per ton. The value of the crop on this field was, therefore, only \$20.81 and the loss incurred in producing it \$18.42.

COST OF PRODUCING SUNFLOWER ENSILAGE

The sunflower crop at the Station was affected in 1923 by the ravages of the Peacock fly. The adult of this insect lays its eggs on the stems of the plant during the early part of the season, and when the maggot hatches out it burrows into the pith, or centre of the stem, and begins to eat its way upward. When it reaches the top it bores its way out again and enters the ground, where it pupates. Just how serious this pest will be is hard to conjecture; however, as the infestation last season was confined to a comparatively limited area, it should not deter farmers in this district from growing sunflowers again. No serious damage was done until the crop was ready for ensiling and there was consequently no great reduction in yield. Twenty-nine acres of corn and sunflowers mixed, which were rather badly infested, gave a yield of over 15 tons per acre, fully 75 per cent of the yield being sunflowers. This ensilage is now being fed to steers, that seem to be making as good gains as those fed on straight corn ensilage.

Four acres of sunflowers, which escaped the Peacock fly infestation, produced a yield of 16.8 tons per acre. This crop was planted on May 25 and harvested on September 14. The land which was a gravelly loam was spring ploughed. It received 15 tons per acre of barnyard manure and commercial fertilizer made up of 100 pounds muriate of potash and 250 pounds acid

phosphate applied at the rate of 300 pounds per acre. When calculating the cost of manure and fertilizer it was estimated that forty per cent of the value of manure and seventy-five per cent of the cost of fertilizers are charged against this crop. The variety used each year at this Station is Mammoth Russian which is sown in rows 42 inches apart at the rate of 10 pounds per acre. The following statement which shows how the cost of producing an acre of sunflowers is calculated, was made up from records kept in connection with the four acre field just referred to.

COST OF PRODUCING AN ACRE OF SUNFLOWERS FOR ENSILAGE

Item	Statement	Amount
Rent.....	Interest and taxes.....	\$ 6 60
Manure.....	6 tons at \$1 per ton.....	6 00
Fertilizers.....	225 pounds at \$27.14 per ton.....	3 05
Seed.....	10 pounds at 9 cents per pound.....	0 90
Machinery.....		3 00
Twine.....	3½ pounds at 15 cents per pound.....	0 53
Manual labour.....	25 hours at 20 cents per hour.....	5 00
Teamsters labour.....	31 hours at 22 cents per hour.....	6 82
Horse labour.....	72 hours at 12 cents per hour.....	8 64
Ensiling.....	16.8 tons at 36 cents per ton.....	6 05
Total cost per acre.....		46 59
Yield per acre.....	16.8 tons.	
Cost per ton.....		2 77

Sunflowers produced slightly more dry matter per ton than corn at this Station last year. However, as the ensilage is not quite so satisfactory for feeding, it is doubtful if it is worth any more, ton for ton, than the latter. Valued at \$2.02 per ton it gave a return of \$33.94 per acre, which meant a loss of \$12.65 when all cost items were considered.

Where corn will produce a satisfactory yield there is no need to grow sunflowers, as it is a more difficult crop to harvest and does not produce so palatable an ensilage. However, where the growing season is too short for corn, sunflowers for ensilage is an economical crop to grow.

COST OF PRODUCING A MIXTURE OF OATS, PEAS AND VETCHES FOR ENSILAGE

The oats, peas and vetches mixture may often be grown with profit because of its threefold usefulness as a hay, silage and soiling crop. Very often it produces a heavy yield when hay and pastures are poor, in which case this crop may be fed to milch cows as green feed or cut and dried for hay. As it produces its heaviest green weight about eighty days after seeding, it may be sown early in July for harvesting in September. This allows time for early summer fallowing of weedy ground, and besides gives the farmer a chance to estimate the possible yields from his main forage crops. It contains more protein than either corn or sunflowers and should be carefully tramped in the silo to prevent moulding or decomposition. The best results are obtained by cutting the crop when the oats have begun to turn yellow, at which stage it should contain about 30 per cent dry matter. It may be cut with either the mower or grain binder.

At the Station the crop is often grown on areas which are apt to be too wet for corn; grass seed being sown at the same time for seeding down to hay. As it is not an intertilled crop, it is not so useful in a rotation for the control of weeds as corn, sunflowers or roots, and should always be considered more as a supplementary than as a main ensilage crop.

Several acres of this crop were grown for ensilage at the Station last season. The ensilage has rather an offensive odour but is readily eaten by the stock. The land on which it was grown was fall ploughed and received manure

at the rate of 12 tons per acre. The seeding mixture consisted of Banner oats 2 bushels, Arthur peas $\frac{3}{4}$ bushel and common vetches $\frac{1}{4}$ bushel, or 128 pounds per acre in all. This was sown with the grain drill about June 1. The following statement gives the various items entering into the cost of producing this crop for ensilage:—

COST OF PRODUCING AN ACRE OF O.P.V. ENSILAGE

Item	Statement	Amount
Rent.....	Interest and taxes.....	\$ 6 00
Manure.....	4.8 tons at \$1 per ton.....	4 80
Seed.....	2 bushels oats at 60 cents.....	\$ 1 20
	$\frac{3}{4}$ bushel peas at \$3.....	2 25
	$\frac{1}{4}$ bushel vetches at \$4.75.....	1 19
		4 64
Machinery.....		3 00
Manual labour.....	9 hours at 20 cents per hour.....	1 80
Teamsters' labour.....	22 hours at 22 cents per hour.....	4 84
Horse labour.....	50 hours at 12 cents per hour.....	6 00
Ensiling.....	7.1 tons at 36 cents per ton.....	2 53
Total cost per acre.....		34 21
Yield per acre.....	7.1 tons.	
Cost per ton.....		4 82

Considering its high protein and dry matter content it might be thought that O.P.V. ensilage would have a greater feeding value than good corn ensilage. However, actual feeding trials with milch cows have shown that ton for ton it does not produce milk any cheaper than the latter, which, according to the present market value of hay is worth \$3.15 per ton. According to the foregoing statement, therefore, an acre of O.P.V. ensilage producing 7.1 tons would be worth \$22.37, so that the crop was grown at a loss of \$11.84 per acre.

COST OF PRODUCING SWEDE TURNIPS

The land for swedes was ploughed in September, 1922, and disced twice during the fall. This helped to control weeds, which do so much damage in a root crop. Manure was applied at the rate of 20 tons per acre and ploughed under, after which the land was disced and hilled up in drills 27 inches apart. Planting was done on June 11, the variety used being Bangholm. The seed was sown at the rate of two and one-half pounds per acre, which is not considered heavy seeding. Thinning is easier when the rate of seeding is kept under that amount. However, if there is any danger of cut worm injury, a heavier rate than that, by producing more plants, ensures a better stand. The crop was thinned when the plants were about three inches high, hoed once and cultivated twice during the summer, which was all the labour put on it until harvest time. The following table gives a detailed statement of the cost of growing an acre of swedes:—

COST OF PRODUCING AN ACRE OF SWEDES

Item	Statement	Amount
Rent.....	Interest and taxes.....	\$ 6 00
Manure.....	8 tons at \$1 per ton.....	8 00
Seed.....	2½ pounds at 76 cents per pound.....	1 90
Machinery.....		3 00
Manual labour.....	78 hours at 20 cents per hour.....	15 60
Teamsters' labour.....	46 hours at 22 cents per hour.....	10 12
Horse labour.....	94 hours at 12 cents per hour.....	11 28
Total cost per acre.....		56 50
Yield per acre.....	28.6 tons.	
Cost per ton.....		1 98

Compared on the basis of the dry matter content of each, swede turnips have two-fifths of the value of good ensilage corn. With the latter, valued at \$3.15 per ton, swedes were worth only \$1.26 per ton or \$36.04 per acre. This would mean that they were produced at a loss of \$20.46 per acre at the Station last season.

Thirty years ago swede turnips and mangels were the principal succulent roughage crops grown throughout Eastern Canada, but owing to the relatively large amount of hand labour required for their cultivation, they have gradually been supplanted by corn, wherever the latter can be successfully grown. Silage made from corn which has reached the glazed stage contains more than twice the dry matter found in roots and is worth much more per ton for feeding to live stock as the main succulent roughage. In many sections of the province of Quebec, however, corn is not an economical crop to grow on account of late spring and early fall frosts. When grown under such conditions it must be cut when quite immature, which results in a heavy shrinkage in the silo and ensilage of inferior quality. The sunflowers and the oats, peas and vetches mixture may be grown with fairly satisfactory results, but unless corn has already been tried there must be a rather heavy outlay for the silo and ensiling machinery. Roots, on the other hand, can be made to produce large yields anywhere in the East and can be housed usually with very little expense. As succulent roughage in some form or other is necessary for the profitable feeding of live stock, roots have a place and a value in the colder parts of the province which they have not got in the strictly corn growing districts. Under such conditions, therefore, a 28 ton crop of roots, instead of being grown at a loss, would probably produce a very substantial profit.

COST OF PRODUCING OATS

The total area sown to oats in 1923 was 54 acres which gave an average yield of 46.1 bushels. Owing to the unfavourable weather conditions which prevailed during May, 12 acres were seeded while the ground was too wet, and as the soil was a clay loam, it baked quite hard soon after the grain came up. As a consequence the yield on this field was only 31 bushels per acre. The later sown fields were seeded when the ground was in good condition and produced good yields. Owing to the cool summer weather, harvesting was at least three weeks later than usual, but the quality of the grain was excellent, there being very little evidence of either smut or stem rust injury. The variety used throughout was Banner, seeded at the rate of two and one-half bushels per acre.

Oats are one of the crops raised on the Farm which has a definite market value, so it is easy to calculate whether a profit or a loss is made, if cost records are kept. In this report oats are valued at 55 cents per bushel, and oat straw at \$4 per ton, which agrees with the values of these commodities furnished to the Dominion Bureau of Statistics by crop correspondents throughout Quebec. The following table gives a detailed statement of the cost of producing oats in a five acre field which was in corn in 1922:—

COST OF PRODUCING AN ACRE OF OATS

Item	Statement	Amount
Rent.....	Interest and taxes.....	\$ 6 60
Manure.....	4.8 tons at \$1 per ton.....	4 80
Seed.....	2½ bushels at 60 cents per bu.....	1 50
Machinery.....		3 00
Twine.....	2½ pounds at 15 cents per lb.....	39
Manual labour.....	6.5 hours at 20 cents per hour.....	1 30
Teamsters labour.....	11.9 hours at 22 cents per hour.....	2 62
Horse labour.....	36.6 hours at 12 cents per hour.....	4 39
Threshing.....	54.4 bush. at 9 cents per bush.....	4 90
Total cost.....		\$29 50
Yield of grain per acre.....	54.4 bushels.....	
Cost of grain per bushel.....		cts. 47.9
Yield of straw per acre.....	0.985 tons.....	
Value of grain.....	54.4 bushels at 55 cents per bu.....	29 92
Value of straw.....	0.985 tons at \$4.....	3 94
Total value of grain and straw.....		\$33 86
Profit per acre.....		4 36

The foregoing table shows that with this crop a profit of \$4.28 was secured. Although this may not look like a very large profit, it must be remembered that the farmer has already been paid a fair wage for his labour, after interest, taxes and other cost items have been deducted. It may, therefore, be regarded in the nature of a dividend and if added to the cost of labour, would mean that he was paid at the rate of 45 cents per hour for his work.

COST OF PRODUCING HAY

The total yield of hay from 140 acres was 374 tons, or an average yield of 2.67 tons per acre. As the barns were full to overflowing with the first cut, the second crop of clover was pastured. If this crop had been hayed, the total yield would probably have amounted to well over three tons per acre. Three weeks of very good weather permitted the housing of the bulk of the crop in good condition. The following statement is made up from records kept in connection with a 20-acre field which produced a first year hay crop in 1923.

COST OF PRODUCING AN ACRE OF HAY

Item	Statement	Amount
Rent.....	Interest and taxes.....	\$ 6 60
Manure.....	3.2 tons at \$1 per ton.....	3 20
Seed.....	Timothy, 10 pounds at 11 cts.— \$1 10	
	Red clover, 8 pounds at 27 cts..... 2 16	
	Alsike, 2 pounds at 16 cts..... 0 32	
	(2 hay years)..... 3 58	
	(One hay year)..... 1 79	1 79
Machinery.....		3 00
Manual labour.....	7.2 hours at 20 cents per hour.....	1 44
Teamsters labour.....	6 hours at 22 cents per hour.....	1 32
Horse labour.....	7.7 hours at 12 cents per hour.....	0 92
Total cost per acre.....		\$18 27
Yield per acre.....	2.7 tons (first cut).....	
Cost per ton.....		6 77
Value per acre.....	at \$10.50 per ton.....	28 35
Profit per acre.....	from one cutting.....	10 08

The foregoing table shows that hay was the most profitable crop grown at the Station in 1923. This was due to the extra heavy yield and to the fact that, on account of the favourable weather at haying time, this crop required much less labour than hoed crop or grain.

COMPARISON OF SUCCULENT ROUGHAGE CROPS

In order to determine the relative yields of the succulent roughage crops grown in this district as well as their demand on the fertility of the soil, an acre each of corn, sunflowers, oats, peas, vetches mixture and roots were grown side by side on uniform clay loam soil. They all received the same application of manure, 16 tons per acre, applied early in the spring. Each crop received the soil preparation and summer cultivation peculiar to its needs, as described in the report on cost of production. Careful records were kept of costs and yields, and samples for dry matter determination taken at harvest time. The following table shows the green and air-dry weights from each acre as well as the cost of producing these weights:—

COMPARISON OF SUCCULENT ROUGHAGE CROPS

	Green weight	Air dry weight	Cost of green weight per ton	Cost of air-dry weight per ton
	tons	tons	\$ cts.	\$ cts.
Corn.....	8.6	1.64	4 46	23 37
Sunflowers.....	15.5	3.02	2 42	13 94
O.P.V.....	8.8	2.99	4 06	11 95
Swedes.....	24.4	2.83	2 23	19 23

Although the comparative test of these crops has only been carried on for one year, yet the results obtained, when compared with the cost of production studies, would seem to indicate,—

1. That corn is not a sure crop every year, especially in districts east and north of Sherbrooke;
2. That sunflowers, although they do not produce so palatable an ensilage, give economical yields. The objection to them is the difficulty of harvesting and the possible infestation by the Peacock fly;
3. That the oats, peas and vetches mixture may be grown as a supplementary crop and that when other ensilage crops produce good yields this mixture may be cut for hay or used as a soiling crop;
4. That the roots are an economical crop to grow where corn does not produce satisfactory yields. This is especially true on small farms where the acreage of tillable land available would hardly warrant the cost of a silo and ensiling equipment.

The yields and costs obtained in this experiment vary somewhat from those obtained in the general farm rotation. It must be remembered, however, that in this experiment, soil and fertility conditions were as nearly similar as they could be obtained under field conditions, while in the general rotation there was more or less variation in those factors, with its consequent effect on yields. The corn was badly frozen on August 24 and had to be cut early, which accounts in part for the low yield obtained. All the other crops did well and were harvested in good condition. This experiment will be carried on each year under field conditions, records being kept of the yields of grain and hay following each

of the crops. In this way the demand of each crop on the fertility of the soil will be ascertained as well as their relative values for the production of succulent roughage.

The average yield of corn, sunflowers and roots at the Lennoxville Station for the past three years has been 12.2 tons, 17.6 tons and 28.3 tons respectively. In that time corn gave one very good and two poor yields. From that it would seem that in this vicinity and farther east and north especially, corn is not a crop that can be depended on every year.

COMMERCIAL FERTILIZERS

During the summer of 1922, a twelve-acre field of rough pasture was ploughed up, the intention being to grow a crop of grain, seed it down, and return it again to pasture. As this was outside the general farm rotation, it was found necessary to purchase manure or fertilizer, to increase its fertility. Manure purchased in Montreal was used on eight acres, the application being 15 tons per acre. Of the remaining four acres, three received a dressing of 320 pounds per acre of a mixed fertilizer made up of 75 pounds of nitrate of soda and 200 pounds acid phosphate. The remaining acre received neither manure nor fertilizer and was used as a check. Manure is charged at the rate of \$2 and the fertilizer at the rate of \$35.75 per ton, these prices including the cost of application. Oats were sown on June 3, the grass and clover mixture sown along with it being as follows:—

Timothy.....	5 pounds
Red clover.....	5 "
Alsike.....	2 "
White Dutch.....	2 "
Alfalfa.....	2 "
Canadian Blue grass.....	2 "
	18 pounds

Records were kept this year of the weight of grain and straw produced. Next year the hay will be cut and weighed in order to ascertain the effect of each treatment on the second crop. After that, the crop will be pastured and observations made in order to determine the value of the different grasses and clovers for making up a pasture mixture. The following table shows the effect of the two applications on the yields of grain and straw:—

COMPARISON OF MANURE AND COMMERCIAL FERTILIZER

	Fertilized area	Manured area	Check
Yield of grain per acre.....bush.	45.8	45.9	27.9
Yield of straw per acre.....ton	1.15	1.2	0.6
Increase in yield of grain.....bush.	17.9	18.0	
Increase in yield of straw.....ton	0.596	0.60	
Value of increase.....\$	13.84	13.90	
Cost of increase.....\$	5.72	12.00	
Profit per acre due to increase.....\$	8.12	1.90	

The table shows that the area which received commercial fertilizer gave a profit over the cost of the fertilizer of \$8.12, while the barnyard manure only gave a profit of \$1.90. When calculating the costs, the total cost of the fertilizers and 40 per cent of the value of the manure were charged against the grain crop. Although this work has only been carried on for one year it shows that there is an opportunity to use commercial fertilizers to advantage on worn-out pasture land for which manure cannot be supplied.

HORTICULTURE

VEGETABLES

POTATOES

Recommended Varieties.—Previous to the past season a variety test of potatoes has been conducted at this Station each year since 1916. Of the varieties tested two have shown a decided superiority, namely, Irish Cobbler for early use, and Green Mountain as a main crop. Since these are the two main commercial varieties throughout Eastern Canada, and are well known to the trade, it was decided to discontinue the variety testing of potatoes until other promising strains or varieties are available. For the time being, therefore, the varieties recommended for the district served by this Station are Irish Cobbler and Green Mountain.

Spraying versus Dusting.—An experiment for the purpose of comparing the Bordeaux mixture and calcium arsenate spray with several of the recommended dust preparations as a control for the potato blight and the Colorado potato beetle was conducted during the past season. The dusts used were Green Potato arsenate, Bordeaux arsenate, Brown Apple dust, and a mixture composed of hydrated lime 8 pounds and calcium arsenate 1 pound. The most complete and efficient control was obtained with the Bordeaux calcium arsenate spray.

Sprouting Seed Potatoes.—An experiment to determine the value of the practice of sprouting seed potatoes before planting was begun in 1923 with the Irish Cobbler and the Green Mountain varieties. Small whole potatoes and ordinary cut sets were exposed to subdued light, in shallow trays, at a temperature of about 45 degrees, for a period of six weeks before planting. Half of each lot was placed on about an inch of moist sand, and the remainder merely allowed to sprout on the bare tray. For comparison a lot of each variety was kept as dormant as possible under ideal storage conditions. All lots were planted under uniform conditions in duplicate plots on May 10. Aside from an increase in the earliness of the crop, the results of this experiment indicated that there is little advantage in sprouting seed potatoes before planting, but in other experiments there has been an increase in yield from sprouting.

ONIONS

Sixteen varieties were tested in 1923 and of these, five have given the best results over a period of four years. The results from these varieties are as follows:—

ONIONS, TEST OF VARIETIES

Variety	Colour	Shape	Yield from two thirty foot rows	
			Average of four years	
			lbs.	ozs.
Extra Early Flat Red.....	Red.....	Flat.....	29	12
Giant Prize taker.....	Yellow.....	Oval.....	28	12
Red Wethersfield.....	Red.....	Slightly flat	26	..
Ailsa Craig.....	Yellow.....	Oval.....	25	12
Yellow Globe Danvers.....	Yellow.....	Oval.....	23	8

Any of the above varieties are apparently quite satisfactory for the district, although Red Wethersfield is the most generally grown, and, owing to its splendid keeping qualities, is possibly the most readily saleable in large lots.

For pickling, White Barletta is the best variety that has been tested at the Station, the average yield for the past four years amounting to 14 pounds 4 ounces from two 30-foot rows. The onion matures well, is quite small in size and of a greenish-white colour.

Transplanting Onions.—Seed of Giant Prizetaker, Yellow Globe Danvers and Red Wethersfield was started in flats in the hotbed on April 12. The plants were pricked out May 1 and transplanted to the open on May 14. Each of the three varieties produced a much larger and better matured crop than the same variety seeded in the open, although their relative standing as regards yield was the same.

GARDEN CARROTS

Test of Varieties.—Six varieties and strains of garden carrots were tested in 1923. From the results obtained the Ottawa selection of Chantenay proved the most desirable variety of those tested. Half Long Danvers produced the heaviest yield, but was coarse and of poor quality. Half Long Scarlet is of excellent quality, but light yielding.

Different Dates of Seeding.—Seed of the Chantenay variety was sown on six different dates, at intervals of about ten days, beginning May 18. Carrots of bunching size were obtained from the seedings made up until June 18, but later seedings did not produce a crop of marketable size.

GARDEN BEETS

Test of Varieties.—In all thirty-one varieties and strains of garden beets have been tested during the past eight years, and although other varieties frequently yield heavier crops, it has been found that, when both quality and yield are considered, the best varieties tested are Crosby Egyptian and Detroit Dark Red.

Different Dates of Seeding.—In order to determine the latest date at which garden beet seed may be sown, so as to produce a crop and also to obtain a comparison of yields from seeding at different dates, seed of the Detroit Turnip variety was sown on May 18 and at intervals of about ten days until July 7. Beets of bunching size were obtained from all seedings excepting that made on July 7.

ASPARAGUS

Excellent results were again obtained with the Washington variety of asparagus. A plot consisting of three-year-old plants of this variety produced a yield of 3,780 pounds per acre, which would make approximately 1,600 bunches of marketable size.

Bunched asparagus is one of the garden delicacies that is both readily saleable and commands an excellent price. As a crop it is well suited to the district.

RADISH

Owing to the cool moist weather during spring and early summer, radishes did well and remained crisp and tender much longer than usual.

Of the seven varieties tried, XXX Scarlet Oval seemed the most desirable, as it combines good quality with ideal size, and a fine appearance when bunched. Improved French Breakfast is a good second choice as a market radish, and, for home use, possibly the best since the quality is a shade better than any other variety tested.

SWISS CHARD

The leaves of this vegetable are used in the same manner as spinach for cooking green. It is much later, however, and heavier yielding. When planted at the same time as summer spinach it is usually ready for use shortly after the spinach is finished. Three or four cuttings are usually possible at intervals of two to three weeks.

Silver Leaf and Giant Lucullus were grown. Each made an excellent growth and produced a good crop, although that from Silver Leaf was the best quality.

SPINACH

Spinach usually does well at Lennoxville and is a vegetable that should be more grown throughout the district for home use at least. Two varieties were grown in 1923. Victoria, an early summer kind, and New Zealand, a late variety. Both gave good results and formed an excellent combination for crop succession.

PEPPERS

Owing to the unfavourable weather that continued throughout the season, disappointing results were obtained from all varieties of peppers tried. Normally such varieties as Harris Early and Neapolitan are ready for use by the middle of July, but with the 1923 crop, the first ripe pepper was picked on August 18, and on August 24 frost killed the plants. Accordingly, the only information obtained from this experiment was the indication that only extremely early varieties of this vegetable may be recommended for the district.

GARDEN PEAS

Test of Varieties.—Thirty-five varieties and strains of garden peas were tested in 1923. Of these six have been under test for the past six years. Following are the average yields:—

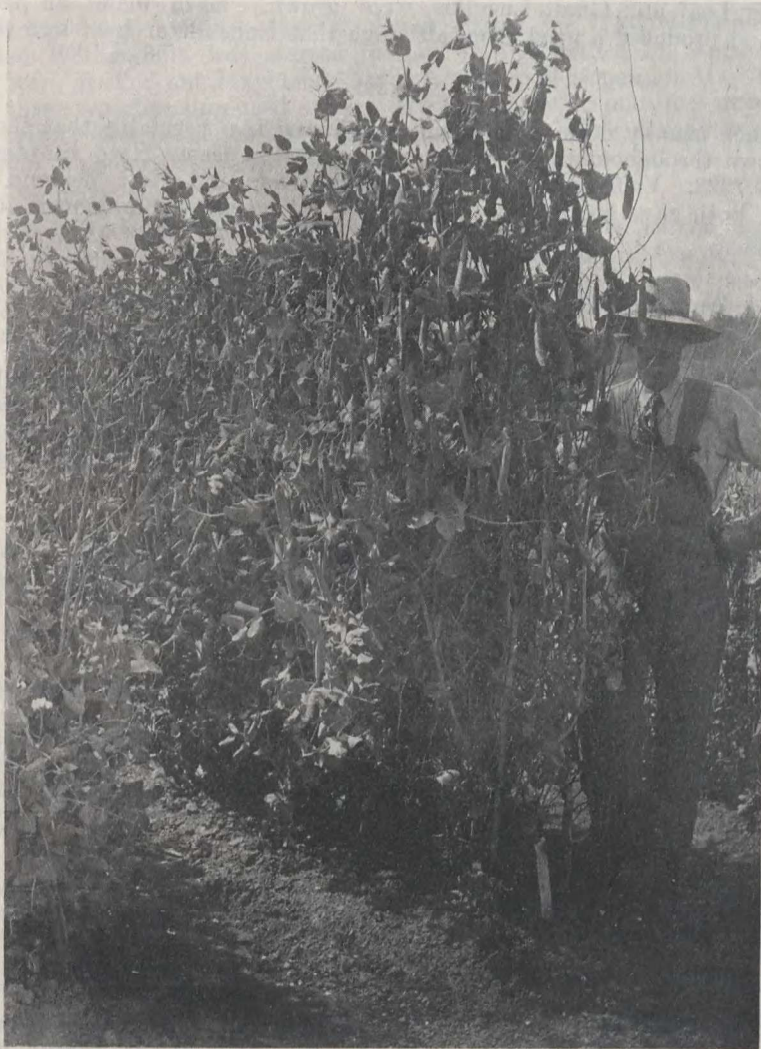
GARDEN PEAS, AVERAGE OF SIX YEARS

Variety	Season	Yield of unshelled crop from one thirty foot row	
		lbs.	ozs.
Telephone.....	Late.....	17	15
Thomas Laxton.....	Early.....	17	6
Gradus.....	Early.....	16	6
Stratagem.....	Late.....	16	1
Sutton Excelsior.....	Mid-Season...	14	5
American Wonder.....	Early.....	11	2

Distance apart of Planting in the Row.—In order to determine the most satisfactory distance at which to plant peas in a row, seed of English Wonder, Thomas Laxton and Stratagem was planted, in rows at distance of one-half, one, two and three inches apart, in rows 30 inches apart.

The resulting crop showed that the closer plantings gave the best yield of crop. This, no doubt, was largely influenced by the character of the season as the ample rainfall and cool weather permitted full development of the plants. In seasons when the weather is normal, or hot and dry, it is probable that there would not be sufficient moisture available in the soil to properly supply the plants where the planting was only one-half an inch apart.

Breeding Work.—The seed of the Gradus variety, saved from high-yielding plants in 1922, was planted in separate rows. Five lots produced uniform plants that bore more than the average number of well-filled pods, as determined from plants raised from ordinary commercial seed. Each of these lots was allowed to mature and the seed thus obtained will be used for further work.



Telephone, the highest-yielding garden pea on an average of six years' trial.

Work of a similar nature was started with the Telephone variety, the object being to obtain by selection a uniform high-producing strain. Two hundred individual plants were raised from ordinary commercial seed, and sixteen of these having desirable characters were allowed to ripen and the seed thus obtained will be planted next season for further observation.

PUMPKINS

Owing to the early fall frost on August 24, which killed the plants, very poor results were obtained with each of the four varieties tested. From the results of former seasons, the heaviest yields and largest pumpkins are usually obtained with a variety known as Connecticut Field, while the best quality was found in the crop of the Quaker Pie variety.

CUCUMBERS

Like pumpkins, all varieties of cucumbers were killed before the plants were bearing freely, and, as a result, comparisons of the eight varieties tested would prove misleading.

Under normal seasonal conditions the best results have been obtained with Davis Perfect and Improved Long Green for the main crop, and Early Russian as an early variety. For pickling, West Indian Gherkin is very satisfactory.

WATERMELONS

Four varieties of watermelons were tried, three hills of each being grown in the open garden and two hills in the hotbed. No crop was obtained from the plants grown in the open and but a small one from those in the hotbed.

SQUASH

As with other crops, the season proved too short for the proper development of squash and low yields were obtained. Of four varieties tried the best results were obtained with Golden and Green Hubbard varieties.

Two strains of English Vegetable Marrow were tested and both produced about half of a normal crop.

CITRON

Three varieties of citron, Red Seeded, Green Seeded and a selection, made at the Central Experimental Farm, of Colorado. Although the season was anything but favourable, a few matured specimens were obtained from each variety, Colorado giving the heaviest yield.

MUSK-MELONS

Eight varieties of musk-melons were tried both in the open garden and in cold frames. With the former method no crop was obtained as the vines were killed by frost before any of the melons ripened. In the cold frames a rather light crop was produced.

Of the large melons the heaviest crop was obtained with Montreal Market. Milwaukee Market, another large variety, produced a crop of excellent quality. Emerald Gem and Paul Rose were the best of the small varieties tested.

BEANS

Test of Varieties.—The cool weather during July and August was very unfavourable for beans, and as a result development was slow, many of the most popular varieties being killed by frost when only a small portion of the indicated crop had matured sufficiently for picking. Of the twenty-seven varieties tested, only the earliest produced a normal crop. Of these the highest yielding were Plentiful French, a green podded variety, and Davis White Wax. Both were quite badly infected with pod spot, and it was quite evident that

their high comparative standing was made possible by normally higher yielding and disease resistant varieties being killed by frost before a full crop had developed.

Previous results indicate that Refugee 1000-1 and Hodson Long Pod are very desirable varieties for this district.

Distance Apart for Planting in the Row.—This experiment was begun during the past season, and has for its object the determining of the most satisfactory distance at which to plant beans in the row. Two varieties, Round Pod Kidney Wax and Stringless Green Pod, were used and seed of each planted two, four and six inches apart, in rows 30 inches apart.

The results indicated that close planting was advisable. It is quite probable, however, that in normal seasons, when moisture is none too plentiful and warm weather the rule, instead of the exception, that seed planted two inches apart would be found too close. This experiment will be conducted for several years.

TOMATOES

During the past two seasons only the earliest varieties of tomatoes have produced even average yields of ripe fruit. The seed for the variety test has been planted in the hotbed during early April and in both seasons well developed



When the mercury dropped to nine degrees above zero on April 10, young tomato plants in this hotbed were not injured.

plants were set out, yet the cool, cloudy weather has retarded maturity, and, generally speaking, poor results have been obtained. Of the twenty varieties tested in 1923, Alacrity, Bonny Best and John Baer gave the best results.

CABBAGE

Test of Varieties.—In so far as the requirements of the cabbage crop were concerned, the season was ideal, and the yields obtained were better than usual. Fifteen varieties were tested and of these the most satisfactory results were obtained with Copenhagen Market for early use, Succession as a mid-season sort, and Danish Ballhead as a late or main crop variety. Marblehead Mammoth is usually the highest yielding variety and produces very solid heads. It, however, cannot be recommended as a late variety for the district, as many of the heads frequently burst before they are fully grown.

Different Dates of Seeding.—The object of this experiment is to obtain a comparison of the yield and quality of the crop, for storage purposes, from several successive seedings throughout the season. Seed of a late and early variety, Copenhagen Market and Danish Ballhead, was started in the cold frame on May 14 and seedings in the open were made at intervals of about ten days from May 28 until July 10.

The best heads from a storage standpoint were produced from the seedings made on June 28 with Copenhagen Market and June 7 with Danish Ballhead.

BRUSSELS SPROUTS

Seed of the Paris Market variety was started in a cold frame on May 2. The plants were picked off on May 24 and transplanted to the garden on June 18. Owing to the fine warm weather during September and early October, a fair crop of sprouts developed, the yield from thirty plants being 24 pounds. This is the first time that this vegetable has produced a crop at the Station, as in normal seasons only very small sprouts develop.

CAULIFLOWER

Test of Varieties.—The season was ideal for cauliflower and excellent results were obtained with both varieties tested. Extra Early Dwarf Erfurt produced heads of the finest quality and proved to be a little earlier than Early Snowball. The later variety, although yielding a heavier crop, has a tendency to produce open loose heads of rather poor quality.

Different Dates of Planting.—Four plantings of Extra Early Dwarf Erfurt and Early Snowball were made at intervals of approximately one month from April 7 until July 9. With the first planting the seed was sown in the hotbed, the second in a cold frame and the remainder of the seedings were made in the open garden. Good marketable heads were obtained from each seeding, although that made on June 14 produced the best crop.

CELERY

Test of Varieties.—Sixteen varieties of celery were tested, each variety occupying a double row 30 feet long. The seed was started in the hotbed on March 28, and the plants were pricked out on May 14 and 15 and transplanted to the garden on June 3. The season was decidedly favourable for this crop and excellent celery was produced.

The varieties found most satisfactory are: For home use, White Plume; for early market, Golden Self-blanching; for main crop and winter storage, Evans Triumph and French Success.

Different Methods of Blanching.—In this experiment three methods of blanching celery were compared, blanching with soil, boards and pliable material such as strips of ready roofing. The results obtained over a period of six years indicate that although there is less labour entailed in blanching with boards or pliable material, the best celery is obtained by banking the rows with earth.

SWEET CORN

Twenty-one varieties of sweet corn were tested, but, owing to the unfavourable season, the only varieties that produced a normal crop were Picaninny and Early Malcolm. Usually Golden Bantam and other popular varieties may be depended upon to produce a normal crop at Lennoxville, but during the past season all such varieties failed to develop marketable ears before all corn was killed by frost on August 24.

TREE FRUITS

APPLES

Variety Orchard.—Although the winter of 1922-23 was unusually severe and the following spring late, apple trees wintered well and little winter-killing occurred in the variety orchard.

The crop of apples was somewhat lighter than in 1922, yet several varieties bore fruit for the first time at Lennoxville. The most outstanding of these were



A young Horace apple tree heavily laden, Lennoxville, 1923.

Brock and Horace, both originated by the Dominion Horticulturist. Brock is an early fall apple, somewhat similar in appearance and flavour to the well-known Gravenstein. Horace is also an early fall apple and resembles Wealthy in flavour, size and type of tree, but is much higher coloured. Other hardy

varieties originated by the Dominion Horticulturist that are of good quality and have done well at Lennoxville, are as follows:—

Variety	Season
Galetta.....	August and September.
Melba.....	August and September.
Joyce.....	September and October.
Pedro.....	September and October.
Lobo.....	September to November.
Rocket.....	October to January.

Scions and Trees.—Approximately one thousand two-year-old roots of hardy stock were grafted during the winter of 1922-23, with a number of the best of the hardy varieties of apples that have been found successful at Lennoxville. These were planted out in nursery rows early in the spring, and when growth was well under way it was found that eight hundred and twelve of the graft had been successful. These trees, when of sufficient size, will be used for supplying part of the demand for hardy varieties of apples, particularly in districts where standard commercial varieties are not successful.

During the year 1922, two thousand and twenty-five scions of hardy varieties of apples were distributed. This, however, represents only part of the demand, as the supply of scions was limited and it was found impossible to accommodate nearly half of the applicants.

PLUMS

Very little fruit was produced in the plum orchard in 1922, although the trees made a good growth and were in a healthy vigorous condition throughout the season. Varieties that have been found satisfactory are, Waneta, Kahinta and Hawkeye. Scions of these varieties are available for distribution.

CHERRIES

Of the cherry trees planted in 1915 only four have produced fruit. These are unnamed seedlings obtained from the Horticultural Division, Central Experimental Farm, Ottawa. Each tree produces fruit of a distinctive character and different from the others, although all are of good size and pleasant flavour. Trees of standard varieties that have been planted have not proven hardy and, although a few are still alive, they are in a poor condition and so far have not borne.

PEARS

Although several varieties of seedling pears planted in 1915 are still alive, no fruit has been produced and the trees are in poor condition. Except in the winter of 1921-22, from two-thirds to all of the previous season's growth has been killed back during the winter and at present the trees are but little larger than when planted.

SMALL FRUITS

STRAWBERRIES

Strawberries are usually a successful crop throughout western Quebec, and, although large areas are grown, the demand for berries is nearly always in excess of the supply. As a result prices are high and growers find little trouble in getting rid of their crop.

Test of Varieties.—In all thirty-one varieties of strawberries have been tested at the Station since 1916, and, although many of them have proven to be comparatively high yielding and of good quality, the best results have been

obtained with Senator Dunlap (perfect), Buster (imperfect), Valeria (perfect), and Portia (imperfect). The last two varieties were originated at the Central Experimental Farm, Ottawa, and, although at present plants of Valeria are not obtainable commercially, nurserymen are beginning to grow them, and it is hoped that within a few years both these two excellent varieties will be generally available.

Breeding.—Seed of the William Belt and Portia varieties was planted in 1921. A number of strong plants were obtained and several of the most promising, from each lot, were transplanted to four feet each way and allowed to multiply. From these, two lots of plants were developed that possessed desirable characters, an early fruiting kind from a plant raised from Portia seed, and a late bearing sort from William Belt. Rows from each lot have been set out in the strawberry plantation for the purpose of comparing them with established varieties.

GRAPES

Although frost was recorded on August 24 and again early in September of the past season, the situation on which the variety test of grapes was conducted was fairly high, and all varieties remained untouched until September 24. Accordingly, despite the unfavourable season, several varieties ripened fruit. Of these, those that produced grapes of good quality were Moore Early, McTavish and Delaware.

Grapes are usually a hazardous crop at Lennoxville, yet the results obtained, during the past seven years, indicate that, with a little extra care, grapes of good quality may be ripened in many parts of the district for home use at least.

BUSH FRUITS

Since all possible comparisons had been obtained with the varieties in the bush fruit plantation set out in 1916, and from an experimental standpoint it was of no further use, it was discarded in the fall of 1922, and replaced with a new plantation, containing a number of promising varieties. As this new plantation did not bear generally in 1923, no results of experimental value were obtained.

From the results obtained during the six seasons from 1917 to 1922 with the old plantation, the following varieties have been found most satisfactory:—

Raspberries.—King, Eaton and Brighton.

Black Currants.—Saunders, Kerry and Climax.

Red Currants.—Red Grape, Victoria.

White Currants.—White Cherry.

Gooseberries.—Houghton, Carrie, Downing.

ORNAMENTAL GARDENING

ANNUALS

Annual flowering and foliage plants are nearly always successful at the Station. During the past season two hundred and seventy-six varieties, strains and selections were tested with but very few negative results. Owing to the cool moist weather during summer, and the fine warm autumn, growth was strong and bloom, particularly that late in the season, profuse and of excellent quality. Among the many annuals, commonly seeded in the open, that have been found satisfactory are: Mignonette, Sweet Pea, *Gypsophila elegans*, several varieties of Poppies, Candytuft, Clarkia, Godetia, Malope, Lavatera, and Cornflower.

Although very late the various varieties of Gladioli bloomed freely and produced spikes of unusual size. The best varieties tested were: Peace, War, Loveliness, Halley, and Panama.

Three varieties of Cannas, King Humbert, Yellow Humbert, and Vaughan, were grown in a large oval bed, in a prominent situation on the lawn. Each variety bloomed freely and the entire bed made a fine display.

DUTCH BULBS

Practically all varieties of Dutch bulbs wintered well and the bloom, although later than usual, was of exceptional size and quality. The various varieties of tulips were from five to seven inches taller than the average of previous seasons; clumps of Narcissi growing in the lawn produced blooms of unusual size, and snowdrops, crocus and scilla were particularly successful.

Of the varieties of tulips and narcissi, that have been tested for a number of years, the following have been very satisfactory:—

Narcissi.—Emperor, Golden Spur, Madame de Graaf and Sir Watkin.

Early Tulips.—Proserpine, Artus, Joost Van Vondel, Cottage Maid, and Duchess de Parma.

Darwin Tulips.—Farncombe Sanders, Clara Butt, La Tulipe Noire, Isis, and Madama Krelage.

Canadian Grown Bulbs.—Several varieties of tulip bulbs, grown at the Dominion Experimental Station from Vancouver island, B.C., were planted along with the variety test of Dutch bulbs. The Canadian grown bulbs produced splendid tulips that were superior, in both size and quality of bloom, to those produced by the bulbs of the same variety imported from Holland.

PERENNIALS

A splendid duration of bloom was maintained throughout the entire season by perennial flowering plants, of which one hundred and sixteen varieties are now well established throughout the ornamental grounds. Of these the best results have been obtained with the following:—

Lupins, *Delphinium hybridum*, *Delphinium Chinense*, Lychnis, Perennial Phlox, Iris, Helianthus, Hollyhock, Coreopsis, Pyrethrum, Oriental Poppy, Sweet Rocket, *Campanula pyramidalis*, Garden pinks, Pansies, and Paeonies.

ORNAMENTAL SHRUBS

Extreme hardiness is essential in ornamental shrubs for this district, as it is due to the lack of this character that many of the best varieties will not succeed at the Station. It has been found, however, that a great many desirable kinds are sufficiently hardy and may be recommended for the district. Following are a few of the best of these:—

Hydrangea paniculata grandiflora, Bush honeysuckle, a few varieties of Lilac, Siberian pea tree, Japanese quince, *Rosa rugosa*, Philadelphia grandiflorus, Barberry, Flowering crab, and Dogwood.

As the beginning of a variety test of roses, fifty rose bushes representing eleven varieties of the hybrid tea group and fourteen hybrid perpetuals were obtained from England early in February, 1923. These were transplanted to the open on April 25. All varieties made excellent growth which ripened well and all bushes were in good condition when covered for winter.

CEREALS

In order to realize the best returns from any class of live stock, it is necessary to balance the ration with concentrates in some form or other. It is also evident that the more of such concentrates, which can be produced on the farm, the greater is the chance to make a profit. In western Quebec the great majority of the dairy farmers, at the present time, depend almost entirely on imported mill feeds to supply this part of the ration. The result is that a large part of the revenue, from the sale of milk and cream, goes to the local feed dealer. There can be no question that if farmers could produce at least the major part of the grain for their stock at home, there would be fewer mortgaged farms and more prosperity generally. Barley, oats and field peas produce profitable yields in this district and can be utilized, either alone or in combination, for the feeding of all classes of live stock. Even if these grains cost as much to produce as would be paid for the imported product, it should be realized that this cost is largely returned for the use of land, machinery and labour, and the farmer is, in a sense, buying from himself.

The experimental work with cereals during 1923 consisted of the testing of a number of the principal varieties of oats, barley, wheat, peas, and field beans. All varieties were grown in duplicate plots, and, in order to determine any variation in soil productivity, the ranges of plots were checked at regular intervals with plots of a standard variety for each class of crop.

OATS

Fourteen varieties of oats were sown on May 7. The season was favourable for growth and a heavy yield of grain and straw was secured. Owing to the cool weather which prevailed during the growing season, harvesting was about ten days later than usual.

OATS—TEST OF VARIETIES OR STRAINS
Date of Sowing, May 7, 1923

Name of variety	Date of ripening	Number of days maturing	Average length of straw, including head	Strength of straw on scale of 10 points	Yield of grain per acre	Yield of grain per acre	Weight per measured bushel after cleaning
			Inches		Lbs.	Bush. Lb.	Lb.
Banner, Lennoxville.....	Aug. 13	100	69	5.8	3,005	88 13	25.0
Legacy, Ottawa 678.....	" 10	97	60	9.5	2,950	86 26	31.0
Victory.....	" 16	103	62	4.0	2,875	84 19	31.5
Banner, Macdonald College 44.....	" 13	100	68½	6.5	2,800	82 12	30.0
Longfellow, Ottawa 478.....	" 10	102	62	9.8	2,800	82 12	34.0
O.A.C. 72.....	" 9	101	71	9.5	2,775	81 11	31.0
Storm King.....	" 14	101	67	8.5	2,675	78 23	20.0
Gold Rain.....	" 16	103	68	7.5	2,625	77 7	32.0
Daubeny, Ottawa 47.....	" 6	91	55	8.0	2,600	76 16	32.5
Banner, Ottawa 49.....	" 13	100	65	8.0	2,583	75 33	28.0
Bell.....	" 15	102	70	5.5	2,500	73 18	23.0
Alaska, Macdonald College 712.....	" 4	89	61	8.0	2,425	71 11	38.0
Alaska.....	" 4	89	58	7.5	2,325	68 13	37.0
Liberty, Ottawa 480 (Hull-less).....	" 10	102	62	9.5	1,725	50 25	43.0
Average.....					2,619	77 1	

The results listed in the foregoing table show that Banner, Lennoxville, which is merely registered Banner, that has been grown at the Station for the main farm crop for a number of years, is the heaviest yielding variety, and

Alaska the earliest. Banner is probably the most desirable main crop oat for the Eastern Townships. It is certainly much more productive than the various varieties of side oats, such as Storm King and Mammoth Cluster, that are commonly grown throughout the district, which, though apparently high yielding, are very thick hulled and produce a feed of poor quality. In districts where an



Alaska oats ripened eleven days earlier than Banner at Lennoxville, 1923.

early variety is required or where rusts are prevalent, Alaska will give good results. Although not as high yielding as Banner, it has a very thin hull and produces grain of excellent feeding quality.

BARLEY

Barley is not a common crop in this section of the country, although it is sometimes grown along with oats. Grown under exactly similar conditions, however, it produced more pounds of grain per acre at this Station than did oats. It is a very useful feed for all classes of live stock and is considered equal to corn for feeding hogs. When grown either alone or mixed with oats it will produce profitable yields.

Following are the results of the variety test with barley:—

BARLEY—TEST OF VARIETIES OR STRAINS

Date of Sowing, May 13, 1923

Name of variety	Date of ripening	Number of days maturing	Average length of straw including head	Strength of straw on scale of 10 points	Yield of grain per acre		Weight per measured bushel after cleaning
					Lbs.	Bush. L b	
Chinese, Ottawa 60.....	Aug. 9	87	53	9.8	4,175	86 47	49.0
Charlottetown 80.....	" 15	93	52	9.9	4,100	85 20	53.2
O.A.C. 21.....	" 9	87	53	9.5	3,950	82 14	49.4
Mensury, Macdonald College 3207.....	" 10	88	54	9.8	3,855	80 15	49.2
Duckbill, Ottawa 57.....	" 16	94	54	10.0	3,375	70 15	49.6
Himalayn, Ottawa 59 (Hull-less).....	" 4	82	36	9.8	2,625	54 33	60.0
Average.....					3,680	76 4	

SPRING WHEAT

Spring wheat, although at one time an important crop in this district, is at the present time grown by only a few farmers for grinding for home use.

The land on which the wheat was grown was more sandy than the remainder of the field which may account for the comparatively low yields. All varieties were somewhat affected with stem rust, but no smut was observed.

SPRING WHEAT—TEST OF VARIETIES OR STRAINS

Date of Sowing, May 11, 1923

Name of variety	Date of ripening	Number of days maturing	Average length of straw including head	Strength of straw on scale of 10 points	Yield of grain per acre		Weight per measured bushel after cleaning
					Lb.	Bush. Lb.	
Huron, Ottawa 3.....	Aug. 27	114	59	10	1,875	31 15	61.2
Marquis, Ottawa 15.....	" 25	112	55	10	1,787	29 47	64.0
Charlottetown 123.....	" 21	108	53	10	1,675	27 55	56.2
Ruby, Ottawa 623.....	" 18	105	51	10	1,637	27 17	62.0
Pringles Champlain, Macdonald College 307.....	" 27	114	61	10	1,625	27 5	58.2
Early Red Fife.....	" 25	112	53	10	1,600	25 40	58.0
Average.....					1,700	29 —	

FIELD PEAS

Three varieties of field peas were tested. Chancellor Ottawa No. 26, Arthur Ottawa No. 18, and McKay Ottawa No. 25. Of these, Chancellor proved to be the most satisfactory variety, yielding 31 bushels and 40 pounds per acre.

FIELD BEANS

Of the eight varieties of field beans tested, Navy Ottawa No. 711 gave the heaviest yield and showed comparative freedom from pod spot or Anthracnose.

FORAGE CROPS

In a district, such as the Eastern Townships, where the majority of the farmers are largely dependent upon the returns from live stock for their income, forage crops are necessarily of extreme importance. In order to secure a profitable return from the feeding of live stock one of the main essentials is the economical production of palatable roughages, and possibly the most important factor in economical production is the choice of the best variety. In order to determine the best variety, the actual yield per acre in tons or bushels of green crop is not always a reliable guide, as varieties of the various classes of forage crops vary in actual feeding value. This variation is, however, almost in direct proportion to the dry matter content. Should a certain variety of swede turnips contain a high dry matter content and another prove to be low in this respect, the former will make the best feed ton for ton. Accordingly, samples of all forage crops tested at the Station in 1923 were reduced to a constant air-dry weight for comparison.

ENSILAGE CORN

The land on which the variety test of ensilage corn was conducted was a high, well-drained sandy loam in a good state of fertility and thus well suited to withstand the unfavourable weather conditions in so far as the requirements of the corn crop were concerned. As a result the yields were fully up to the average of previous seasons and much larger than those obtained on other areas at the Station.

Sixteen varieties were grown in duplicate plots of one-hundredth acre each. The seed was planted in hills three feet each way and later, when the plants were about four inches high, the crop was thinned to four stalks per hill. Owing to almost perfect germination, a complete and uniform stand was obtained throughout. All necessary attention was given the crop, but, although growth was fair, season conditions delayed maturity, and, as a consequence the quality for ensilage, as indicated by the dry weight, was very poor. The first killing frost was experienced on this particular area on September 17, and the crop, although still quite immature, was, of necessity, harvested on September 18. The results are shown in the accompanying table.

ENSILAGE CORN, TEST OF VARIETIES

Variety	Source	Style of Maturing	Height		Average yield per acre of two plots			
					Green weight	Air-dry weight		
			Ft.	In.	Tons	Lb.	Tons	Lb.
Compton's Early.....	J. O. Duke.....	Late milk.....	9	1	26	750	3	1,630
White Cap Yellow Dent..	Steele Briggs.....	Ears partly formed.	9	-	19	1,450	3	1,334
90 Days White Dent Lot 1318.	Dakota Improved Seed Co.	Early milk.....	9	2	20	250	3	1,246
Wisconsin No. 7.....	J. O. Duke.....	Ears partly formed.	9	-	22	900	3	1,224
Golden Glow.....	J. O. Duke.....	Ears partly formed.	8	8	20	650	3	1,192
N.W. Red Dent, Lot A.B.	Dakota Improved Seed Co.	Early milk.....	8	-	20	1,750	3	741
Longfellow.....	J. O. Duke.....	Early milk.....	8	1	20	1,800	3	720
Leaming.....	John Parks.....	Ears formed.....	9	-	20	750	3	608
Twichell.....	Exp. Station, Fredericton..	Early dough.....	7	-	14	1,250	3	534
Salzer's North Dakota...	Steele Briggs.....	Early milk.....	7	1	19	600	3	511
Longfellow, Lot 1097.....	Dakota Improved Seed Co.	Early milk.....	8	1	20	1,150	3	415
Leaming.....	J. O. Duke.....	Ears just formed..	8	6	16	1,950	3	285
Wisconsin No. 7.....	John Parks.....	Ears just formed..	9	-	20	1,100	2	1,996
Quebec No. 28.....	Macdonald College, Que....	Early dough.....	6	8	17	500	2	1,881
North West Dent, 15-472.	A. E. McKenzie.....	Early dough.....	5	-	15	50	2	1,286
Pride, Lot 1015.....	Dakota Improved Seed Co.	Early milk.....	5	6	13	500	2	493
Average.....					19	588	3	506

When reduced to dry weights the relative standing of the varieties is somewhat different than would be the case if only green weights were considered. It is, however, gratifying to note that Compton's Early, which has been the highest yielding variety of green material at this Station, when averaged over a period of seven years, produced the greatest amount of dry material per acre in 1923. This variety also reached the most advanced stage of maturity attained by the higher yielding varieties, although, in this respect, the maturity was not sufficiently advanced to make the most desirable quality of ensilage. Under normal seasonal conditions it usually reaches the dough stage by the end of the first week in September, and, from the results obtained, would seem to be the best variety for the district.

White Cap Yellow Dent, Wisconsin No. 7, and Golden Glow are well known varieties and usually mature sufficiently to make good ensilage. Each may be considered as a good second choice to Compton's Early.

SUNFLOWERS

During the past four years sunflowers have been grown for ensilage at the Station with excellent results. Their use has become quite general throughout the district, and, at present, they may be considered as one of the main roughage crops.

Ten varieties and regional strains were tested in duplicate during the past season. The land used for this experiment was a rather poor sandy loam that had been in sod for several years. Eighteen tons of barnyard manure per acre were applied, and ploughed under early in May. Further preparation of the soil was completed a few days before seeding. The seed was sown in rows three feet apart on June 2. Germination was good and an excellent stand was obtained. When about five inches high, the plants were thinned to six inches apart in the row. Throughout the season the crop received all necessary cultivation and was hand hoed once.

Although an almost complete and uniform infestation by the Peacock fly occurred over this area, the damage was not apparent until late in the season. As a result the yield was lowered but the quality of the crop was almost wholly retained by harvesting on September 12. This date was somewhat early, and, had the crop been in a healthy normal condition, harvest could have been delayed until the last week of the month, as no frosts, sufficiently severe to damage sunflowers, occurred previous to October 7. Such an addition in the length of the growing season would have increased the yields materially.

SUNFLOWERS—TEST OF VARIETIES

Variety	Source	Stage of maturity	Height	Average yield per acre of two plots	
				Green weight	Air-dry weight
			Ft. Ins.	Tons Lb.	Tons Lb.
Mammoth Russian.....	Clarke & Stewart, Lennoxville.	45% in bloom.....	7 -	21 500	4 489
Russian Giant.....	Dakota Improved Seed Co.	40% in bloom.....	6 9	17 150	3 1,980
Mammoth Russian.....	Kenneth McDonald.....	51% in bloom.....	6 6	15 1,900	3 805
Manchurian.....	McKenzie.....	A little past full bloom.	5 -	15 100	3 250
Manteca.....	C.P.R.....	30% ripe.....	5 2	15 1,500	3 241
Giant Russian.....	C.P.R.....	Full bloom.....	5 10	17 150	2 1,933
Ottawa No. 76.....	Exp. Farm, Ottawa.....	Full bloom.....	5 -	15 100	2 1,893
Black Seed.....	C.P.R.....	Beginning to ripen	5 9	13 1,600	2 964
Mixed Lot.....	C.P.R.....	Full bloom.....	5 9	13 350	2 745
Mixed Mammoth.....	Rosthern district, Sask.....	Beginning to ripen	4 6	12 1,050	1 1,260
Average.....				15 1,340	3 59

From the accompanying table it will be noted that the strain of Mammoth Russian, supplied by Clarke & Stewart of Lennoxville, produced the highest yields of both green and dry material. It was also the highest yielding strain tested in 1922.

SWEDE TURNIPS

Swede turnips are more generally grown throughout the Eastern Townships than either mangels or field carrots as a feed for live stock. Better stands and heavier yields are usually obtained under varying conditions, and the crop is generally regarded as being the most dependable root crop for the district. Before the advent of the silo, swede turnips were extensively grown, the majority of the farmers raising from five to forty acres. Even at present with ensilage crops forming the chief source of succulent roughage, swede turnips are an important crop and, in certain sections, there is a tendency towards their increased production.

During the past it has been observed that of the numerous varieties of swede turnips offered for sale, a large number are incorrectly named. With a view towards obtaining actual comparative information on this matter, a number of the most prominent varieties were obtained from each of several seedsmen and were tested along with the other varieties in the usual manner. In all thirty-one different lots of seed, obtained from sources in Canada, Sweden and Denmark, were included in the test.

The seed was sown under favourable conditions on June 4, in rows thirty inches apart. Germination was good and the crop was thinned to ten inches apart in the row on June 15. All varieties were harvested on October 22 and 23.

As a result of tests conducted during previous seasons, when the dry weights were not taken into consideration, the highest yielding varieties and those recommended by the Station were, Halls Westbury, Bangholm and Magnum Bonum. Although some of the various lots of these varieties, obtained from different sources, made a very poor showing, one lot of each stood near the top of the list and produced a very desirable yield. Carter's Imperial was tested for the first time in 1923, and although the yield was outstandingly high, the results of one season's test are not considered sufficient to warrant its general recommendation. The Purple Top Swede, which comes second on the list, was obtained from Mr. George Halliday, of Sawyerville, Que., who has been raising the seed of this variety in a small way for several years. Although not quite pure as regards trueness of type, it is very productive and with a little further selection should prove an excellent variety for the district.

MANGELS

Twenty-six lots of mangels were tested in duplicate. These included several of the most common varieties that were representative of the main types, each secured from several sources, and seven varieties from Sweden and Denmark. The seed was sown in rows 28 inches apart on May 11, but owing to cool weather and heavy rains the crop was not ready for thinning until June 20. The stand was, as a consequence, thin but fairly uniform throughout. The remainder of the season was favourable and the yields obtained fully up to the average of past seasons. The crop was harvested on October 16.

MANGELS—TEST OF VARIETIES

Variety	Source	Average type	Per cent true to type	Average yields per acre of two plots	
				Green weight	Air-dry weight
				Tons Lb.	Tons Lb.
Danish Sludstrup.....	McDonald....	Yellow, intermediate.....	84.4	34 1,050	4 603
Yellow Intermediate.....	Exp. Farm, Ottawa	Orange yellow, intermediate	89.2	30 1,450	4 351
Giant White Feeding.....	Bruce.....	Green top white, intermediate.	54.5	27 1,450	3 753
Runkelroefro Barres Stryno V 3084.	Denmark.....	Orange yellow, intermediate	74.4	18 100	2 1,968
Gate Post.....	Bruce.....	Red, long.....	87.9	22 1,150	2 1,713
Half Sugar Rose No. 1141...	Sweden.....	Light rose, intermediate....	83.6	26 1,950	2 1,686
Giant Rose Sugar.....	Bruce.....	Rose, intermediate.....	88.0	21 1,350	2 1,613
Large Yellow Globe.....	Bruce.....	Lemon yellow, globe.....	66.6	28 1,000	2 1,386
Sludstrup Barres.....	Denmark.....	Orange yellow, intermediate	88.5	23 400	2 1,363
Mammoth Red Intermediate.	Bruce.....	Red, ovoid.....	65.4	23 1,350	2 1,335
Golden Tankard.....	Bruce.....	Orange, ovoid.....	48.6	21 1,300	2 1,237
Giant White Half Sugar....	Wm. Ewing..	Green top white, intermediate.	96.1	22 -	2 1,120
Red Globe.....	Wm. Ewing..	Red, globe.....	88.3	22 550	2 869
Red Globe.....	Bruce.....	Deep red, globe.....	86.9	20 1,500	2 735
Selected Giant Rose Intermediate Sugar.	Wm. Ewing..	Rose, intermediate.....	83.2	16 1,850	2 545
Danish Sludstrup.....	Wm. Ewing..	Light orange, intermediate.	61.2	18 50	2 331
Giant Yellow Intermediate.	Bruce.....	Light orange, intermediate.	65.7	16 400	2 172
Sugar Mangel (Rose).....	Denmark....	Light rose, intermediate....	81.3	18 850	2 145
Barres Tystofte 749.....	Denmark....	Orange yellow, intermediate	78.1	18 1,000	2 44
Barres Stryno 748.....	Denmark....	Orange, intermediate.....	83.3	17 500	2 38
Golden Tankard.....	Wm. Ewing..	Orange, intermediate.....	67.7	16 900	1 1,724
Giant Yellow Globe.....	Wm. Ewing..	Lemon yellow, globe.....	72.5	17 100	1 1,461
Golden Fleshed Tankard....	Steele Briggs.	Orange, tankard.....	68.7	15 1,350	1 1,426
Yellow Intermediate.....	Wm. Ewing..	Light yellow, intermediate.	72.4	15 1,150	1 1,358
Long Red Mammoth.....	Wm. Ewing..	Deep red, long.....	86.6	11 300	1 890
Barres Stryno V 7034.....	Denmark....	Light orange, intermediate.	57.6	11 1,700	1 857
Average.....				20 1,336	2 912

From the accompanying table it will be noted that there is often a decided difference in the yielding ability and type trueness in the various strains of a variety as handled by different seedsmen. Uniformity of many commercial varieties is also lacking and in some instances it proved a difficult task to determine the average type owing to the large percentage of impurities present.

During the eight years that mangels have been tested at the Station it has been found that the greatest uniformity and the highest yield is usually obtained with the varieties of the yellow intermediate type.

The two highest-yielding varieties in the foregoing table namely, Danish Sludstrup and Yellow Intermediate, are quite representative of this type and are good dependable varieties for the district.

FIELD CARROTS

Thirteen varieties and strains of field carrots were included in the variety test for 1923. The seed was sown on May 23. Germination was good and conditions throughout the season favourable. Improved White Intermediate and White Belgian produced the highest yield of dry material per acre and may be considered as very satisfactory varieties for the district.

RED CLOVER

Red clover is at present the most important of the leguminous forage crops grown throughout the Eastern Townships. In many sections it is not as successful as in others, owing to soil acidity, and in some localities lack of hardiness

limits its use. However, its splendid adaptability as a crop for short rotations, along with its high feeding value, renders it practically indispensable to all farmers who keep live stock.

Thirteen varieties and regional strains of red clover were sown in sixtieth-acre plots on June 3, 1922. In each instance a splendid stand was obtained and the crop on all plots entered the winter in good condition. The results of the experiment are shown in the accompanying table:—

RED CLOVER—TEST OF VARIETIES

Variety	Dates of cutting	Average yield per acre of two plots					
		1st cutting		2nd cutting		Total	
		Green	Air-dry	Green	Air-dry	Green	Air-dry
		Ton Lb.	Ton Lb.	Ton Lb.	Ton Lb.	Ton Lb.	Ton Lb.
Seed from Italy No. 501...	July 19.....	9 1,180	2 1,093	.....	.....	9 1,180	2 1,093
Medium Late Red Swedish	July 15.....	10 860	2 497	.....	.....	10 860	2 497
Ottawa 1917-1920.....	July 4, September 19.....	7 420	1 342	3 1,000	1 116	10 1,420	2 458
Ottawa 1916-1920.....	July 5, September 19.....	6 600	1 443	3 230	1,902	9 830	2 345
Seed from Ottawa district.	June 30, September 19.....	5 1,270	1 324	3 860	1,982	9 130	2 306
Seed grown at St. Clet, Que.	July 19.....	7 1,960	2 139	.....	.....	7 1,960	2 139
Seed from St. Casimir.....	July 3, September 19.....	7 70	1 506	2 1,040	1,551	9 1,110	2 57
Ottawa, O S. 21.....	July 3, September 19.....	5 80	1 890	2 760	1,874	7 840	1 1,764
Seed from France, No. 500.	July 15.....	8 730	1 1,763	.....	.....	8 730	1 1,763
Alta Swede.....	July 5, September 19.....	4 1,940	1 329	3 790	1,416	8 730	1 1,745
Seed from Kenora district.	July 5.....	5 920	1 457	.....	.....	5 920	1 457
Late Red Swedish.....	July 3.....	4 1,170	1,804	.....	.....	4 1,170	1,804
Early Red Swedish.....	July 3.....	3 1,210	1,239	.....	.....	3 1,210	1,239
Average.....	.....	6 1,262	1 833	3 113	1,807	8 84	1 1,666

ALSIKE AS A SUBSTITUTE FOR RED CLOVER

In many parts of the district served by this Station, disappointing results are frequently obtained with red clover as a result of soil acidity. Until this unfavourable condition is corrected it is commonly supposed that alsike is the best crop to grow, in combination with timothy for a hay crop, as its growth is not retarded by acid conditions in the soil to the same extent as red clover.

With a view towards obtaining information in support, or otherwise, of this supposition an experiment was begun in 1922, in which a standard amount of timothy seed was used in combination with varying amounts of red clover and alsike seed. The land on which this work was conducted was characteristic of large areas of the Eastern Townships in that it was naturally well drained, in a fair state of fertility and decidedly acid in its reaction to litmus.

The mixtures were sown in duplicate plots of one-sixtieth acre each on May 25, 1922. Following are the particulars of the experiment and the results obtained when the crop was cut on July 12, 1923:—

COMPARISON OF ALSIKE AND RED CLOVER

Quantity of Seed per Acre	Average yield per acre of two plots	
	Green	Air-dry.
	tons. lb.	tons. lb.
Timothy, 8 pounds, red clover, 10 pounds.....	9 360	2 1,439
Timothy, 8 pounds, red clover, 8 pounds, alsike, 2 pounds.....	8 380	1 1,997
Timothy, 8 pounds, red clover, 6 pounds, alsike, 3 pounds.....	8 170	2 414
Timothy, 8 pounds, red clover, 4 pounds, alsike, 4 pounds.....	7 1,990	2 849

The results obtained do not indicate that alsike is the best crop to grow on the particular site chosen for the experiment for although the soil was decidedly acid, the mixture containing only red clover and timothy gave the best yield of dry material per acre. It was also observed that both this plot and the one containing eight pounds of red clover per acre, produced a good aftermath. The experiment is being continued and should prove productive of interesting results.

SWEET CLOVER

For the purpose of comparing white and yellow sweet clover, and securing additional information on the value of either variety for the district, duplicate plots of each were sown on May 22, 1922. As it had been found difficult to obtain a stand of sweet clover in previous attempts, no nurse crop was used and the land chosen was in an excellent state of fertility. The seed germinated well and a good stand was obtained on all plots. Growth throughout the season was satisfactory and both varieties entered the winter in excellent condition.

Although conditions during the spring and early summer of 1923 were favourable for hay crops, both varieties of sweet clover made poor progress. Owing to severe winter-killing the stand was thin and such plants as survived made a decidedly uneven growth. As a result the quality of the hay was not uniform and inclined to be coarse and woody. The plots were cut on July 12, at which time both varieties were beginning to bloom freely. Following are the results obtained:—

COMPARISON OF WHITE AND YELLOW SWEET CLOVER

Variety	Per cent hardy	Height when cut		Average yield per acre of two plots			
				Green.		Air-dry.	
		ft.	in.	tons	lb.	tons	lb.
White Blossom.....	67	4	1	6	1,020	1	1,275
Yellow Blossom.....	54	3	.	6	870	1	1,719

When reduced to a constant weight it was found that sweet clover contains more water than most clovers and grasses. Also, owing to the coarse, woody stems, the hay is very hard to cure thoroughly, and even when apparently well cured it contains a higher percentage of moisture than hay made from other clovers and grasses. Accordingly, yields of sweet clover are deceptive, and in many cases apparently heavy crops of cured hay contain less dry matter than average crops of red clover or mixed clover hay.

Although growing freely along railway embankments and roadsides, either variety seems reluctant in its response to fertile field conditions in this district. During past seasons several attempts have been made to establish a stand of the white variety at the Station, but in each case it has winter-killed more or less severely. If hardy strains were available, and it were possible thereby to winter a good stand of crop, the quality and yield of hay might be sufficiently increased to warrant its limited use, as a forage crop, by Eastern Townships farmers. However, from the information at present available it would seem folly to grow either the white or yellow variety in preference to red or alsike clover.

HUBAM

Hubam, an annual sweet clover very similar in appearance to the white blossom biennial variety, has been tested at the Station for the past two years. In 1922, owing to the unavoidable flooding of the crop when about three inches

high, the yield was low and the quality of the hay poor. In 1923, the seed was planted on a high well-drained site where the land had been well worked, and was in a good fertile condition.

As this species is recommended as an emergency or catch crop to be used principally for supplementing the ordinary hay crop, it would be of little use in this district if it could not be successfully produced from late seedings. Accordingly, the seed was sown June 19. Germination was good and the crop made a splendid growth throughout the season and presented a fine appearance. It was cut, when partially in bloom, on September 19, and produced a yield of 9 tons 1,610 pounds of green forage per acre. When reduced to a constant air dry weight the yield of dry material was 2 tons 1,286 pounds per acre. Such a yield may be considered as very satisfactory and it is possible that Hubam may become one of the principal annual forage crops for the district.

ALFALFA

Alfalfa has been tried out at the Station for the past eight years with very unfavourable results. Each year varying amounts of inoculated seed have been included along with the regular hay mixture, and sown on what appeared to be fairly favourable areas of the land used for the general hay crop. So far the best result obtained has been the appearance of a few plants in isolated patches throughout the main hay crop. In 1916 Grimm's Alfalfa was sown in rows on land that had been well limed and was in good condition generally. This stand remained practically intact until 1922 when it was ploughed up. Plots that were sown broadcast on the same area were badly winter-killed after the first season. Plots of Ontario Variegated that were sown in 1922 on well limed land survived the winter of 1922-23 satisfactorily and produced an average crop of hay. Further seedings were made in 1923.

Such results are conflicting, although it would seem that failure was due chiefly to soil acidity and lack of hardiness. If the crop is considered worth the additional expense, the acidity may be corrected, but, sufficient hardiness can only be secured by the introduction of hardier strains than those at present obtainable commercially. From the information at present available the crop cannot be recommended for general use throughout the district.

THE PERSISTENCE OF AGRICULTURAL GRASSES

This experiment was begun in 1921, and has been conducted with the object of comparing the value of some of the less commonly used agricultural grasses with timothy, when combined with mixed clovers, as a hay crop. Half-acre strips of the various mixtures have been sown with a nurse crop of Banner oats along with the main farm crop. In each case a standard mixture composed of five pounds timothy, eight pounds red clover, two pounds alsike and one pound White Dutch clover per acre, was used, and the necessary amounts of the different grasses added to it. The persistence of the various grasses has been observed, both in the first and second year after seeding, and their behaviour under field conditions noted. Following are the particulars of the experiment and the yields obtained in 1923:—

COMPARISON OF AGRICULTURAL GRASSES

Amount of grass seed added to standard mixture	Yield of cured hay per acre	
	tons.	lb.
Timothy, 5 pounds.....	2	1,420
Red top, 4 pounds.....	2	1,270
Meadow fescue, 10 pounds.....	2	600
Tall oat, 8 pounds.....	2	445
Orchard grass, 10 pounds.....	1	1,820

The above results are in fairly close accord with those obtained in 1922, and indicate that, for average field conditions, timothy will usually give the best results.

TEFT-GRASS

This is a fine-stemmed, dense-growing annual grass that would appear to be of use as a forage crop in much the same capacity as Huban. Two sixtieth-acre plots were sown to this crop on June 19. The land was a heavy clay loam, well drained and in an excellent state of fertility.

The crop made slow growth during the season and when cut on September 16 was 16 inches high. The yield of green forage per acre was 6 tons 180 pounds and the air dry weight 1 ton 1,854 pounds.

Unless future results prove more favourable, little can be said in its favour as a forage crop for this district.

BREEDING WORK

Field Roots.—The improvement by selection of the long red variety of mangels and the Bangholm Swede turnip, begun in 1922, was further conducted in 1923. Seed was produced from the selected roots saved in 1922 and a further selection of roots was made from which to raise seed in 1924.

Sunflowers.—The complete infestation by the Peacock fly of the sunflower plants, reserved for breeding work, prevented the production of seed, and in a sense brings the breeding work with this crop to a standstill. A few plants that were not attacked by this insect, and possessed desirable characters, were found growing among the general field crop. These were allowed to ripen and the seed thus obtained will be used to provide material for further breeding work.

POULTRY HUSBANDRY

An exceptionally cold winter and a late backward spring, throughout the Eastern Townships, made the hatching and rearing of young stock a greater difficulty, especially during the months of March and April. Therefore, a large percentage of the pullets raised by the farmers, entered the laying pens the past autumn in a more immature condition than has been the case for the past three years.

STOCK

The stock on hand at this Farm at the beginning of 1923 consisted entirely of Barred Plymouth Rocks divided as follows: 198 pullets, 100 breeding hens of one, two and three-years old, 4 yearling males, and 16 young males. The breeding stock comprises individuals which have made a good record during their pullet year, and are then given a rest from production so as to recover their full strength and constitution, their value being considered in their ability to produce young stock of improved quality and good vitality. The best young male, G2, which is a son of a 301 egg hen, was mated to 18 females, each having a record of over 230 eggs. A second male, G1, also from the 301 egg hen, was mated to 18 females, having records ranging from 217 to 230 eggs each. Another two pens of 18 females each, having records over 200 eggs each, were mated, one to another son of the 301-egg hen, and the other to a son of a 290-egg hen.

The eggs used for hatching from the above mentioned matings proved 87 per cent fertile, and from these were hatched the greater number of the chicks reared on the Farm during the summer.

INCUBATION

The 2,440 Buckeye machine was started and the first eggs set on March 15. The early hatches did not give a very high percentage of hatchability, but the later hatches were very good. One thousand three hundred and fifty chicks were

hatched between April 5 and June 8, 250 being sold as day-old chicks and 1,100 being brooded on the Farm. The cost of operating the incubator during the period required to hatch the 1,350 chicks, amounted to \$27, or an average of two cents per chick. The number of eggs required to hatch a chick averaged three and a half eggs for the total season, owing to the difficulty in getting good hatchability during the month of April. A greater number of eggs were required to hatch a chick from pullets than from hens.

BROODING

All the chicks reared were brooded artificially, coal-burning brooder stoves being used in colony houses for the purpose. The cost of the coal required to heat the brooders during the time that the chicks required heat, would average 2½ cents per chick. A continuation of the test as to the cost of rearing birds for the laying pens was carried on during the summer of 1923. An account of all feed used each month is kept, and prices charged according to the actual prevailing prices in the district. The following table gives the feed cost for the past five years:—

FEED COST OF GROWING CHICKS

Year	April	May	June	July	Aug.	Sept.	Oct.	Total cost of feed per chick
	\$	\$	\$	\$	\$	\$	\$	\$
1919.....		.03½	.06½	.14½	.18½	.20½	.23½	0 87
1920.....	.02½	.06½	.07	.12½	.17½	.20½	.27½	0 94½
1921.....	.01½	.05½	.07½	.12½	.15½	.15	.16½	0 74½
1922.....	.01½	.03½	.05½	.09½	.09½	.10½	.11	0 51½
1923.....	.02	.05½	.07½	.11	.12½	.14½	.14½	0 67½

NOTE.—The approximate average cost of feed to raise a pullet to laying age, according to the past five years' prices, would be seventy-five cents per bird.

Two pullets in 1923 commenced to lay at the age of 130 and 136 days respectively, yet the age at which pullets commenced to lay during the past five years would average between 160 and 180 days.

DISPOSAL OF STOCK DURING YEAR

During the months of June and July, 225 young cockerels were sold as broilers; in October, 220 pullets were selected for the winter laying pens; 50 pullets were shipped to the Experimental Station at La Ferme, Que., and 230 pullets were sold locally in small lots to farmers. During the late fall, 75 cockerels were sold as breeders to farmers throughout the province, while 170 were used for crate feeding and sold as dressed roasters.

Throughout the year there is always a great demand for small breeding pens of matured birds by farmers, or farmers' wives, wishing to get a start in bred-to-lay stock. During 1923, 90 Barred Plymouth Rock hens were sold in small lots locally for this purpose, and in addition to 54 hens which were shipped to the Experimental Station at Ste. Anne de la Pocatiere; 58 birds were sold for market purposes, these being individuals which had not made desirable records, ones that had become overfat, or for any other reason were considered not desirable for breeding purposes.

RESULTS FROM LAYING STOCK

It might be interesting to note that despite the extremely cold and long winter of 1922-23, among the pullets which were entered in the laying pens in the autumn of 1922, forty completed their pullet year with records over 200

eggs, and another ten birds had laid over 190 eggs each in the same time. The highest individual record made in 1923 was 286 eggs, followed closely with 284 eggs from a daughter of Lennoxville Champion, whose record in her pullet year was 301 eggs. The next eight highest birds had records as given here: 268, 266, 250, 243, 241, 236, 234, and 234 eggs each.

An average of 157 pullets were housed in the laying pens from November 1, 1922, until October 31, 1923. These birds produced in that time 25,927 eggs, which at the average market price of 45 cents per dozen, amounted in value to \$997.43. The total cost of the feed consumed by those birds amounted to \$327.47 or an average of \$2.06 per bird. Deducting the cost of feed from the value of eggs laid, would give a profit over cost of feed of \$669.96, or an average of \$4.08 per bird. The average per cent production per day throughout the year was over 45 per cent, October and November being the only months when the daily production went below 40 per cent.

RESULTS FROM BREEDING STOCK

The term "breeding stock" in this case means females which have made a good individual record of production during their pullet year, and which, providing their records of egg size, breed type, health, etc., are favourable, have been reserved for their value as reproducers of good stock. These breeders are not forced during the winter months for egg production, but are rather given a rest period in which time they are given every opportunity possible to get into the best of breeding condition. Another essential in the breeding up of a successful bred-to-lay strain is the selection of individuals having the power to transmit their qualities to their progeny. For instance, a fairly striking example might be taken from an individual at present in the Farm flock. Lennoxville Princess, D 120, was hatched in May, 1919; during the first year she laid 217 eggs, in her second year 133 eggs, in their third year 124 eggs and in her fourth year 111 eggs, a total of 585 eggs in four years. She has eleven daughters now in the breeding pens with records during their first year, viz., 290, 258, 250, 233, 230, 223, 219, 204, 203, 193, and 191 eggs each. One of her daughters which laid 250 eggs in her first year has laid 205 in her second year, a total of 455 eggs in two years. D-120 has also seven daughters and twenty-five grand-daughters descended directly from her, which are under trapnest work at present in the laying pens. Another feature to be noticed is the lack of inclination, to any great extent, of broodiness, in D-120 and her progeny. D-120 has a most desirable feature in the results of her hatching record. During her first year 36 eggs were used for hatching which proved 100 per cent fertile; in her second year the same number were set with another 100 per cent fertile; in the third year she was mated to her grandson, 36 eggs were set and this time 6 were infertile, but in her fourth year another 36 eggs were set from this hen, D-120, and again proved 100 per cent fertile. The total eggs set from this hen, in four years was 144, with an average of over 75 per cent hatchability. Eggs were used for hatching from six of her daughters during the spring of 1923, and in spite of the exceptionally hard season on all fertility results, these gave an average of 88½ per cent fertile.

D-120 had also four sons and ten grandsons which were used as breeders on the Farm, besides a number being sold to other Farms, all apparently having a great strength of vitality and breeding qualities. Eleven pullets sired by sons of D-120, which were put into laying quarters in the fall of 1922, gave average records of 226½ eggs for their pullet year.

Individuals having the qualities of good producers and also as reproducers of those qualities, are invaluable and should be kept as long as they will give good results.

While all stock birds which are kept over, after their first laying year, are kept primarily for their value as breeders, yet an accurate account is kept of their feed cost and their production, etc., in order to know whether they will pay their way. From the results of four years test, it is safe to say that even when the eggs are valued only as market eggs, they can be made to pay for their feed and, as a general rule, a small profit to balance. The following will give the costs of feed, the production and the profit from hens when considered as a commercial proposition during the year 1922-23: An average of 85 hens produced during the year 8,859 eggs, which at the average market price of 45 cents per dozen, would amount to \$296.28. The total cost of feed consumed during the year amounted to \$143.52, or an average of \$1.70 per bird. Deducting the cost of feed from the value of eggs would leave a profit over cost of feed of \$152.76, or an average of \$1.92 per bird. The average production was almost 60 eggs per bird less than the average production from the pullets during the same time.

EARLY VERSUS LATE HATCHED PULLETS

This test which was started in 1919, has been carried on each winter since, as a means of demonstrating the necessity of having pullets well matured before the cold weather sets in. Lot No. 1 were hatched during the first two weeks in April, and Lot No. 2 were hatched during the first two weeks in May. They were in every case housed, fed and cared for under identical conditions.

The following is a result of the test during the winter of 1922, and 1923:—

(EARLY HATCHED PULLETS)

Month	Cost of feed	Eggs laid	Value of eggs	Profit over feed	Profit per bird
1922					
November.....	\$ 8 46	483	\$ 24 15	\$ 15 69	\$ 0 31
December.....	9 29	767	47 25	37 96	0 76
1923					
January.....	9 18	679	31 12	21 94	0 43
February.....	10 30	781	32 54	22 24	0 44
Total.....	\$37 23	2,710	\$135 06	\$97 83	\$1 94

(LATE HATCHED PULLETS)

Month	Cost of feed	Eggs laid	Value of eggs	Profit over feed	Profit per bird
1922					
November.....	9 31	170	8 50	0 81	0 01
December.....	9 94	630	39 37	29 43	0 58
1923					
January.....	8 14	835	38 77	30 63	0 61
February.....	11 98	815	33 96	21 98	0 44
Total.....	\$39 37	2,450	\$120 60	\$82 85	\$1 64

It might be noted that in almost each month, more feed was required to feed the late hatched pullets than was the case with the earlier hatched. Below is given the summary of four years results of the test viz., Early versus Late Hatched Pullets.

(EARLY VS. LATE HATCHED PULLETS—FOUR YEARS)

	Number of birds	Cost of feed	Eggs laid	Profit over feed	Profit per bird
		\$		\$	\$
Early 1919-1920.....	25	27 51	750	24 21	0 96
Late 1919-1920.....	25	27 44	736	21 98	0 87
Early 1920-21.....	25	26 77	1,798	93 34	3 73
Late 1920-21.....	25	24 75	1,068	43 89	1 75
Early 1921-22.....	25	16 15	1,668	70 83	2 83
Late 1921-22.....	25	15 60	1,124	42 78	1 70
Early 1922-23.....	50	37 23	2,710	97 83	1 95
Late 1922-23.....	50	39 29	2,450	81 23	1 62

The average profit per bird over the cost of feed for four winter months during the past four years from early hatched pullets was:—\$2.37.

The average profit per bird over cost of feed for four winter months during the past four years from late hatched pullets was:—\$1.48.

From the results of four years, it is good proof that pullets must be hatched early enough to become fully matured before cold weather and short days arrive, if the most profitable production is to be expected during the winter months when eggs are selling at high prices.

It has been observed that the best month for the hatching of any of the general purpose breeds raised in the Eastern Townships is the month of April.

COMMERCIAL FEED VERSUS HOME MIXED

As the result of a great deal of discussion arising from the question as to whether commercial feeds are as economical, and will give as good results as home mixed feeds, this test was commenced on November 1, 1922. One hundred pullets of uniform size, maturity and breeding were divided into two pens of 50 birds each, excepting that pen No. 4 was fed a commercial scratch feed and a commercial mixed mash, while pen No. 3 was fed a home mixed scratch feed consisting of 1 part cracked corn, 1 part wheat and one-half part oats, and a home mixed mash consisting of 1 part bran, 1 part middlings, 1 part cornmeal and 12 per cent beef meal. From the results of a four month's test, the home mixed rations were superior in every way.

COMMERCIAL MIXED FEEDS

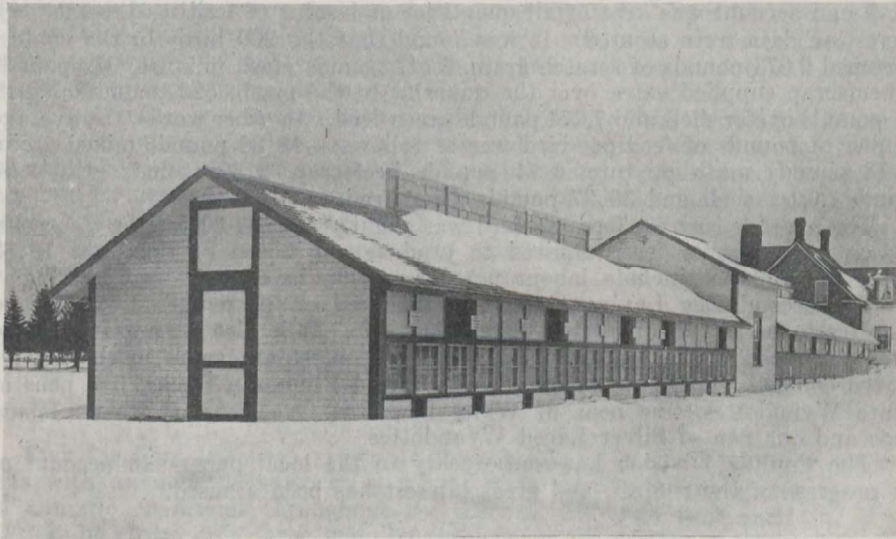
Month	Cost of feed	Eggs laid	Value of eggs	Profit over feed
	\$		\$	\$
1922				
November.....	10 06	220	11 00	0 94
December.....	12 90	587	36 75	23 85
1923				
January.....	10 11	668	30 69	20 59
February.....	12 51	673	28 04	15 53
Total.....	\$45 58	2,148	\$106 48	\$60 91

HOME MIXED FEEDS

Month	Cost of feed	Eggs laid	Value of eggs	Profit over feed
1922				
November.....	9 31	170	8 50	0 81
December.....	9 94	630	39 37	29 43
1923				
January.....	8 14	835	38 77	30 63
February.....	11 98	815	33 96	21 98
Total.....	\$39 37	2,450	\$120 60	\$81 23

QUEBEC WESTERN EGG LAYING CONTEST

The first Egg Laying Contest to be conducted in the Eastern Townships was commenced on November 1, 1922, and closed on October 30, 1923, at this Farm. Twenty pens of birds were entered including three pens from this Farm. There were nine pens of White Wyandottes and one pen of Rhode Island Reds. During the fifty-two weeks, 29,143 eggs were recorded, and twenty-three birds were registered in the National Poultry Record Association, having the neces-



The Western Quebec Egg-Laying Contest building, Dominion Experimental Station, Lennoxville.

sary qualifications of producing 200 eggs of good size during the 364 days of the contest. Small cash prizes were awarded each period of 28 days for the two pens, and the individual, coming highest during that period, and this helped arouse a wonderful interest in the contest.

Those winning cash prizes at the close of the contest were as follows:—

To the pen laying the largest number of marketable eggs:—

1st, Pen 18, W.W., owned by Miss R. G. Knight, Beebe, Que., \$7. Total eggs laid, 1,921.

2nd, Pen 3, W.L., owned by H. S. Beane, Beebe, Que., \$5. Total eggs laid, 1,887.

3rd, Pen 6, W.W., owned by E. G. White, Lennoxville, Que., \$3. Total eggs laid 1,859.

4th, Pen 4, W.L., owned by Elmhurst Poultry Farm, Montreal West, \$2.

5th, Pen 19, W.W., owned by C. Warner, Lennoxville, Que., \$1.

To the hen laying the largest number of marketable eggs during the year:—
1st, No. 189 W.W., owned by Miss R. G. Knight, Beebe, Que., \$2. With a total of 253 eggs.

2nd, No. 67 W.W., owned by E. G. White, Lennoxville, Que., \$1. With a total of 243 eggs.

To the pen making the most revenue over cost of feed:—

Pen-18, W.W., owned by Miss R. G. Knight, Beebe, Que., \$1.

FEEDING OF THE CONTEST BIRDS

A scratch grain was used consisting of 100 pounds wheat, 100 pounds cracked corn and 50 pounds good plump oats: this is scattered morning and afternoon in a litter of straw about 8 inches deep. A dry mash consisting of 100 pounds bran, 100 pounds middlings, 100 pounds cornmeal, with 12 per cent of beef meal and 1 per cent of charcoal, is kept in a self-feeding hopper. Grit and oyster shell were kept in hoppers before the birds at all times. Green feed consisted of green clover during the summer months and mangels or sugar beets during the winter.

As an account was kept of all quantities and value of feed used, some very interesting data were secured. It was found that the 200 birds in the contest consumed 9,673 pounds of scratch grain, 6,147 pounds mash mixture, 942 pounds of beefscrap supplied extra over the quantity in the mash, 525 pounds of grit, 931 pounds oyster shell and 7,274 pounds green feed. In other words, the average number of pounds of feed per bird was as follows:—48.36 pounds mixed grain, 30.73 pounds mash mixture, 4.71 pounds beefscrap, 2.62 pounds grit, 4.65 pounds oyster shell and 36.37 pounds green feed.

The average cost for feed per bird was slightly over \$1.99 for the 52 weeks. The average cost of feed required to produce one dozen of eggs was 16.38 cents; this did not include labour nor interest on investment and housing.

The second Egg Laying Contest commenced on November 1, 1923, and promises to be as full of interest as the last one. It is also very gratifying to note that most of the contestants of the last contest are again in the newly-started contest. There are seven pens of Barred Plymouth Rocks, five pens of White Wyandottes, five pens of White Leghorns, two pens of Rhode Island Reds and one pen of Silver Laced Wyandottes.

The Poultry Division has sent weekly to the local papers an account of the progress of the contest, and great interest has been aroused.

BEEES

Although the spring of 1923 was unusually late and cool with occasional frosts until well into June, a fairly generous supply of nectar and pollen was available during May and early June. Accordingly colonies built up rapidly and were in good condition generally by the first of July. No large honey flow developed during the season but bees made substantial gains over a period of about five weeks from the first of July until August 5. Fall bloom was plentiful, but, owing to the cool weather, practically no late honey was obtained and many hives lost weight rapidly during late August and September. As a con-

sequence, conditions were unfavourable for the building up of nuclei, and unusually heavy feeding was required to bring colonies up to a satisfactory weight for winter.

The three colonies of Italian bees which were wintered in the cellar of the office building, were removed to the open on April 20. On examination it was found that two of these had wintered well and were in good condition, while one was weak and had to be strengthened with brood taken from the other colonies early in May.

In order to build up an apiary of sufficient size to be used for the conducting of experimental work as rapidly as possible, the production of honey was disregarded and the three colonies were used for increase in so far as possible. The first division for increase was made on June 9 and the last on July 18. In all, nine nuclei were established with laying queens, procured from various sources, and brood from the original colonies. These did not build up very fast, but by the occasional adding of brood, from stronger colonies, and careful feeding they developed into fairly strong colonies before late fall and were in good condition when last examined.

A total of 106 pounds of extracted honey was obtained from the three colonies from which the divisions were taken, and one of the new colonies produced a surplus of twenty-four pounds. This together with an increase from three up to twelve colonies may be considered as a satisfactory performance.

Feeding was begun early in October in the usual way. A syrup, composed of two parts sugar and one of water, was fed in the regular ten-pound honey pail feeder to all hives. Those to be wintered in the cellar were fed until the total weight, less the cover, amounted to seventy pounds. Four hives that were to be wintered outside, in a specially constructed quadruple wintering case, were fed up to a weight of eighty pounds. At the last examination the bees covered an average of eight frames in each hive.

This division co-operated with the Bee Division of the Provincial Department of Agriculture, Quebec, in organizing and arranging for a Bee Day, which was held at the Station on August 8. The apiary and equipment at the Station were used for demonstrations and several lectures on bee-keeping, in both French and English, were given by prominent bee-keepers and officers of both departments. Over three hundred people were present and as the beginning of such specialized excursions it was a decided success.

FIBRE PRODUCING PLANTS

FLAX

Flax for fibre has been grown at this Station in a small way for several years with average success. It is a crop that seems well suited to the soil and climatic conditions throughout the district, although it is doubtful if it will ever be grown on a large scale by farmers, as the system of farming in the Eastern Townships leaves little or no cleared land available for the growing of crops other than those required for the feeding of live stock.

Variety Test.—Seed of five varieties was sown broadcast at the rate of ninety pounds per acre in duplicate plots one-fiftieth acre each, on May 26. The season was fairly favourable for the crop although several heavy rains, during July, caused lodging and consequent damaging of straw.

The varieties tested were: Saginaw, Pure Line No. 5, Riga Blue, Pure Line No. 3, and Longstem. Of these the best yielding variety was Pure Line No. 5, which produced a yield of 400 pounds of fibre and 737 pounds of tow per acre.

Different Dates of Seeding.—An experiment to determine the influence of different dates of seeding upon the yield and quality of the crop indicated that the best results may be expected from comparatively early seeding.

HEMP

Two fiftieth-acre plots were sown with hemp seed on May 26. Germination was good and the crop grew steadily throughout the season. It was cut on September 20, when a little past full bloom at which time the straw averaged 7 feet 6 inches in length. This was dried and shipped to Ottawa for retting and scutching, the results of which are not available at the time of writing. It may be said, however, that contrary to expectations, the hemp produced a fair crop and the quality of the straw seemed quite good.

EXTENSION WORK

EXCURSIONS

The first activity in connection with this line of work at the beginning of the year is the three days' Short Course for boys and girls, which is held in the early part of January, at Lennoxville, at which the Experimental Station co-operates with other local organizations by furnishing live stock for the judging competitions, lending men and equipment, and assisting in every way possible to carry on the work. The attendance at these courses is gradually increasing from year to year, and this year over fifty boys took part in this judging work. Such prominent agriculturists as Mr. E. S. Archibald, Director Experimental Farm; Mr. E. S. Hopkins, Dominion Field Husbandman; Mr. H. S. Arkell, Live Stock Commissioner; Messrs. MacLaurin, Martin and Mr. McOuat, of the Live Stock Branch, Ottawa; Professor Barton, and a number of the staff of Macdonald College have assisted in looking after these classes during the three days' courses.

A Field Day for bee-keepers of this district, organized by the Bee Division of the Provincial Department of Agriculture, Quebec, in co-operation with the Lennoxville Station, which was held at the Station on August 8, was attended by three hundred people.

The ninth annual Farmers' Day was held on August 15. There was the usual large attendance from all sections of the Eastern Townships to the number of over two thousand people. This is an annual event that farmers and their families look forward to, as a place to meet, look over and discuss their various agricultural and home problems, and it is one of the best means of getting farmers to realize the various lines of experimental work which are being conducted at the Station. This gathering is always attended by the best agriculturists from the Federal and Provincial Departments of Agriculture, who give short addresses on agricultural topics.

EXHIBITIONS

The fall exhibitions attended with the exhibit from the Experimental Station were as follows: The Stanstead County Agricultural Exhibition, held at Ayer's Cliff, August 21, 22 and 23; the Great Eastern Agricultural Association Fair, at Sherbrooke from August 26 to September 1; Compton County Agricultural Association Fair at Cookshire, September 11, 12 and 13. The exhibit at the various fairs was in charge of Messrs. MacCharles and Brown, assistants to the superintendent, Mr. Lang, poultryman, Mr. Mahaffy, gardener, and Mr. Beaudoin, apiarist.

The poultry exhibit from the Poultry Division of the Experimental Station was staged at the Sherbrooke Poultry Show; the Short Course, Lennoxville; Quebec Poultry Show, Quebec; Brome County Poultry Show, Foster; St. Hyacinthe Poultry Show; and the Chantecler Show, Montreal.

The staff co-operated in every way possible with practically all the fair associations of the district in helping to judge the live stock, poultry, fruit, vegetables and maple products at different fairs.

A number of days were spent in helping farmers' clubs and agricultural societies of the district in the judging of their standing crop competitions as well as assisting the provincial department at their fall school fairs.

MEETINGS

The staff attended various meetings throughout the district during the year. Some of the lectures were illustrated and were held under the auspices of farmers' clubs, agricultural societies, women's institutes and other such organizations.

GENERAL FARM NOTES

BUILDINGS

The only new building erected in 1923 was a small building for the accommodation of a set of platform scales near the dairy barn, 16 by 20 feet in dimension. Repair work was done on the house known as the Ward house, which is soon to be occupied by the superintendent. Other small emergency repairs were made on various buildings.

ROADS

There were no new roads constructed during the year. Gravel was drawn in the winter and left in piles to be used in surfacing and repairing the Farm roads. All roads were dragged at different intervals throughout the season in order to keep them in the best possible condition.

FENCES

Seventy-five rods of permanent wire fence were erected on the east boundary of the Farm running north from the Ascot School; 100 rods erected in field F, dividing this field so that part of it may be used in a pasture rotation; 25 rods near the dairy barn for a night paddock, and 30 rods on the south boundary of the Farm; making a total of 230 rods.

**EXPERIMENTAL PROJECTS UNDER WAY AT THE EXPERIMENTAL
STATION, LENNOXVILLE, QUE.**

ANIMAL HUSBANDRY

BEEF CATTLE

Project No.	Title
A. 180.	Feeding steers loose vs. tied.
A. 192.	Elevator screenings vs. mixed meal for steers.
A. 193.	Early vs. late grain feeding to steers.

DAIRY CATTLE

A. 13.	Corn silage vs. sunflower silage for milch cows.
A. 59.	Cost of rearing dairy bred calves and heifers.
A. 217.	Cost of maintaining herd sires.
A. 218.	Calf-porridge for dairy-bred calves.
A. 219.	Feeding minerals to calves.
A. 220.	Blatchfords vs. Home-mixed porridge for calves.
A. 258.	Feeding calves twice vs. three times daily.
A. 353.	Influence of two vs. three milkings daily.

HOGS

A. 142.	Elevator screenings for hog feeding.
A. 143.	Value of skim-milk as a feed for swine.
A. 157.	Cost of rearing sows to breeding age.
A. 160.	Cost of rearing pigs to time of weaning.
A. 163.	Cost of pork production.
A. 168.	Skim-milk vs. tankage for hogs.
A. 169.	Elevator screenings vs. home mixed meal.
A. 221.	Influence of time of breeding sow on condition of litter.
A. 222.	Feeding corn to bacon hogs for finishing.
A. 238.	Feeding lard vs. bacon type hogs.

HORSES

A. 293.	Cost of horse labour.
A. 299.	Wintering idle work-horses.

SHEEP

A. 309.	Age at which to breed ewe lambs.
A. 307.	Winter feeding of lambs.
A. 329.	Fall vs. winter marketing of lambs.
A. 337.	Improvement of fleece by better flock management.
A. 338.	Cost of rearing lambs for market.

FIELD HUSBANDRY

ROTATION EXPERIMENTS

F. 4.	Three-year rotation—Potatoes; oats, clover.
F. 10.	Four-year rotation—Corn; oats; clover; timothy.
F. 18.	Four-year rotation—Oats; clover; timothy; timothy.
F. 26.	Five-year rotation—Corn; barley; clover; timothy; oats.
F. 41.	Six-year rotation—Corn; oats; clover; timothy; timothy; oats

CULTURAL EXPERIMENTS

F. 48.	Preparation of land for grain.
F. 49.	Preparation of land for silage crops.
F. 52.	Depth of ploughing.
F. 54.	Date of seeding hay crops.
F. 67.	Pasture renovation.
F. 72.	Tile-drained vs. undrained land.

MANURE AND FERTILIZER EXPERIMENTS

F. 76.	Quantities of manure and place in rotation of applying manure.
F. 78.	Green manure crops.
F. 81.	Commercial fertilizers for hay.
F. 82.	Commercial fertilizers for potatoes.
F. 84.	Commercial fertilizers for silage crops.
F. 85.	Use of lime.

FIELD HUSBANDRY—*Concluded*

FARM MANAGEMENT EXPERIMENTS

Project No.	Title
F. 88.	Yield and profit from root and silage crops.
F. 90.	Cost of operating tractor.
F. 91.	Cost of producing farm crops.

HORTICULTURE

SMALL FRUITS

H. 1.	Blackberry, breeding.
H. 4.	Currant, variety experiment.
H. 6.	Gooseberry, variety experiment.
H. 11.	Raspberry, variety experiment.
H. 21.	Strawberry, variety experiment.

TREE FRUITS

H. 26.	Apple, fertilizer and cover crop experiment.
H. 33.	Apple, variety experiment.
H. 35.	Cherry, variety experiment.
H. 44.	Pear, variety experiment.
H. 45.	Plum, breeding.
H. 48.	Plum, variety experiment.

VEGETABLE GARDENING

H. 54.	Asparagus, variety experiment.
H. 57.	Bean, of different seasons vs. one variety planted at different dates.
H. 61.	Bean, variety experiment.
H. 62.	Bean Pole, variety experiment.
H. 67.	Beet, thinning experiment.
H. 68.	Beet, variety experiment.
H. 70.	Brussels sprouts, variety experiment.
H. 75.	Cabbage, protection from root maggot.
H. 77.	Variety experiment.
H. 82.	Carrot, thinning experiment.
H. 90.	Celery, blanching experiment.
H. 94.	Celery, variety experiment.
H. 102.	Corn, variety experiment.
H. 106.	Cucumber, variety experiment.
H. 107.	Egg plant, variety experiment.
H. 108.	"Herbs," variety experiment.
H. 112.	Leek, variety experiment.
H. 116.	Lettuce, variety experiment.
H. 122.	Melon, musk, variety experiment.
H. 125.	Melon, water, variety experiment.
H. 128.	Onion, breeding for trueness to type.
H. 130.	Onion, distances of planting.
H. 131.	Onion, growing sets.
H. 136.	Onion, thinning experiment.
H. 138.	Onion, variety experiment.
H. 144.	Parsnip, thinning experiment.
H. 145.	Parsnip, variety experiment.
H. 147.	Pea, breeding for yield.
H. 150.	Pea of different seasons vs. one variety planted at different dates.
H. 153.	Pea, variety experiment.
H. 157.	Pepper, variety experiment.
H. 158.	Potato, beetle control.
H. 160.	Potato, cost of producing.
H. 165.	Potato, distances of planting.
H. 164.	Potato, different sizes of sets.
H. 171.	Potato, hill selection for seed.
H. 186.	Potato, variety experiment.
H. 188.	Pumpkin, variety experiment.
H. 192.	Radish, variety experiment.
H. 195.	Rhubarb, variety experiment.
H. 197.	Salsify, variety experiment.
H. 199.	Spinach, variety experiment.
H. 201.	Squash, variety experiment.

HORTICULTURE—*Concluded*VEGETABLE GARDENING—*Concluded*

Project No.	Title
H. 207.	Tomato, methods of training.
H. 211.	Tomato, variety experiment.
H. 214.	Turnip, variety experiment.

ORNAMENTAL GARDENING

H. 261.	Annuals, variety experiment.
H. 267.	Crocus, variety experiment.
H. 274.	Herbaceous perennial, variety experiment.
H. 278.	Narcissus, variety experiment.
H. 286.	Snowdrop, variety experiment.
H. 290.	Tulip, treated as annuals, variety experiment.
H. 307.	Trees and shrubs, ornamental and shelter, variety experiment.

CEREAL

Ce. 1.	Common spring wheat, test of varieties or strains.
Ce. 4.	Winter wheat, test of varieties or strains.
Ce. 5.	Oats, test of varieties or strains.
Ce. 6.	Barley, test of varieties or strains.
Ce. 7.	Field peas, test of varieties or strains.
Ce. 8.	Field Beans, test of varieties or strains.
Ce. 11.	Winter Rye, test of varieties or strains.
Ce. 20.	Field Beans, production of superior varieties or strains by selection from old sorts.

FORAGE PLANTS

Ag. 1.	Indian corn, variety tests for ensilage purposes.
Ag. 16.	Mangels, variety tests for yield and purity.
Ag. 17.	Mangels, breeding of pure strains.
Ag. 36.	Carrots, variety tests for yield and purity.
Ag. 46.	Turnips, variety tests for yield and purity.
Ag. 51.	Swedes, variety tests for yield and purity.
Ag. 52.	Swedes, breeding of pure strains.
Ag. 66.	Sugar beets, variety tests for yield and purity.
Ag. 76.	Sunflowers, variety tests for yield and purity.
Ag. 77.	Sunflowers, breeding of pure strains.
Ag. 126.	Alfalfa, variety tests hardiness yield suitability.
Ag. 146.	Red clover, variety tests for yield and general suitability.
Ag. 148.	Red clover, rows vs. broadcast for seed production.
Ag. 161.	Sweet clover, variety tests.
Ag. 201.	Timothy, variety tests for yield and purity.
Ag. 241.	Annual hay crops, variety tests for yield and suitability.
Ag. 241(C).	Grasses, variety tests for yield and suitability.
Ag. 258(E).	Hay and pasture mixtures experiment, mixed clovers as a base.

CHEMISTRY

C. 10.	Sugar Beet investigation.
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POULTRY

P. 31.	Rearing costs.
P. 43.	Costs and gains in fattening roasters.
P. 58.	Best hatching date for egg production.
P. 59.	Individuality in egg production.
P. 62.	Costs of egg production.
	Exp. (a) and (b) Per dozen, winter eggs.
	Exp. (e) Eggs required to pay for winter feed.
	Exp. (f) Eggs required to pay for year's feed.
P. 108.	Cost of feeding layers.
P. 150.	Egg preservatives.

APIARY

Ap. 7.	Wintering in cellar.
Ap. 8.	Wintering in four-colony cases.
Ap. 20.	Returns from apiaries.
Ap. 30.	Outdoor versus cellar wintering.

FIBRE PLANTS

E. 3.	Testing varieties of flax.
E. 4.	Testing varieties of hemp.
E. 7.	Seeding tests, sowing flax at different dates.