DOMINION OF CANADA

DEPARTMENT OF AGRICULTURE

DOMINION EXPERIMENTAL FARMS

EXPERIMENTAL STATION

FREDERICTON, N.B.

INTERIM REPORT FOR THE YEAR 1921

Prepared by

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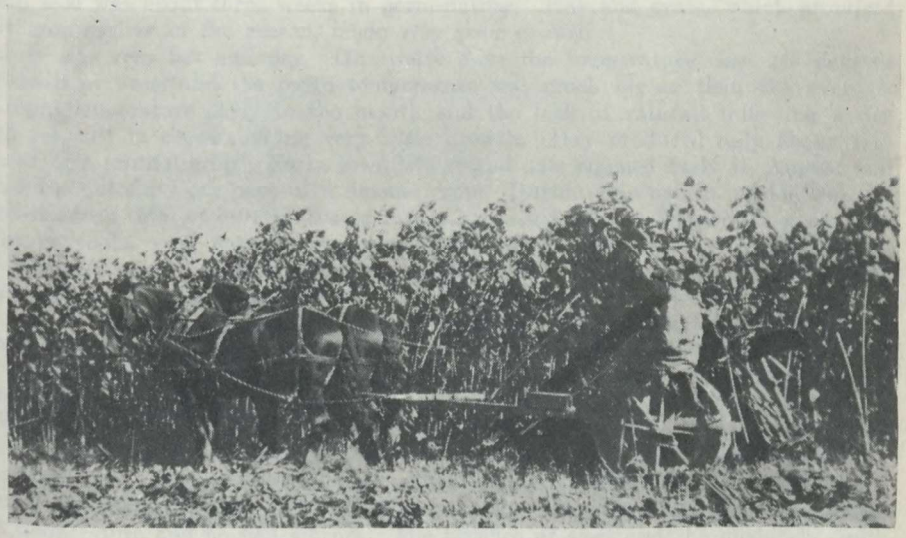

Harvesting Giant Russian Sunflowers

Printed by authority of Hon. W. R. Motherwell, Minister of Agriculture, Ottawa, 1922

OTTAWA

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1922

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EXPERIMENTAL STATION, FREDERICTON, N. B.

SEASONAL NOTES

The winter of 1920-21 was an exceptionally fine one. The ground was covered with snow on November 25 and remained covered until March 10. The even covering of snow and the moderate temperature were very favourable for fall grains and grass crops. Orchards also came through the winter in good condition.

The month of March was unusually mild and in the early part of April the frost was out of the ground. Ploughing was begun on April 14, and on the 30th the first seeding of wheat was done. Vegetation was very rapid during the spring months and about two weeks earlier than usual. Apple trees began to bloom on May 15. At the end of May, fall wheat was 30 inches high, spring wheat was 6 inches high, seed turnips were in bloom and grasses and clovers were much more advanced than usual. The precipitation for the month was below the average and a slight frost was recorded on the 13th. A dry June, following a dry May, resulted in growth being seriously retarded. Potatoes were very slow in sprouting, and missed badly. Turnip seed was about three weeks in germinating. Hay and grain, which promised a fair crop earlier in the season, made very poor growth.

July was very hot and dry. On twelve days the temperature was 90 degrees Fahrenheit or over, and the mean temperature was much higher than the average. The high temperature early in the month and the lack of rainfall following a dry spring resulted in crops making very little growth. Hay produced only about fifty per cent of a normal crop. Early sown wheat and oats ripened early in August and produced about sixty per cent of a normal crop. During this month, cooler weather prevailed and a total of 3·01 inches of rainfall resulted in a revival of the growth of late grain, roots, corn, potatoes and fruit crops. September was a very fine month. Late potatoes, corn and roots made very good growth. A slight frost was recorded on the 21st but did very little damage. October continued fine, and potatoes, ensilage corn and root crops were harvested in good condition. On account of the light rainfall and very clear weather, very little blight developed in potatoes, and a very sound crop was harvested. Roots grew well until the last of the season and eighty per cent of an average crop was harvested.

Winter conditions were ushered in early in November with very little frost in the ground. Snow fell on the 2nd, 4th and 5th of that month and all stock had to be housed. A thaw on the 19th and 20th removed most of this snow, after which the ground froze up for winter. The winter months following were fine, with an average mean temperature and no bad storms. The absence of sleet and the moderate depth of snow were favourable for orchards. Live stock, which had to be housed early in the season, were brought through the winter with a minimum of feed and consequently are in rather poor condition.

METEOROLOGICAL RECORDS

Month	Temperature F.			Precipitation			Sunshine
	Mean	Highest	Lowest	Rainfall	Snowfall	Total	
				inches	inches	inches	hours
1920							
January	4·1	35·0	−25	.....	12·50	1·25	110·15
February	16·0	38·0	−25	1·73	52·0	6·93	97·55
March	27·0	63·5	−19	1·68	11·0	3·58	152·70
April	44·0	82·0	15	3·06	4·5	3·51	108·15
May	54·0	87·0	30	1·17	.....	1·17	269·3
June	60·4	86·0	34	1·05	.....	1·05	218·9
July	72·47	97·0	45	0·74	.....	0·74	258·65
August	62·8	89·0	39	3·01	.....	3·01	247 8
September	59·20	92·0	30	3·08	.....	3·08	195·45
October	47·45	72·0	20	2·39	.....	2·39	155·55
November	29·38	58·0	− 2	1·22	30·0	4·22	49·75
December	19·48	51·0	−14	0·5	7·0	1·20	110·30
1921							
January	11·34	37·0	−25	0·15	16·0	1·75	132·20
February	14·2	46·0	−33	0·18	28·0	2·98	123·20
March	29·9	54·0	−20	2·91	4·0	3·31	176·05
Totals for year ending March 31, 1922	.....	.....	.....	19·46	89·5	28·41	2,045·30
Totals for six growing months	.....	.....	.....	.....	.....	12·56	1,298·25

ANIMAL HUSBANDRY

HORSES

Horses are used in most farm operations on the Station, but little breeding or experimental work has been done with them. Two pure-bred Clydesdale colts were reared during the year, sired by the Station stallion, Favourite Spencer—20117. Unfortunately this horse has not developed enough size and his colts are showing the same fault. This lack of size is apparent in the Clydesdales throughout the province, and the acquisition of a stallion with a good deal more size would be desirable to offset this tendency.

In order to determine the cost of horse labour, a record was kept of the feed consumed by the draught horses from April 1 to November 30. Five horses were worked throughout the whole period; four were worked until September 19, when they were sold; two mares raised colts and were worked very little until after September 20 and one of those was sold on November 3. During this period, 12,702 hours of horse labour were recorded. The amount of feed consumed by these horses during this period and the cost were as follows:—

34,652 lbs. grain at 2¼c.	$ 779 67
671 lbs. roots at 8c. per bush.	1 07
36,270 lbs. hay at $15 per ton.	272 02
	$1,052 76

Cost per working hour, 8.28c.
Cost per working 10 hours, 82.8c.

On account of the intermittent nature of the work during the winter months, no calculation has been made as to cost of horse labour per hour for that period. The

horses were kept in good condition on a ration of from 8 to 10 pounds of oats, 4 pounds of wheat bran, a few roots and 14 pounds of hay per day.

Probert 28. COST OF REARING COLTS OF DIFFERENT AGES

Name	Breed	Period	Feed consumed						Weights	
			Oats at 75c. per bus.	Bran at 2½c. per lb.	Roots at 8c. per bus.	Hay at $15 per ton	Pasture at $1 per mo.	Total Cost	At beginning of period	At end of period
									lbs.	lbs.
Nell	Grade Clydesdale	From birth to 1 year	27.6	475	509	3,100	.....	$55 44	.....	875
Grace	Clydesdale	From 1 year to 2 years	17.6	300	826	3,000	$5 50	49 27	740	1,030
Blaze	Grade Clydesdale	From 2 years to 3 years	15.2	259	826	2,685	6 10	38 67	1,110	1,400

The dam of Nell was worked during the time that her colt was sucking her. Nell was kept in the barn during the whole year and was fed a grain mixture as soon as she would eat it. Grace was on pasture for 165 days and Blaze for 189 days, during which time these colts received no grain.

The stock of horses at the end of the year consisted of:—

1 pure-bred Clydesdale stallion.

2 pure-bred Clydesdale mares.

1 pure-bred Clydesdale mare, three years old.

1 pure-bred Clydesdale filly, one year old.

1 pure-bred Clydesdale stallion, one year old.

2 grade Clydesdale mares.

2 grade Clydesdale geldings.

1 grade Clydesdale filly, two years old.

2 general-purpose mares by standard-bred sires.

1 general-purpose gelding by thoroughbred sire.

DAIRY CATTLE

The stock of cattle consists of the following:—

PURE-BRED CATTLE

Holsteins—4 milch cows, 2 heifers, 5 bulls.

Ayrshires—4 milch cows, 7 heifers, 4 bulls.

Shorthorns—5 milch cows, 5 heifers, 5 bulls.

GRADE CATTLE

Grade Holsteins—1 milch cow, 6 heifers.

Grade Ayrshires—5 milch cows, 8 heifers.

Grade Shorthorns—2 milch cows, 6 heifers, 1 steer.

Holsteins

The Holstein cows have the following records to their credit during the past season:—

Name	Age when calving	No. of days milking	Pounds of milk produced	Pounds of butter fat produced	Per cent fat
Lee Keyes Korndyke	4 years	321	13,462·8	443·20	3·2
Echo Ormsby Lee Keyes	2 "	365	9,224·8	339·38	3·6
Rue Belle of Fredericton	2 "	353	8,778·4	275·32	3·1
Helen Clover Ormsby	3 "	7 day official test	518·5	13·91	2·7

A young bull, Johanna Beauty Boy 48966, from the Central Experimental Farm, now heads the Holstein herd. This bull, which promises to develop into a very fine individual, was a year old on March 11, 1922. His dam, Canaan Beauty 2nd 21172, has a 365-day record of 18,637 pounds of milk and 605·32 pounds of fat as a three-year-old. His sire, Roycroft King Johanna 35689, is the present senior herd sire at the Central Experimental Farm.

Ayrshires

The Ayrshire cows are all young and none of them, at this date, has completed its first lactation period. The herd sire, "Ravenwood Ivanhoe 72901," was received from the Charlottetown Station last April. He is a very fine individual and should get some good stock. His dam, Buttercup of Glenholm 56491, broke the four-year-old Canadian Ayrshire record in 1921 with 16,444 pounds of milk and 662 pounds of butter fat in the year.

Shorthorns

Three Shorthorn cows completed lactation periods during the season, with the following records to their credit:—

Name	Age at calving	No. of days milking	Pounds of milk produced	Poundsof butter fat produced	Per cent fat
Princess 108371	7 years	341·5	6,674·9	227·1	3·4
Betty Fairfax 140456	2 "	415·0	6,342·4	252·7	3·9
Lily of Fredericton 140507	2 "	380·0	5,174·3	228·4	4·4

The old herd bull, Kentville Champion=111756=, was slaughtered in July. Unfortunately, the heifers from this bull are developing into low producers.

A new bull, Major Maude=116374=, bred by the Ontario Agricultural College, is now being used as a herd sire. He has some heavy milking ancestors, his maternal granddam, Lady Maude=104585=, having an R.O.P. record of 11,891 pounds of milk in one year. He is a very fine type of bull and should get some good milking Shorthorn heifers.

Project 18.—Grading-up Experiment with Dairy Cattle

Three grade Shorthorn cows which were from cows of mixed breeding, and by a pure-bred Shorthorn bull, completed their lactation periods during the season as four-year-old cows. The average production of their dams for three years, as mature

cows, is shown in table I. The average production of the first cross Shorthorns as four-year-old cows for the past year is shown in table II.

TABLE I.—*Grading-up Experiment, Shorthorns*

Class of Cows: Average of mature grade cows for 3 years	No. of days milking	Pounds of milk	Pounds of butter fat
Maggie	294·3	6,099·7	243·99
Brindle	282·3	5,272·1	232·5
Brownie	261·0	4,581·2	182·5
Average	279·2	5,317·6	219·66

TABLE II.—*Grading-up Experiment, Shorthorns*

Class of Cows: 1st cross from grades and Shorthorn sire, as 4-year-olds	No. of days milking	Pounds of milk	Pounds of butter fat
Maggie 1–S	271·0	4,616·5	180·95
Brindle 1–S	315·0	6,519·9	233·44
Brownie 1–S	325·0	5,541·3	222·11
Average	303·6	5,559·2	212·16

Five heifers which were from cows of mixed breeding, and by a pure-bred Ayrshire bull, completed their first lactation period during the year. The average production of their dams for three years as mature cows, is shown in table III. The average production of the first cross Ayrshire heifers from them is shown in table IV.

TABLE III.—*Grading-up Experiment, Ayrshires*

Class of Cows: Average of mature grade cows for 3 years	No. of days milking	Pounds of milk	Pounds of butter fat
Kate	273·6	5,865·8	231·7
Tiny	284·0	4,662·2	171·0
Maggie	294·3	6,099·7	243·99
Blossom	318·6	6,585·3	260·5
Julia	301·6	6,099·0	236·7
Average	294·4	5,862·4	228·7

TABLE IV.—*Grading-up Experiment, Ayrshires*

Class of Cows: 1st cross from grades and Ayrshire sire, as 2-year-olds	No. of days milking	Pounds of milk	Pounds of butter fat
Kate 1–A	380·5	5,998·0	295·4
Tiny 1–A	360·0	6,123·5	258·69
Maggie 1–A	375·0	6,053·2	273·88
Blossom 1–A	222·0	4,755·9	206·7
Julia 1–A	339·0	5,056·5	212·38
Average	335·3	5,597·4	249·4

Summer months.—The drought made the summer of 1921 rather unfavourable for pasture. The pasture at the Station, while fairly extensive, is rather rough, so that it was necessary to feed the milch cows from five to six pounds of grain and from ten to fifteen pounds of silage each per day during the summer months. The heifers and dry cows were on pasture for one month. After July 10 they were fitted for the shows and were fed from four to eight pounds of grain and ten to twenty pounds of silage to supplement the pasture. They presented a very good appearance when stabled in the fall. The value of silage for both milch cows and growing stock was clearly demonstrated.

Winter months.—The cattle were wintered under fair conditions. The crops were well harvested, but owing to the extremely dry summer they were rather light. This made necessary the purchase of some hay and straw. However, there were sufficient roots and corn silage for the winter requirements, and a good quantity of corn silage will be left over for summer feeding. The grains which were largely purchased were bought at a lower price than last year. The ration fed the milch cows was, on the average, as follows:—

Corn silage	12-15 pounds
Hay	8-12 "
Roots	10-35 "
Meal	6-20 "

The meal mixture for the cows in heavy milk consisted of equal parts oil cake, cottonseed meal, bran and crushed oats. For the dry cows and those nearing the end of their lactation period, the ration consisted of two parts screenings, one part bran and one part oilcake.

The meal was fed on top of the roots just after the morning milking. As soon as the roots and grain were eaten, the hay was fed. At 2 o'clock p.m. the cows were given their ensilage and grain and the hay was given after the night milking. The cows were usually given all the roughage they would eat clean and one pound of grain to each three and a half to four pounds of milk. Water was before the cows at all times. Salt was added to the grain ration at the time of mixing.

Project 23.—COST OF PRODUCING BEEF FROM DAIRY-BRED SHORTHORN GRADES

Three grade Shorthorn steers raised at the Farm were fattened during the year. One of these, Muley 1-S-2, was fed grain during the summer and fattened in the fall. The other two were turned out on rough pasture during the summer months and were fattened during the winter. The first mentioned steer was never allowed to lose his bloom. The latter two came into the barn in the fall in rather poor condition and required a good deal of feed to fatten them.

The weights of these steers, the cost of rearing them and the financial aspect of the operation were as follows:—

COST OF PRODUCING BEEF FROM DAIRY-BRED SHORTHORN GRADES

Feeds consumed	Muley-1-S-2	Maggie 1-S-2	Shannon 1-S-2
Whole milk	455 lbs.	443 lbs.	428 lbs.
Skim milk	3,307 "	3,327 "	3,152 "
Crushed oats	494 "	388 "	384 "
Bran	971 "	741 "	738 "
Screenings	798 "	768 "	768 "
Oil cake	641 "	410 "	406 "
Corn meal	200 "	200 "	200 "
Roots and ensilage	3,108 "	8,694 "	8,678 "
Hay	2,304 "	1,992 "	1,992 "
Pasture	1 month	4½ mos.	4½ mos.
Total cost of feed	$85.53	$83.80	$82.88
Value of calf at birth	2.00	2.00	2.00
Total cost	87.56	85.80	84.88
Age when sold	1 y. 8 m. 20d.	1 y. 10 m. 14 d.	1 y. 9 m. 26 d.
Live weight	940 lbs.	845 lbs.	925 lbs.
Cost per lb. live weight	9·3 cts.	10·1 cts.	9·1 cts.
Selling price	$63.10	$50.70	$55.50

SHEEP

A flock of Shropshires, a flock of Cheviots and a few grade ewes are kept at this Station. The sheep were dipped on May 10, and turned on pasture on May 23. On account of the extremely dry weather during the summer months the pasture was very poor. The Shropshire flock were housed in the fall in very thin flesh. The Cheviots were apparently able to rustle for their living a little better, and were housed in fair condition. The sheep were again dipped on September 4 and the flock was housed the latter part of October.

SHROPSHIRES

The flock of Shropshires at the beginning of the year included fourteen yearlings, eleven breeding ewes and one ram. The eleven breeding ewes and two yearlings produced nineteen lambs, ten of which were rams. One ram and one ewe died. Shearing was done the latter part of April. The average weight of the Shropshire fleeces was 6.9 pounds. The grading of twenty-four fleeces was as follows: one fine medium combing, twenty-one medium combing, one medium clothing, one burry and seedy.

All the ram lambs and one of the ewe lambs were sold in the fall. The flock at the end of the season consisted of twenty-three breeding ewes, one ram and seven yearlings.

CHEVIOTS

The flock of Cheviots at the beginning of the year included twelve breeding ewes and four yearlings. Eleven of the ewes produced eighteen lambs, twelve of which were rams and six ewes. The average weight of the Cheviot fleeces was 5.9 pounds. The grading of the fleeces was as follows: six medium combing, eleven low medium combing.

The ram lambs were sold in the fall. One ewe lamb was obtained in exchange for a ram, and a new ram was bought to head the flock. The flock at the end of the season included fifteen breeding ewes, one ram and six yearlings.

Grades

Five grade Shropshire ewes were on hand at the beginning of the year. Four of these produced six lambs, four of which were ewes and two rams. The lambs and three of the ewes were sold in the fall. The average weight of the fleeces of these grades was 7·7 pounds, and the grading was as follows: one fine medium combing, four medium combings.

ANGORA GOATS

The stock of goats at the beginning of the year included thirteen breeding females, one buck, eight stags.

Angora Goats on bush Land.

Thirteen young kids were born. Five of these were males and eight females. One female was killed by another goat. Dipping was done on May 10. On May 16 they were enclosed in two acres of pasture which was grown up with birches and alders, to determine whether they would kill the bushes and at the same time derive any nourishment from them. On June 20 the trees on this area were completely stripped of their leaves excepting for a few alders, which the goats do not like. Another block of one and one-half acres was then enclosed and they were confined to that for a month. At the end of that time a new growth of leaves had started to develop on the first area and the flock was then allowed the run of the complete block. They were thus confined until October 15 at which time the young growth of birches was apparently pretty well killed. The fact that they came in in good condition in the fall was evidence that they had been sufficiently nourished in this manner.

SWINE

Five pure-bred Yorkshire sows produced litters in the spring of 1921. The farrowing records were as follows:—

FARROWING RECORDS

No. of Sow	Number of Pigs	Males	Females	Number reared
No. 5	16	9	7	8
No. 8	11	5	6	8
No. 9	9	6	3	7
No. 10	10	6	4	4
No. 11	7	4	3	5

Average young pigs per litter	10·6
Average number males per litter	6·0
" " females per litter	4·6
Average number of pigs raised per litter	6·4

Two of the old sows were disposed of during the summer and were replaced by young sows. Thirteen young pigs were sold as breeders and the balance were kept at the Station for experimental purposes.

Project 30.—TO DETERMINE THE VALUE OF SKIM-MILK AND TANKAGE FOR PIGS

Three lots of pigs eight weeks of age and of the same average weight were taken for this experiment.

Lot I was fed water, grain and green feed.

Lot II was fed water, grain, green feed and tankage (tankage in self feeder).

Lot III was fed water, skim milk, grain and green feed.

All pigs were fed green feed in equal quantities. All pigs were fed the same grain ration in equal quantities. The grain ration was made up as follows:

From eight to eleven weeks of age—June 20 to July 11:—
- 1 part screenings.
- 1 part crushed oats.
- 1 part shorts.
- ½ part corn meal.
- 5 per cent oilcake.

Cost, $1.67 per cwt.

From 11 to 13 weeks of age—July 11 to July 25:—
- 1 part screenings.
- 1 part oats.
- 1 part shorts.
- 1 part corn meal.
- 5 per cent oilcake.

Cost, $1.61 per cwt.

From July 25 to November 2 (100 days):—
- 1 part screenings.
- 1 part oats.
- 1 part shorts.
- 2 parts corn meal.
- 5 per cent oilcake.

Cost, $1.54 per cwt.

Skim-milk was charged at $8 per ton.

Tankage was charged at $60 per ton.

STATEMENT OF PIG FEEDING EXPERIMENT

—	Lot I Grain and green feed	Lot II Grain, green feed and tankage in self-feeder	Lot III Grain, green feed and skim milk
Number of days in experiment	135	135	135
Number of hogs in each group	5	6	6
	lbs.	lbs.	lbs.
First weight, gross	140·0	170·0	171·0
" average	28·0	28·3	28·5
Gross weight, November 2	380·0	642·0	648·0
Average weight, November 2	76·0	107·0	108·0
Total gain for group	240·0	472·0	477·0
Average gain for animal	58·0	78·6	79·5
Average daily gain for group	1·77	3·49	3·53
" " animal	0·354	0·582	0·588
Meal eaten by group, 1st period	47·05	56·47	56·47
" " 2nd period	38·24	45·88	45·88
" " 3rd period	417·6	501·2	501·2
" " in 3 periods	503·0	603·5	603·5
Skim milk fed group for period	.....	.....	3,339·0
Tankage fed group for period	.....	200·0	.....
Meal fed per pound gain	2·09	1·27	1·26
Skim milk fed per pound gain	.....	.....	7·0
Tankage fed per pound gain	.....	0·42	.....
Cost of feed for group, green feed neglected	$7.86	$15.43	$22.78
Cost of feed per head, green feed neglected	$1·572	$2·57	$3.796
Cost of feed per head per day, green feed neglected	$0·0116	$0·0190	$0·0281
Cost of feed to produce 1 lb. gain, green feed neglected	$0·0327	$0·0327	$0·0477

This project shows almost equal gains for the tankage- and skim-milk-fed pigs, but the cost per pound gain for tankage-fed pigs is much lower. The grain-fed pigs made slower gains, but they made those gains as cheaply as the tankage-fed pigs. At the end of the feeding experiment the pigs in lot I were not as thrifty in appearance as in lot II and III. One pig in lot III went lame. The balance were in fair condition.

COST OF FATTENING PIGS

On November 1 seventeen of the spring pigs used in project 30 feeding experiment, were placed on a fattening ration composed of boiled potatoes, cornmeal, middlings, screenings, bran and skim-milk.

The results of this experiment are as follows:—

	Amount	Value per 100 lbs.	Total Cost
Number of pigs	17		
	lbs.		
First weight, gross	1,665·0		
" " average	98·0		
Finished weight, gross	2,245·0		
" " average	132·0		
Number of days in experiment	51		
Total gain for period	580·0		
Average gain per animal	34·0		
Average daily gain for group	11·3		
Average daily gain for ar imal	0·66		
Amount of corn meal eaten	512·0	$1·15	$5·88
" middlings	476·0	2·00	9·52
" screenings	676·0	1·15	7·77
" bran	296·0	1·85	5·47
" potatoes	4,360·0	0·40*	10·57
" skim-milk	629·0	0·40	2·51
Total cost of feed	.....	.....	41·72
Cost of feed per head per day	.....	.....	0·048
Cost of feed to produce 1 lb. gain	.....	.....	0·072

* Per barrel of 165 lbs.

FIELD HUSBANDRY

HAY

Sixty-six and three-quarter acres of hay land produced 112 tons. Thirty-five and one-half acres which were newly seeded timothy and clover yielded at the rate of 1 ton 1,199 pounds per acre. This low yield was due to the failure of the clover to develop a strong growth except on limed plots, and the lack of rainfall. Thirty-one and one-quarter acres of old sod, part of which had been top-dressed with manure the previous season, yielded at the rate of 1 ton 1,569 pounds per acre of mixed hay.

The cost of making and storing this crop was $4.76 per ton. Included in this cost is a charge of 85 cents per ton for hand mowing which had to be done in the orchard, arboretum and on intervales.

OATS

Twenty-nine and three-quarter acres were sown with Banner oats on land which the previous year was in hoed crops. Seeding was done from the 10th to the 21st of May and the crop harvested from the 5th to the 23rd of August. The total yield was 1,056 bushels of grain and 18 tons 1,022 pounds of straw.

The cost per acre of producing this crop was as follows:—

Rent of land at $3 per acre	$ 3 00
Manure, ½ of 15 tons at $1 per ton	5 00
Use of machinery at 60c. per acre	60
Ploughing, 7.05 hours at 51c	3 60
Harrowing, 2.31 hours at 51c	1 18
Harrowing, 1.24 hours at $1	1 24
Seeding, 1.18 hours at 51c	60
Planking, .26 hours at 51c	13
3.75 bushels oats for seed at $1	3 75
Binding, 1.34 hours at 51c	68
Stooking, 1.34 hours at 35c	47
Twine, 2½ pounds at 20c	50
Hauling in, 1.14 hours at 51c	58
Threshing, 35.5 bushels at 7c	2 48
Total cost per acre	$23 81
Yield per acre, 35.5 bushels grain.	
Yield per acre, 1,244 pounds straw.	
Credit straw, 1,244 pounds at $10 per ton	$ 6 22
Cost of grain per acre	17 59
Cost of grain per bushel, 49.5 cents.	

One acre was sown on May 21 with Liberty oats which are a hulless variety. Harvesting was done on August 5. The yield was 19 bushels and 14 pounds of grain and 1,070 pounds of straw.

SPRING WHEAT

Three and seven-tenths acres were sown on April 30 with Huron wheat, the land having been in corn the previous year. Harvesting was done on August 5. The yield was 53 bushels of grain and 4,180 pounds of straw.

The cost per acre of producing this crop was as follows:—

Rent of land at $3 per acre	$ 3 00
Manure, ½ of 15 tons at $1 per ton	5 00
Use of machinery at 60c. per acre	60
Ploughing, 8.1 hours at 51c	4 13
Harrowing, 5.4 hours at 51c	2 75
Seeding, 1.08 hours at 51c	55
Two bushels of wheat for seed at $2.25	4 50
Cutting, 1.08 hours at 51c	55
Twine, 2½ pounds at 20c	50
Stooking, 1.35 hours at 35c	47
Hauling in, .81 hours at 51c	41
Hauling in, .81 hours at 35c	28
Threshing, 14.3 bushels at 15c	2 15
Total cost per acre	$24 89
Yield per acre, 14.3 bushels grain.	
Yield per acre, 1,130 pounds straw.	
Credit straw, 1,130 pounds at $8 per ton	$ 4 52
Cost of grain per acre	20 37
Cost of grain per bushel	1 42

SWEDE TURNIPS

Monarch swedes were grown on eight acres of land which the previous year were in clover. The land was fall-ploughed, and cross ploughed in the spring. Previous to the spring ploughing barnyard manure at the rate of 15 tons per acre was applied.

Four acres of the above area received fertilizer. Two acres received 3-8-4, and two acres 3-10 fertilizer at the rate of 700 pounds per acre.

The land was seeded on the 10th and 11th of June, but on account of the dry condition of the soil due to lack of rainfall, germination was very slow. Harvesting was begun the latter part of October. The total yield was 6,069.3 bushels.

The cost per acre of producing this crop was as follows:—

Rent of land at $3 per acre	$ 3 00
Manure, ½ of 15 tons at $1 per acre	7 50
Fertilizer, 175 pounds (average) 3-8-4 at $44.84 per ton	3 92
Fertilizer, 175 pounds (average) 3-10 at $40.52 per ton	3 54
Hauling manure, 7½ hours at 51c	3 82
Hauling manure, 7½ hours at 35c	2 62
Ploughing, 15 hours at 51c	7 65
Harrowing, 5 hours at 51c	2 55
Planking, .62 hours at 51c	32
Drilling, 2½ hours at 51c	1 27
Seed, 1¼ pounds at 50c	62
Seeding, 1 hour at 42c	42
Cultivating (4 times), 10 hours at 42c	4 20
Hoeing, 37½ hours at 35c	13 12
Pulling, 35⅔ hours at 35c	12 51
Hauling in, 18.37 hours at 51c	9 37
Use of machinery at 60c. per acre	60
Cost of Swede turnips per acre	$77 03

Yield per acre, 18 tons 1,933 pounds.
Cost per ton, $4.06.
Cost per bushel, 10.1 cents.

ABERDEEN TURNIPS

In order to compare Aberden turnips with swedes 0.85 of an acre of these was sown on June 11. The yield was 901.1 bushels or at the rate of 1,060 bushels per acre (26½ tons).

WHITE TURNIPS

One-third of an acre of white turnips was sown on June 17. The yield was 401.9 bushels, or at the rate of 1,205.7 bushels (30 tons 285 pounds) per acre.

MANGELS

On May 12 one acre was sown with Yellow Intermediate mangels. Only a poor stand was obtained. Part of the piece was ploughed up and seeded to turnips at a later date. The balance, a little more than one-fifth of an acre (0.217 of an acre) was cultivated throughout the season and yielded 100.5 bushels, or at the rate of 463 bushels per acre.

SILAGE CORN

The area included in this crop was ten acres. The main crop was White Cap Yellow Dent. The balance included an acre of Sweepstake and one-half acre of Northwestern Dent. The crop was grown on fall-ploughed clover sod. Barnyard manure

at the rate of 15 tons per acre was applied in the spring and ploughed under. On part of the ground 3-10 and 3-8-4 fertilizer at the rate of 625 pounds per acre, was used for experimental purposes. Seeding was done in rows 3½ feet apart on June 7.

White Cap Yellow Dent Corn for ensilage.

Growth in the early season was very slow, but by frequent cultivation sufficient moisture was retained to promote the growth of a very good crop. Harvesting was done from 27th to the 30th of September. The total yield was 130 tons.

The cost per acre of producing this crop was as follows:—

Rent of land at $3 per acre	$ 3 00
Manure, ½ of 15 tons at $1 per ton	7 50
Fertilizer, 60 pounds (average)	1 30
Ploughing, 15 hours at 51c	7 65
Hauling manure, 7.5 hours at 51c	3 82
Hauling manure, 5 hours at 35c	1 75
Hauling manure, 2.5 hours at 20c	50
Harrowing, 5 hours at 51c	2 55
Rolling, ½ hour at 51c	25
Seeding, 1 hour at 51c	51
Seed, 25 pounds	1 47
Cultivating, 8 hours at 51c	4 08
Cutting, 3 hours at 51c	1 53
Twine, 2.5 pounds at 20c	50
Hauling in, 6 hours at 51c	3 06
Loading, unloading and putting in the silo, 20.4 hours at 35c	7 14
Gasoline for tractor, 4.2 gal. at 39c	1 63
Oil for tractor	21
Use of machinery at $1 per acre	1 00
Cost of silage corn per acre	$49 45

Yield per acre, 13 tons.
Cost per ton, $3.80.

A comparison on part of the field, of the relative yielding power of the varieties grown gave the following results:—

Sweepstake	12	tons	1,500	pounds	per acre
White Cap Yellow Dent	11	"	1,580	"	"
North Western Dent	7	"	791	"	"

The North Western Dent was grown from seed developed at this Station in 1920. On account of its immaturity it gave less than a sixty per cent stand.

SUNFLOWERS FOR ENSILAGE

Two acres were sown with Giant Russian sunflowers in rows 3½ feet apart on June 7. The soil was prepared in the same manner as for the corn, and received 15 tons of barnyard manure per acre as fertilizer. Seed was sown at the rate of 12 pounds per acre. The sunflowers were harvested on September 13, and the yield was 24 tons 1,510 pounds.

The cost of production per acre was as follows:—

Rent of land at $3 per acre	$ 3 00
Manure, ⅓ of 15 tons at $1 per ton	7 50
Ploughing, 15 hours at 51c	7 65
Hauling manure, 7½ hours at 51c	3 82
Hauling manure, 7½ hours at 35c	2 62
Harrowing and rolling, 5 hours at 51c	2 55
Seeding, 2½ hours at 51c	1 27
Seed, 12 pounds at 9c	1 08
Cultivating, 5 hours at 51c	2 55
Cutting, 2½ hours at 51c	1 27
Twine, 2½ pounds at 20c	50
Hauling, 10½ hours at 51c	5 35
Loading, 10½ hours at 35c	3 67
Unloading and putting in silo, 34 hours at 35c	11 90
Gasoline and oil used in tractor while filling silo	2 17
Use of machinery at $1 per acre	1 00
Cost of sunflowers per acre	$57 90

Yield per acre, 12 tons, 755 pounds.
Cost per ton, $4.68.

OATS, PEAS AND VETCHES FOR ENSILAGE

Ten and one-half acres were sown with this crop. The land was in the same crop the previous year and was manured and spring ploughed at that time, a heavy sod being turned under. No manure was applied this season. Seeding was done on June 6 and the mixture consisted of 2½ bushels of oats, 1 bushel of peas and half a bushel of vetches sown at the rate of 4 bushels per acre. Harvesting was done from the 18th to the 20th of August at which time the grain was in the milk stage. The total yield was 33 tons 440 pounds.

The cost of production per acre was as follows:—

Rent of land at $3 per acre	$ 3 00
Manure, ⅓ of 15 tons at $1 per ton	5 00
Ploughing, 5.7 hours at 51c	2 90
Harrowing, 2.85 hours at 51c	1 45
Seeding, .76 hours at 51c	38
Seed, 4 bushels at $1.67½	6 70
Cutting, 1.23 hours at 51c	62
Twine, 1.5 pounds at 20c	30
Hauling in, 2.47 hours at 51c	1 26
Loading, unloading and putting in silo, 7.9 hours at 35c	2 76
Gasoline and oil used in tractor when filling silo	79
Cost of O.P.V. per acre for ensilage	$25 16

Yield per acre, 3 tons, 327 pounds.
Cost per ton, $7.95.

HORTICULTURE

The orchard came through the winter in good condition in 1921. In March an application of barnyard manure was placed around each tree to hold the frost and retard the bloom. In April the orchard was lightly pruned. On account of the earliness of the season the bloom appeared about ten days earlier than usual. Three sprays were applied during the season.

Poisoned Bordeaux mixture was applied on the 13th and 14th of May. The formula used was 3 pounds of copper sulphate, 10 pounds of hydrated lime, one and one-half pounds of arsenate of lime and 40 gallons of water.

The second spray was applied on the 2nd and 3rd of June and was made up of 1 pound of soluble sulphur, half a pound of arsenate of lime, 5 pounds of hydrated lime, and three-tenths of a pint of black leaf 40, in 40 gallons of water.

Poisoned Bordeaux mixture was applied on the 13th and 14th of May. The formula used was 3 pounds of copper sulphate, 10 pounds of hydrated lime, one and one-half pounds arsenate of lime, three-tenths of a pint of black leaf 40, and 40 gallons of water.

As a result of this treatment a healthy crop was produced and insect injury prevented.

Project 47.—Cultural Experiment in Apple Orchard

The cultural orchard remained in sod during the year. One-half of this orchard is in a three-year rotation and manure is applied for the hoed crop at the rate of 20 tons per acre. The balance is in permanent sod and is not manured. The soil in the orchard, however, is very productive. On one-half of the sod section, the grass is cut and allowed to remain on the ground as a mulch. On the other half the crop is made into hay and removed. A difference in the yields on these areas was recorded as shown in the following table:—

Orchard Cultural Experiment

Cultural treatment	Average per cent bloom for trees which bloomed		Average yield in pecks for bearing trees	
	McIntosh	Fameuse	McIntosh	Fameuse
Three-year rotation	.....	.....	0·63	
Permanent sod—Grass cut and left as mulch	37·4	37·1	1·27	2·39
Permanent sod—Grass cut and removed	14·4	21·4	0·4	1·92

Project 46.—The Growing of a Commercial Orchard

The commercial orchard remained in sod and a crop of hay was harvested from it. An application of barnyard manure at the rate of 15 tons per acre was made in September. The varieties grown and yields recorded were as follows:—

Commercial Orchard—Varieties and Yields

Variety	Number of trees	Number of trees bore fruit	Amount of fruit produced	Average yield per bearing tree
New Brunswick	12	11	22 pecks	2·0 pecks
Duchess	27	20	26 "	1·3 "
Wealthy	25	19	30¾ "	1·61 "
Milwaukee	31	22	36¼ "	1·64 "
Crimson Beauty	30	28	35 "	1·25 "
Fameuse	26	22	32 "	1·45 "
Dudley	23	19	16¾ "	0·88 "
McIntosh	12	6	4½ "	0·75 "
Alexander	22	4	2½ "	0·62 "
Baldwin	4	4	1 "	0·25 "
Bethel	15	3	15 apples	5·0 apples
American Golden Russet	15	4	34 "	8·0 "
Wolf River	14	4	9 "	2·2 "
N. W. Greening	5	0	0	
Yellow Bellflower	7	1	6 "	6·0 "
Salome	5	2	4 "	2·0 "

Project 45.—Testing Standard Varieties of Pears, Plums and Cherries, and New Varieties of Apples

The variety orchard remained in sod during the season, and received as fertilizer 15 tons barnyard manure to the acre. The trees came through the winter in good condition. A number of new varieties produced fruit, and from the results of three years' fruition, several varieties can be considered of promising value for this province. Among these are Melba, Walden, Niobe, Northern Spy Seedling and Medford.

PEAR, PLUM AND CHERRY ORCHARD

The space between the trees in this orchard was this year in a grain crop.

Pears.—The Lawrence, Bartlett and Anjou varieties are in very poor condition. Flemish Beauty trees are somewhat better than the above, but are in only poor condition. Clapps Favourite trees, which were in good condition a year ago, have rather deteriorated.

Plums.—The varieties planted in this orchard, and the yields recorded for the season were as follows:—

PLUMS

Variety	Number of trees	Number of trees bore fruit	Amount of fruit
Gueii	5	5	83 quarts
Imperial Gage	20	12	164 "
Moore Arctic	17	13	94½ "
Lombard	5	5	34½ "
Latchford	2	2	12½ "
Washington	5	2	8 "
Burbank	3	3	8 "
Red June	5	5	11½ "
Shippers Pride	5	3	7 "
John A	2	1	1½ "
Shropshire Damson	5	3	3½ "
Stanton	1	1	1 "
Bradshaw	4	0	
Climax	1	0	
Glass Seedling	2	0	
Shiro	2	0	
Windsor	1	0	

Variety Test of Cherries

The varieties planted in this orchard and the yields recorded for the season are as follows:—

Variety	Number of Trees	Number of trees bore fruit	Yield, in boxes. (1 box = ½ quart)
English Morello	5	5	100 boxes
Wragg	3	2	12½ "
Orel	2	1	3 "
Early Richmond	10	2	2½ "
Empress Eugenie	4	3	3½ "
Hertz Formige	2	1	1½ "
French Morello	1	1	1 "
Montmorency	10	4	3½ "
Vladimir	5	2	1½
Dyehouse	5	0	
Griotte d'Ostheim	1	0	
Minnesota d'Ostheim	1	0	
Orel 25	9	0	
Orel 24	6	0	
Susse Fruhe Weichsel	2	0	

These came through the winter in good condition but, on account of the dry weather in the spring and summer, the amount of fruit produced was small. Barnyard manure was applied to the plantation in March and incorporated into the soil by spring cultivation. The following yields are based on the crop from six bushes in most cases.

Project 51.—VARIETY TEST OF BLACK CURRANTS

Variety	Yield per acre Quarts	Variety	Yield per acre Quarts
Lee Prolific	4408.0	Magnus	1936.0
Saunders	3872.0	Collins Prolific	1839.2
Topsy	3097.6	Eclipse	1742.4
Eagle	2952.4	Clipper	1548.8
Victoria	2565.2	Kerry	1500.4
Buddenborg	2371.6	Boskoop Giant	774.4
Climax	1984.4		

Project 50.—VARIETY TEST OF RED CURRANTS

The yields for the season were very small and on account of the prevalent hot dry weather the fruit was small. The yields are based on the crop from six bushes in most cases.

Variety	Yield per acre Quarts	Variety	Yield per acre Quarts
Red Dutch	3146.0	Perfection	387.2
Red Cross	1016.4	Fay Prolific	338.8
Wilder	754.0	Cumberland	96.8
Victoria Red	484.0	Greenfield	96.8
Rankin Red	387.2		

Project 76.—VARIETY TEST OF WHITE CURRANTS

Variety	Yield per acre Quarts	Variety	Yield per acre Quarts
White Grape	580.8	White Cherry	232.0
Large White	435.6		

Project 58.—VARIETY TEST OF GOOSEBERRIES

The gooseberry bushes have not made satisfactory growth, and the yields for the season were smaller than those of 1920.

Variety	Yield per acre Quarts	Variety	Yield per acre Quarts
Oregon Everbearing	3752.8	Industry	96.8
Pearl	919.6	Whitesmith	41.4
Surprise	352.0	Keepsake	41.4
Downing	338.8	Ocean	41.4
Careless	290.4	Lancashire Lad	20.6
Crown Bob	290.0	Industry	12.0
May Duke	248.8	Victoria	10.3
Lancer	232.3	Glenton Green	9.0

Project 49.—VARIETY TEST OF RASPBERRIES

The varieties grown and the results were as follows:—

Variety	Yield per acre Quarts	Variety	Yield per acre Quarts
Herbert	2948.0	Shaffer	792.0
Marlboro	2574.0	Newman Seedling 6	774.4
Brighton	1716.0	Ruby	506.0
Count	1672.0	Newman Seedling 20	484.0
Newman Seedling 24	1548.8	Older	440.0
Newman Seedling 1	1210.0	Columbian	308.0
Newman Seedling 23	1064.8	Snyder	81.0
Sarah	1056.0	Golden Queen	44.0
King	968.0		

Project 48.—VARIETY TEST OF STRAWBERRIES

The varieties listed below were planted in 1920. These were mulched in December of that year with straw, and came through the winter in good condition. The varieties grown and the yields obtained were as follows:—

Variety	Yield per acre Quarts	Variety	Yield per acre Quarts
K Premier	7062.0	Ophelia	3704.8
Viola	7040.0	Charles I	3520.0
Senator Dunlap	6952.0	Dr. Burrill	3454.0
Warfield	5830.0	Mariana	3300.0
K Prize	5338.8	Brandywine	3006.8
Cassandra	5148.0	Billy Sunday	2926.0
Glen Mary	4796.0	Jersey Giant	2662.0
Lavinia	4774.0	Premier	2618.0
Ozark	4598.5	President	2552.0
Bianca	4422.0	Julia	2464.0
Sample	4400.0	Black Beauty	2332.0
Beder Wood	4290.0	Grand Prize	2288.0
Williams Improved	4257.0	Splendid	2068.0
Portia	4246.0	Cordelia	1936.0
Bubach	4202.0	New York	1877.2
Parsons Beauty	4158.0	Commonwealth	1661.0
Rewastico	3820.0		

Project 45.—VARIETY TEST OF GRAPES

The grape vines were laid down in December of the previous year and mulched with strawy manure. They came through the winter in good condition, and a fair amount of fruit was set. Considerable damage was done to the crop in September by birds. The yields recorded were as follows:—

VARIETY TEST OF GRAPES

Variety	Number of vines	Average yield per bearing vine
		pounds
Lindley	2	13·5
Hartford	2	11·5
Beta	3	8·3
Early Daisy	3	7·0
Rogers No. 17	4	6·25
Mary	2	6·0
Delaware	2	4·75
Peabody	5	4·6
Brighton	2	4·0
Brant	2	3·75
Moore Diamond	2	3·75
Florence X Potter	2	3·62
Wilkins	2	2·75
Moore Early	2	2·5
Merrimac	2	1·75
Canada	2	1·5

VEGETABLES

The experimental work with vegetables for the season included variety tests of the various vegetables, a study of the best method of growing tomatoes, and an experiment on the control of root maggots. Barnyard manure at the rate of 25 tons per acre was applied to the garden in the spring and ploughed under.

Project 55.—VARIETY TEST OF VEGETABLES

BEANS

All varieties were sown in rows two and one-half feet apart and sixty-six feet long, on May 25. The yields recorded were as follows:—

Variety	Source	Yield per 66-ft. row	
		Green beans	Ripe beans
		pecks	pounds
Wardwell Kidney Wax	McDonald	2	10
Extra Early Valentine	Rennie	¼	9½
Masterpiece	O-589	5	9
Refugee	Bruce	.....	9
Pencil Pod Black Wax	McDonald	3	8⅝
Stringless Green Pod	Rennie	2	8
" "	Burpee	1½	8
Plentiful French	O-591	5¼	8
Hodson Wax	Harris	3	8
Bountiful Bush	Gregory	4¼	7
Probably White Marrowfat	O-8973	.....	7
Davis White Wax	McDonald	4½	5
Round Pod Kidney Wax	McDonald	2½	5
White Marrowfat	O-576	.....	4½
Hodson Long Pod	Rennie	.....	4

BEETS

The varieties listed were sown on May 13. The yields were as follows:—

Variety	Source	Yield per 66-ft. row
		pounds
Early Wonder	McDonald	242½
Detroit Dark Red	McDonald	216½
Eclipse	McDonald	181
Early Model	Dupuy & Ferguson	166
Detroit Dark Red	O-200	163
New Dandy	Steele-Briggs	162½
Half-Long Blood	Ferry	156
Crimson Globe	McDonald	154½
Crosby Egyptian	Harris	152
Black Red Ball	O-245	149½
Black Red Ball	Burpee	140

BRUSSELS SPROUTS

Seed was sown in flats on April 14. Transplanting was done on June 4. The varieties grown and yields were as follows:—

Variety	Source	Yield per 66-ft. row
		pounds
Amager Market	Ewing	28
Sutton Dwarf Gem	Sutton	25
Paris Market	Ewing	16

Carrots

The following varieties were sown on May 13, in rows 66 feet long. The yields were as follows:—

Variety	Source	Yield per 66-ft. row
		pounds
Early Scarlet Horn	Dupuy & Ferguson	145
Ox-heart	Steele-Briggs	129
Select Chantenay	McDonald	127
Nantes Half Long	Dupuy & Ferguson	115
Chantenay	O-246	105
Improved Danvers	Dupuy & Ferguson	93
Chantenay	O-246	84

Cabbage

The plants were grown from seed planted in the hot bed on April 14. They were transplanted in the open on June 7 and 8. The varieties grown and the results were as follows:—

Variety	Source	Number of Heads	Weight	Average weight per head
Copenhagen Market	McDonald	12	100	8·33
Amager Round Head	Graham	12	94	7·83
Flat Swedish	Lennoxville	12	87	7·25
Marblehead Mammoth	Ewing	12	80	6·66
New Danish Delicatesse	Dupuy & Ferguson	12	78	6·5
Delicatesse Red	O-842	12	76	6·33
Winnigstadt	Graham	12	75	6·2
Fottlers Improved Brunswick	Ewing	12	63	5·25
Perfection Drumhead Savoy	Ewing	12	63	5·2
Danish Red Stonehead	Ewing	12	60	5·0
Kildonan	Steele-Briggs	12	54	4·5
Early Amager Danish Ballhead	O-105-115	12	53	4·4
Succession	Ewing	12	45	3·7
Early Jerscy Wakefield	McDonald	12	42	3·5

Celery

Seed was sown in the hot-bed on April 14. Pricking out was done on June 2, and the plants were transplanted in the open on July 7 and 8. Applications of Bordeaux for the prevention of fungous diseases were made on the following dates: June 16, June 25, July 2, July 20, August 8 and August 27. As a result of this treatment a clean crop was produced. The varieties grown and the results were as follows:—

Variety	Source	Weight of 25 heads
		pounds
Giant Pascal	Graham	66½
Sanford Superb	Graham	63
Evans Triumph	McDonald	53½
Golden Yellow	Graham	53
French Success	Harris	49½
White Plume	Graham	44½
Golden Self-blanching	O-229-30	40

Cauliflowers

Seed was planted in the hot-bed on April 14. Transplanting was done on June 7. Considerable club root appeared in this crop and only one of the two varieties sown developed any heads. Twelve heads of the Early Snowball variety weighed 26½ pounds.

Garden Corn

Seed was first sown on May 28. On account of the extremely dry condition of the soil, a very poor stand was obtained. On June 14, a second seeding was made to fill the missing hills and to reinforce the weak ones. This resulted in a crop of uneven maturity, thus diminishing the value of experiment. The results recorded were as follows:—

GARDEN CORN—TEST OF VARIETIES

Variety	Source	First ready for use	Yield per 66-ft. row
			ears
Early Malcolm	O-846-58	Sept. 9	132
Extra Early Adams	Ferry	" 12	96
Whipple Early	Harris	" 12	150
Early Fordhook	Burpee	" 12	147
Pickaninny	O-871-76	" 17	173
Early Mayflower	McDonald	" 23	131
Bantam Evergreen	McDonald	" 28	149
Stowell Evergreen	Graham	" 29	82
Extra Early Cory	McDonald	Oct. 1	153
Golden Giant	Burpee	" 1	57
Pocahontas	McDonald	" 8	129
Sweet Kloochman	O-896	" 15	120
Sweet Squaw	O-622-26	" 15	125
Sweet Otta	O-888-9	" 15	127
Country Gentleman	Graham	" 15	93
Tom Thumb (pop corn)	Willis	ripe Oct. 15	451

Egg Plants

Seed was sown in the hot-bed on April 14. They were pricked out on May 13 and transplanted in the open on June 13. The yields as noted below were very small:—

Variety	Source	Date harvested	Yield per 33-ft. row
			pounds
New York Purple	McDonald	Oct. 10	2¼
Black Beauty	McDonald	" 10	1½

Onions

The varieties listed below were sown in rows 66 feet long and one foot wide. Seed was sown in the open on April 28. In order to stimulate the growth of the young plants an application of nitrate of soda was made early in the season. The yields recorded were as follows:—

ONIONS—TEST OF VARIETIES

Variety	Source	Yield per 66-ft. row
		pounds
Southport Red Globe	Graham	77
Prize Taker	"	76
Southport White Globe	"	75
Yellow Globe Danvers	"	72
Large Red Wethersfield	O-1-4	70
Southport Yellow Globe	Ewing	61
Extra Early Flat Red	McDonald	58
Australian Brown	"	57
Extra Select Large Red Weathersfield	"	52½
Ailsa Craig	Graham	48
Yellow Globe Danvers	O-49-54	40
White Barletta	McDonald	12

PEPPERS

Seed was sown in the hot-bed on April 14. Pricking out was done on May 13. The plants were transplanted in the open on June 13. The varieties grown and yields were as follows:—

Variety	Source	Yield per 66-ft. row	
		lbs.	oz.
Harris Earliest	O-878	33	10
Long Cayenne		22	12
Chili	McDonald	6	

PARSNIPS

Only one variety, viz., Hollow Crown 0-104-5, was grown. The seed was sown on May 13. The yield was 97 pounds from a 66-foot row.

PUMPKINS

Five varieties were planted in rows 66 feet long and 10 feet wide. Twelve hills were planted in a row with five seeds to each hill. Poisoned Bordeaux was applied at frequent intervals to control the ravages of the flea and cucumber beetles. The varieties grown and the yields were as follows:—

Variety	Source	Yield of 12 hills
		pounds
Connecticut Field	McDonald	848
King of Mammoth	"	738
Small Sugar	"	535
Winter Luxury	"	496
Large Cheese	"	287½

PEAS

The varieties listed below were sown on May 11. Seed was sown in rows 3 feet apart and the vines were not staked but laid in one direction in the rows.

The varieties grown and the results in the order of maturity were as follows:—

GARDEN PEAS—TEST OF VARIETIES

Variety	Source	Date first picked	Yield per 66-ft. row
			pecks
Eight Weeks	Carters	July 9	4½
Alaska	Bruce	" 9	4¼
Early Morn	McDonald	" 9	4
Thos. Laxton	"	" 12	3¾
Extra Early Blue Bantam	"	" 12	3½
Little Marvel	Graham	" 12	3¼
Gregory Surprise	Gregory	" 12	3
American Wonder	Carter	" 14	3¼
V. I. T. 2360	Sydney	" 14	3
Laxtonian	Graham	" 15	4
Sutton Excelsior	Harris	" 15	3½
Pioneer	Gregory	" 15	3⅜
English Wonder	O–8929	" 15	2¾
McLean Advancer	O–167–8	" 19	2¼
Reliance	Steele-Briggs	" 20	3¼
Gradus	Carter	" 20	3⅛
Danby Stratagem	Carter	" 20	2¾

SQUASH

The varieties listed were sown in rows 66 feet long and 10 feet wide. Ten hills were planted in a row with 5 seeds in each hill. Applications of poisoned Bordeaux were made as necessary, for the control of insects. The yields were as follows:—

Variety	Source	Yield from 10 hills
		pounds
English Vegetable Marrow	McDonald	989
Long White Bush Marrow	"	613
Golden Hubbard	"	469
Delicious	"	440
Hubbard	"	416
Giant Summer Crookneck	Graham	332

TOMATOES

Sixteen varieties of these were grown. The young plants were grown in the hot beds and transplanted on June 9, 10 and 11. The results of this experiment are shown under project No. 56, which is a study of the best method of producing ripe tomatoes in this district.

Project 56.—A study of the methods of growing tomatoes

The experiment on pruning and staking tomatoes which has been carried on for two years was continued again this season in conjunction with the variety test. Three rows of each variety were planted. Each row was 33 feet long. The first row was pruned to one stem and staked, the second pruned to two stems and staked and the third row was left unpruned and unstaked. The rows were 3 feet wide and where pruned and staked the plants were set 2 feet apart in the row. In the unpruned rows the plants were placed 4 feet apart.

The results are shown in the following table:—

TOMATOES—CULTURAL AND VARIETY TESTS

Variety	Source	Treatment	First Ripe	Total Ripe	Total Green	Total Crop
				lb. oz.	lb. oz.	lb. oz.
Burbank Early	O-732	Pruned to 1 stem	Aug. 10	117 3	16 0	133 3
		" 2 stems	" 20	118 14	28 0	146 14
		Unpruned	" 29	68 15	177 0	245 15
Earlibell	O-734	Pruned to 1 stem	Aug. 24	91 1	30 0	121 1
		" 2 stems	" 22	116 11	16 0	132 11
		Unpruned	" 19	77 13	90 0	167 13
Alacrity Earlibell	O-711	Pruned to 1 stem	Aug. 16	79 14	10 0	89 14
		" 2 stems	" 16	89 7	16 0	105 7
		Unpruned	" 29	94 15	57 0	151 15
Chalk's Jewel	O-710	Pruned to 1 stem	Aug. 10	96 11	18 0	114 11
		" 2 stems	" 10	109 12	32 0	141 12
		Unpruned	" 19	47 12	156 0	203 12
Alacrity X Hipper	O-709	Pruned to 1 stem	Aug. 22	85 15	15 0	100 15
		" 2 stems	" 22	108 5	14 0	122 5
		Unpruned	" 29	55 14	115 0	170 14
Alacrity	O-704	Pruned to 1 stem	Aug. 10	108 2	15 0	123 2
		" 2 stems	" 12	114 6	16 0	130 6
		Unpruned	" 24	22 14	126 0	148 14
Bonny Best A	O-719	Pruned to 1 stem	Aug. 10	110 1	30 0	140 1
		" 2 stems	" 10	122 14	29 0	151 14
		Unpruned	" 12	11 5	160 0	171 5
Red Head	Langdon	Pruned to 1 stem	Aug. 10	84 10	20 0	104 10
		" 2 stems	" 10	101 15	36 0	137 15
		Unpruned	" 29	49 7	165 0	214 7
John Baer	Carter	Pruned to 1 stem	Aug. 16	97 10	34 0	131 10
		" 2 stems	" 10	118 2	31 0	149 2
		Unpruned	Sept. 8	1 0	172½	173 8
Wiboltt Danish Export	Wiboltt	Pruned to 1 stem	Aug. 12	57 8	31 0	88 8
	"	" 2 stems	" 16	90 6	33 0	123 6
		Unpruned	" 19	68 2	135 0	203 2
Chalk Early Jewel	Carters	Pruned to 1 stem	Aug. 10	88 5	.....	88 5
		" 1 stems	" 16	100 2	30 0	130 2
		Unpruned	" 31	8 8	156 0	164 8
Crimson Canner	O-707	Pruned to 1 stem	Aug. 12	67 15	34 0	101 15
		" 2 stems	" 19	94 8	50 0	144 8
		Unpruned	" 29	27 8	120 0	147 8
Victoria Whole Salad	Burpee	Pruned to 1 stem	Aug. 20	81 2	45 0	126 2
		" 2 stems	" 24	85 4	68 0	153 4
		Unpruned	" 19	22 3	210 0	232 3
John Baer	O-708	Pruned to 1 stem	Aug. 24	75 14	20 0	95 14
		Pruned to 2 stems	" 29	88 15	45 0	133 15
		Unpruned	" 31	19 15	171 0	190 15
Danish Export	O-722	Pruned to 1 stem	Aug. 12	74 8	32 0	106 8
		" 2 stems	" 10	98 7	36 0	134 7
		Unpruned	" 19	6 0	205½	211 8
Acme	Ferry	Pruned to 1 stem	Aug. 24	67 5	34 0	101 5
		" 2 stems	" 22	86 6	36 0	122 6
		Unpruned	.....	.....	144 0	144 0

Project 77.—EXPERIMENTS ON THE CONTROL OF ROOT MAGGOTS IN CABBAGE

In order to determine the value of different materials recommended for the control of root maggots, five plots were planted with cabbage and treated according to the recommended directions, with the materials stated below. One plot was kept as a check. Transplanting was done on June 14, and 120 plants were set out in each plot. The carco and corrosive sublimate were applied in liquid form. The larvæcide and mag-o-tite were applied in dry form. Only one application of larvæcide was made. The supply then became exhausted and a mixture of one part of arsenate of lime and nine parts of hydrated lime was used in its place. The plants were harvested intact and the weights recorded represent those of the entire plants.

The results were as follows:—

EXPERIMENTS ON CONTROL OF ROOT MAGGOTS IN CABBAGE

Plot treatment	Dates of application	Number of plants which developed	Number of plants which developed merchantable heads	Number of plants which did not produce merchantable heads	Total weight entire plants
					pounds
Check		114	38	76	620
Corrosive sublimate	June 20, July 4–15–29, Aug. 8.	97	56	41	695
Larvæcide and arsenate of lime plus hydrated lime	June 14	95	54	41	700
Mag-o-tite	June 14–20, July 4–15–29, Aug. 8.	94	44	50	720
Carco	June 20, July 4–15–29, Aug. 8.	85	68	17	805

Project 78.—EXPERIMENT ON THE CONTROL OF ROOT MAGGOTS IN ONIONS

In order to determine the value of corrosive sublimate, larvæcide, carco and mag-o-tite for the control of root maggots in onions, the experiment outlined below was carried out. Seeding was done in rows 1 foot wide and 66 feet long on April 28, and the variety used was Yellow Globe Danvers. The results were as follows:—

Plots	Yield per plot	Calculated yield per acre
	pounds	bushels
2 rows, check	100	660
2 rows, corrosive sublimate	127	838½
1 row, check	54	712½
2 rows, larvcide	135	891
1 row, check	56	739½
2 rows, carco	120	792
1 row, check	46	607½
2 rows, mag-o-tite	140	924
2 rows, check	166	1,095½
Average of all checks	.....	762½

The corrosive sublimate and carco were applied in liquid form.

POTATOES

The experimental work for the season included the continuation of the variety test, and the experiment begun in 1920 to compare immature with mature potatoes for seed purposes.

Project 62.—Variety Test of Potatoes

The varieties listed below were grown in one two-hundred-and-sixty-fourth acre plots. They were planted on May 31, on land which the previous year was in clover. Barnyard manure at the rate of 15 tons per acre was applied to the sod and ploughed under in the fall. In addition to this 5-8-7 fertilizer, at the rate of 800 pounds per acre, was applied in the rows at the time of planting.

The varieties grown and the yields were as follows:—

POTATOES—TEST OF VARIETIES

Variety	Source	Yield per acre, in bushels		
		Marketable	Small	Total
Rutledge Favourite	Rutledge	506·0	44·0	550·0
Green Mountain	McCain	488·4	44·0	532·4
Reeves Rose	Indian Head	479·6	22·0	501·6
Snow	Ottawa	453·2	22·0	475·2
Green Mountain	W. H. Moore	435·6	35·2	470·8
Green Mountain	Fraser	431·2	35·2	466·4
American Wonder	Ottawa	413·6	30·8	444·4
Improved Burbank	Charlottetown	396·0	30·8	426·8
Sir Walter Raleigh	Ottawa	382·8	30·8	413·6
Piermont Seedling	"	242·0	162·8	404·8
Eureka Extra Early	"	343·2	57·2	400·4
Seedling	Hoben	374·0	17·6	391·6
Langworthy	Ottawa	378·4	8·8	387·2
Money Maker	Indian Head	369·6	17·6	387·2
Green Mountain	Lowell	365·2	22·0	387·2
Dalmeny Beauty	Indian Head	352·0	35·2	387·2
Rural New Yorker	Charlottetown	356·4	26·4	382·8
Wee MacGregor	Ottawa	338·8	44·0	382·8
Bliss Triumph	Grand Falls	325·6	52·8	378·4
Carman No. 3	Ottawa	356·4	13·2	369·6
New Chieftain	"	347·6	22·0	369·6
Green Mountain	"	290·4	79·2	369·6
Gold Coin	Charlottetown	343·2	22·0	365·2
Factor	Ottawa	334·4	30·8	365·2
Early Nebraska	Ottawa	334·4	30·8	365·2
Dreers Standard	Indian Head	303·6	61·6	365·2
Delaware	W. H. Moore	325·6	35·2	360·8
Irish Cobbler	Fawcett	321·2	39·6	360·8
Carman No. 1	Indian Head	321·2	35·2	356·4
Acadia	Burbank selection	303·6	35·2	338·8
Maggie Murphy	Ottawa	294·8	22·0	316·8
Morgan Pink Seedling	Ottawa	264·0	48·4	312·4
S-5727	Washington	277·2	79·2	356·4
Burpee Extra Early	Ottawa	272·8	35·2	308·0
Black Kidney	Baribeau	264·0	35·2	299·2
Seedling	Hayward	180·4	105·6	286·0
S-13660	Washington	123·2	145·2	268·4
Whitney No. 1	St. Stephen	211·2	48·4	259·6
Morgan Seedling	Charlottetown	211·2	44·0	255·2
Early White Alpino	Ottawa	202·4	35·2	237·6
Barnhouse Beauty	O-922	198·0	22·0	220·0
Table Talk	Charlottetown	198·0	22·0	220·0
Empire State	Indian Head	145·2	52·8	198·0
Early May	Ottawa	127·6	70·4	198·0
Early Hebron	"	154·0	39·6	193·6
Markee	Fredericton	127·6	57·2	184·8
Black Kidney	Loch Lomond	145·2	30·8	176·0

Project 79.—An Experiment to determine the value of Mature versus Immature Potatoes for Seed Purposes

In 1920 thirty-nine varieties of potatoes were planted on May 31 for variety test. On June 28 a duplicate planting was made with the same varieties. The seed produced from the first planting has been designated mature seed and that from the second planting, immature seed.

On May 31, 1921, a planting of mature and immature seed of each of thirty-nine varieties was made. The soil conditions were as uniform as could be obtained and the cultural treatment was the same as outlined in project 62, on the variety experiment on potatoes.

The varieties grown and the results were as follows:—

Potatoes—Mature *vs.* Immature Seed

Variety	Yield from mature seed	Yield from immature seed	Increase from the use of immature seed	Decrease from the use of immature seed
	bush.	bush.	bush.	bush.
Acadia	338·8	457·6	118·8	
American Wonder	444·4	202·4	.....	242·0
Burpee Extra Early	308·0	202·4	.....	105·6
Black Kidney	299·2	356·4	57·2	
Bliss Triumph	378·4	277·2	.....	101·2
Carman No. 1	356·4	391·6	35·2	
Carman No. 3	369·6	338·8	.....	30·8
Dreer Standard	365·2	426·8	61·6	
Dalmeny Beauty	387·2	431·2	44·0	
Delaware	360·8	448·8	88·0	
Early Nebraska	365·2	378·4	13·2	
Early Hebron	193·6	325·6	132·0	
Early White Albino	237·6	475·2	237·6	
Empire State	198·0	255·2	57·2	
Eureka Extra Early	400·4	171·6	.....	228·8
Factor	365·2	356·4	.....	8·8
Gold Coin	365·2	396·0	30·8	
Green Mountain	369·6	378·4	8·8	
Green Mountain	470·8	453·2	.....	17·6
Green Mountain	466·4	444·4	.....	22·0
Irish Cobbler	360·8	391·6	30·8	.....
Improved Burbank	426·8	435·6	8·8	
Langworthy	387·2	470·8	83·6	
Morgan Seedling	255·2	404·8	149·6	
Morgan Pink Seedling	312·4	387·2	74·8	
Money Maker	387·2	422·4	35·2	
Maggie Murphy	316·8	365·2	48·4	
Markee	184·8	132·0	.....	52·8
New Chieftain	369·6	435·6	66·0	
Piermont Seedling	404·8	550·0	45·2	
Reeves Rose	501·6	440·0	.....	61·6
Rural New Yorker	382·8	388·4	5·6	
Snow	475·2	514·8	39·6	
Sir Walter Raleigh	413·6	387·2	.....	26·4
S-5727	356·4	338·8	.....	17·6
Table Talk	220·0	409·2	189·2	
Barnhouse Beauty	208·0	444·4	236·4	
Whitney No. 1	259·6	448·8	189·2	
Wee MacGregor	382·8	448·8	66·0	
	13,645·6	14,983·2	2,252·8	915·2

Average increase per acre from 27 varieties of immature seed	83·4	bush.
Average decrease per acre from 12 varieties of immature seed	76·2	"
Net average increase per acre from 39 varieties of immature potatoes	34·3	"

Field Lots of Potatoes

Potatoes were planted from the 13th to the 21st of June on 6.1 acres. Of this area 3.45 acres included the permanent fertilizer plots and received as fertilizer only ten tons of barnyard manure per acre. The last commercial fertilizer applied to these plots was in 1918. The average yield of sixty-nine one-twentieth acre plots was 98.54 barrels per acre, of which 90.7 barrels were of merchantable size. One half of each of these plots received in 1916 an application of waste lime at the rate of 5,000 pounds per acre. On this limed section of the plots the potatoes were very scabby. It is worthy of note that potatoes grown on these plots in 1918, after an application of commercial fertilizer, were free from scab. It would appear as if the scab organism had been introduced into the soil by the barnyard manure and that, in the presence of some alkaline material, it had found conditions favourable for development.

The balance of the crop was grown on clover sod. Fifteen tons of barnyard manure per acre were applied on the sod and ploughed under the previous fall. In addition to this 4-7-6¼ fertilizer at the rate of 700 pounds per acre was applied in the row at the time of planting. Five applications of poisoned Bordeaux were made during the season, and the crop was free from blight and rot.

The average yield of the varieties grown was as follows:—

Potatoes in Field Lots—Yield per Acre in Barrels

Variety	Total	Marketable Size	Small	Remarks on Treatment
	bush.	bush.	bush.	
Unnamed	131·1	120·7	10·4	Manure and fertilizer.
Acadia	125·9	.....	.....	" "
Dreer Standard	122·4	.....	.....	" "
Irish Cobbler	106·5	95·6	10·9	" "
Wee MacGregor	103·8	.....	.....	" "
Fredericton Green Mountain	102·0	96·0	6·0	" "
Empire State	97·0	88·4	8·6	" "
Fraser Green Mountain	95·77	92·37	3·4	10 tons manure only.
Eureka Extra Early	93·3	82·2	11·1	Manure and fertilizer.
Early Puritan	90·9	80·6	10·3	" "
Bliss Triumph	90·9	75·9	15·0	" "
Burbank	87·3	77·7	9·6	" "
Dreer Standard	86·48	81·09	5·39	10 tons manure only.
S-13660	67·8	60·6	7·2	Manure and fertilizer.
Black Kidney	38·9	26·8	12·1	" "

CEREAL HUSBANDRY

The experimental work for the season included the testing of different varieties of spring cereals and six varieties of winter wheat.

Project 33.—Spring Cereal Variety Test

These were grown on soil which the previous year grew a crop of mangels and potatoes. During that season barnyard manure at the rate of 15 tons, and fertilizer at the rate of 600 pounds per acre was applied for the hoed crop. For the cereal crop the soil was prepared by spring ploughing and thorough harrowing.

On account of the very light rainfall during the growing season the growth was rather shorter than usual. Cut-worms and anthracnose did considerable damage to the bean crop, and only a poor stand was obtained.

The following varieties of wheat were sown on May 11 in one-sixtieth acre plots in triplicate. Seed was sown at the rate of 120 pounds per acre:—

WHEAT—TEST OF VARIETIES

Name of Variety	Date of Ripening	Number of days maturing	Average length of straw, including head	Strength of straw on a scale of 10 points	Actual yield of grain per acre
			inches		bush. lb.
White Russian D	Aug. 9	90	33	8·8	25 —
Early Russian Ottawa 40	" 9	90	33	8·3	24 —
Marquis Ottawa 15	" 13	91	33	8·5	22 30
Ruby Ottawa 623	" 5	86	33	8·7	22 —
Huron Ottawa 3	" 11	92	34	8·6	17 —
Early Red Fife Ottawa 16	" 13	90	31	9·2	16 40

The following varieties of oats were sown on May 12 in one-sixtieth acre plots in triplicate. Seed was sown at the rate of 120 pounds per acre:—

OATS—TEST OF VARIETIES

Name of Variety	Date of ripening	Number of days maturing	Average length of straw including head	Strength of straw on a scale of 10 points	Actual yield of grain per acre
			inches		bush. lb.
Victory	Aug. 5	85	31	9·0	52 12
Gold Rain	" 3	83	28	9·0	48 24
Banner, Ottawa 49	" 5	85	27	9·2	44 4
Liberty, Ottawa 480	July 30	79	28	9·6	30 18
Daubeney, Ottawa 47	" 26	75	27	9·0	30 —

The following varieties of barley were sown on May 12 in one-sixtieth acre plots in triplicate. Seed was sown at the rate of 120 pounds per acre:—

BARLEY—TEST OF VARIETIES

Name of Variety	Date of ripening	Number of days maturing	Average length of straw, including head	Strength on a scale of 10 points of straw	Actual Yield of Grain per acre
			inches		bush. lb.
Chinese, Ottawa 60	July 30	79	31	8·8	38 12
Early Chevalier, Ottawa 51	July 30	79	29	8·5	36 12
Duckbill, Ottawa 57	Aug. 5	85	27	8·8	35 30
Charlottetown, No. 80	Aug. 9	89	28	8·3	35 —
Stella, Ottawa 58	July 30	79	26	9·2	32 24
O.A.C. 21	Aug. 4	84	29	7·8	29 24
Gold	Aug. 8	88	25	8·0	25 40
Himalayan, Ottawa 59	July 26	75	23	9·5	23 36

The following varieties of peas were sown on May 11 in one-sixtieth acre plots in triplicate. Seed was sown at the rate of 120 pounds per acre:—

PEAS—TEST OF VARIETIES

Name of Variety	Average length of straw including head	Actual yield of grain per acre
	inches	bush. lb.
Mackay, Ottawa 25	28	25 40
Arthur, Ottawa 18	26	20 —
Prussian Blue	30	15 40
Canadian Beauty	27	11 40

The following varieties of beans were sown on May 26 in one-sixtieth acre plots in triplicate. Seed was sown at the rate of 60 pounds per acre:—

BEANS—TEST OF VARIETIES

Name of Variety	Average length of straw, including head	Actual yield of grain per acre
	inches	Bush. lb.
Large White, Ottawa 713	16	18 10
Norwegian, Ottawa 710	15	17 40
Navy, Ottawa 711	27	15 15
Beauty, Ottawa 712	14·8	13 30
Carleton, Ottawa 718	15	13 —

Project 75.—Experiment with Winter Wheat

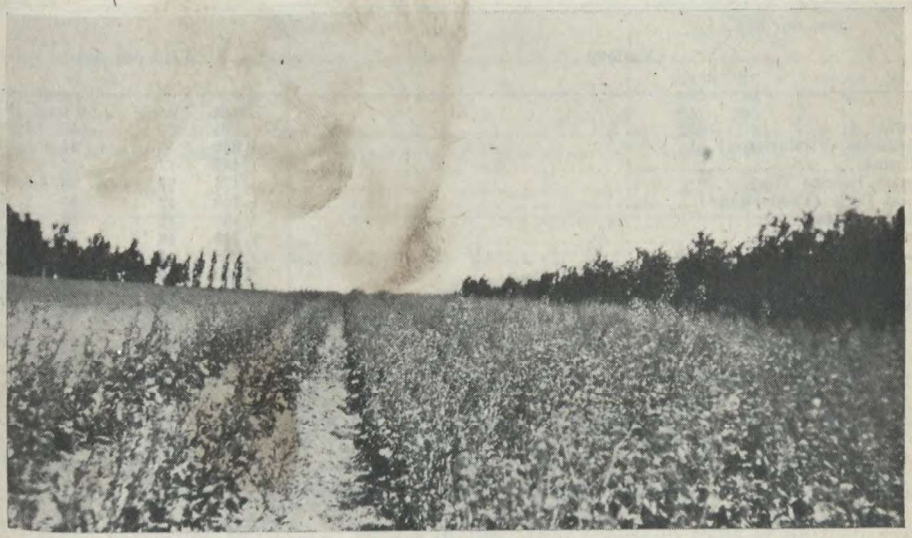
The varieties listed below were sown in one-thirtieth acre plots on September 11, 19, and 20, 1920, on land which had grown a crop of barley during that season. Barnyard manure at the rate of 15 tons per acre was applied to each plot. In spite of the fact that the seeding was rather late, and the growth in 1920 rather short, all varieties came through the winter in good condition, and the yields as noted were very satisfactory.

WINTER WHEAT—TEST OF VARIETIES

Variety	Yield per acre
	bush. lb.
O.A.C. 104	37 30
Imperial Red Amber	35 15
American Banner	31 —
Dawson's Golden Chaff	30 —
Early Red Clawson	29 30
Turkey Red	25 —

FORAGE CROPS

The forage crop work for the season consisted of testing the productiveness and suitability in general of different varieties of Indian corn, field roots, rape and sunflowers for forage purposes, the production of swede turnip seed in connection with the improvement of a variety, and the inauguration of a series of experiments with grasses and clovers.



SEED TURNIPS

Right: Roots and tops trimmed. Left: Roots and crown left intact.

The hoed crops, excepting the swede turnips for seed production, were grown on medium loam which the previous year was in oats. Barnyard manure at the rate of 15 tons per acre was applied in the spring and ploughed under.

The grasses and clovers were sown on land which the previous year was in hoed crops. The soil was a medium loam and in good tilth.

Project 1.—Variety Test of Corn for Ensilage

Ten varieties were planted in one-fortieth acre plots on June 6. Harvesting was done on October 1. The varieties grown and the yields were as follows:—

Indian Corn for Ensilage—Test of Varieties

Variety	Yield per acre		Remarks
	tons	pounds	
North Dakota	21	180	
Compton Early	20	20	
Leaming	16	140	
Longfellow	15	60	
White Cap Yellow Dent	14	180	
Bailey	14	140	
Wisconsin No. 7	13	20	
Canada Yellow	12	120	Developed mature ears.
Twitchell Pride	9	140	" "
Quebec 28	9	100	" "
Average	14	710	

Project 2.—Variety Test of Swede Turnips

Eleven varieties of swede turnips were sown on June 7 in one-fortieth acre plots. Harvesting was done on October 24. The varieties grown and the yields were as follows:—

Swede Turnips—Test of Varieties

Variety	Yield per acre			
	bush.	lb.	tons	lb.
Jumbo	1,901	30	47	1,080
Kangaroo (Fredericton)	1,659	43	41	993
Ditmar	1,487	17	37	367
Derby Bronze Top	1,471	27	36	1,577
Good Luck (Fredericton)	1,462	42	36	1,142
Black Special	1,438	12	35	1,912
Hall Westbury	1,319	46	32	1,996
Kangaroo	1,308	1	32	1,401
Prize Purple Top	1,303	25	32	1,175
Monarch (Nappan)	1,273	2	31	1,652
Sutton Champion (Fredericton)	1,213	25	30	675
Average	1,439	47	35	1,997

Project 8—Variety Test of Mangels

Five varieties were sown in one-fortieth acre plots on June 7. Harvesting was done on October 24. The varieties grown and the yields were as follows:—

Mangels

Variety	Yield per acre			
	bush.	lb.	tons	lb.
Yellow Globe	1,068	38	26	1,438
Mammoth Long Red	948	32	23	1,432
Sugar Mangel	897	44	22	894
Yellow Intermediate	869	36	21	1,486
Golden Tankard	749	43	18	1,493
Average	906	48	22	1,348

Project 5.—Variety Test of Carrots

Two varieties were sown in one-fortieth acre plots on June 7. Harvesting was done on October 25. The varieties and yields were as follows:—

Carrots

Variety	Yield per acre			
	bush.	lb.	tons	lb.
Danish Champion	415	37	10	787
Chantenay Intermediate	402	31	10	131
Average	409	9	20	459

Project 6.—Variety Test of Sugar Beets

Four varieties were sown in one-fortieth acre plots on June 7. The yields were as follows:—

Sugar Beets

Variety	Yield per acre			
	bush.	lb.	tons	lb.
Chatham (Dominion Sugar Co.)	630	24	15	1,524
Rimpaus Klein Wanzleben	611	46	15	596
British Columbia (Dominion Sugar Co.)	555	5	13	1,755
Waterloo (Dominion Sugar Co.)	490	49	12	549
Average	572	6	14	606

Project 12.—To Determine the Value of Rape as Green Feed

One-fortieth of an acre was grown. One cutting was harvested which yielded at the rate of 31 tons, 1,341 pounds, green weight per acre.

Project 73.—To Determine the Yield of Cabbage for Forage Purposes

Mixed varieties of the later-maturing types were transplanted about June 10 in a one-fortieth acre plot. The yield was at the rate of 28 tons per acre.

Project 4.—Swede Turnip Seed Production

When harvesting the crop of swedes in 1920, four thousand roots of uniform type were selected for seed production. The roots were left intact and the tops cut off about one inch from the crown. These were stored in the root cellar, and in no place in the bin did the roots exceed two feet in depth. Out of this number only 1,016 were found sound enough for seed purposes on April 15. The remainder were sufficiently infected with crown rot to render them useless. To replace this loss a number of sound roots, which had been trimmed in the field, were selected and, in all, 2,080 roots were planted on April 15 and 16. The land had previously been in corn for two years and was well manured. The roots were planted in rows 3 feet apart with 1½ feet between roots in the row. The ground was kept well cultivated and growth in the early season was rapid except from roots which had been trimmed. These were slow in starting growth but developed a fairly strong top. One-quarter of an acre of land was utilized for this crop, and the amount of seed obtained was 100 pounds. Harvesting was done on July 13. On account of the prevalent hot, dry weather the pods shelled very easily and considerable loss occurred through handling and damage done by birds.

Project 9.—An Experiment with Grasses and Clovers

In order to study different mixtures of grasses and clovers and to determine what combinations of these are best adapted to this locality, twenty-four one-fortieth acre plots were sown in duplicate with grasses alone, and in combination with red clover, alsike and red clover and alsike. On account of the extremely dry weather, germination and growth during the season were rather slow. A fair stand, however, was obtained by fall. No nurse crop was used. Seeding was done on the 10th of June.

In addition to the above, nineteen varieties of grasses, three varieties of clover, one of alfalfa and one of sainfoin were sown singly in one-eightieth acre plots. The land was in hoed crops the preceding year. Seeding was done June 13. Two of the plots grew a crop, viz., Japanese millet and Sudan grass. The yields were at the

following rates per acre: Japanese millet, 5 tons (cut October 27); Sudan grass, 2 tons 1,200 pounds (cut October 27).

On account of the late date of cutting it was difficult to cure these crops.

Project 7.—EXPERIMENTS IN GROWING ALFALFA

Twelve one-fortieth acre plots of alfalfa were sown in duplicate in order to determine how this crop could be best handled. Seeding was done on June 15. The outline of the experiment is as follows:—

With Lime

Without nurse crop. . . . . Broadcast, 20 pounds per acre.
" " . . . . . Rows 12 inches apart, 10 pounds per acre.
" " . . . . . Rows 24 inches apart, 5 pounds per acre.
With nurse crop. . . . . Broadcast, 20 pounds per acre.
" " . . . . . Rows 12 inches apart, 10 pounds per acre.
" " . . . . . Rows 24 inches apart, 5 pounds per acre.

Without Lime

Without nurse crop. . . . . Broadcast, 20 pounds per acre.
" " . . . . . Rows 12 inches apart, 10 pounds per acre.
" " . . . . . Rows 24 inches apart, 5 pounds per acre.
With nurse crop. . . . . Broadcast, 20 pounds per acre.
" " . . . . . Rows 12 inches apart, 10 pounds per acre.
" " . . . . . Rows 24 inches apart, 5 pounds per acre.

All seed was inoculated.

Project 11.—CLOVER SEED PRODUCTION

Five plots, each one-fourth of an acre, were seeded to clover in order to determine, first, the best method of seeding for seed production; second, which cutting will give the highest seed yield; and third, whether a hay or a seed crop will give the greater profit. The outline of the experiment is as follows:—

With Nurse Crop

1. Seeded broadcast, 10 pounds per acre (two cuttings for hay).
2. Seeded broadcast, 10 pounds per acre (first cutting for hay, second for seed).
3. Seeded broadcast, 10 pounds per acre (first crop for seed).

Without Nurse Crop

4. Seeded in rows, 12 inches apart, 5 pounds per acre (first crop for seed).
5. Seeded in rows, 24 inches apart, 2½ pounds per acre (first crop for seed).

The results of this experiment will be obtained during the coming season.

CHEMISTRY

A series of sixty-eight permanent plots laid out for fertilizer experiments was this year in potatoes. No fertilizer was applied for this crop except barnyard manure at the rate of ten tons per acre. The acreage yield was 98.5 barrels per acre of which 90.7 barrels were of marketable size. One half of each of these plots was limed in 1916 with waste lime at the rate of 5,000 pounds per acre. On this section of the plot the potatoes were very scabby. Fertilizer will be applied to these plots next season and the experiment then continued.

Project No. 35.—FERTILIZER EXPERIMENT ON TURNIPS

In order to determine the value of fertilizer as a supplement to barnyard manure for the turnip crop, two acres were treated with 3-8-4 fertilizer at the rate of 700 pounds per acre in addition to barnyard manure at the rate of 15 tons per acre. The results were as follows:—

Plot	Yield per acre	Cost of fertilizer
	bushels	
Check	684·95	
3-8-4	908·65	15·69

Increase, 223.7 bushels per acre.
Value of increase at 15 cents per bushel, $33.55.
Profit (after deducting cost of fertilizers), $17.86 per acre.

Project 36.—FERTILIZER FOR THE CORN CROP

In order to determine the value of commercial fertilizer as a supplement to barnyard manure, plots of 22,617 square feet were treated with 300 pounds of 3-10-0 and 3-8-4 fertilizer, in addition to barnyard manure at the rate of 15 tons per acre. The results were as follows:—

Plot	Yield per acre		Cost of fertilizer	Value of increase at $6 per ton
	tons	lb.		
Check	13	1,050		
3-10-0	15	372	$11.65	$ 9.96
3-8-4	16	972	12.92	17.76

The corn on the fertilizer plots developed ears a week or ten days earlier than the corn on the check plot.

EXPERIMENT ON THE VALUE OF LIME

An acre of land which was limed at the rate of 5,000 pounds per acre in 1915 gave an increase over an acre adjacent to it, which has always received the same treatment, of 680 pounds of hay per acre. While this is not a large increase, the quality of the hay was much superior on the limed plot.

POULTRY

Only two breeds of poultry are kept at this Station, viz., Barred Plymouth Rocks and White Wyandottes. An effort is being made by careful selection and breeding to improve these two breeds. Records are kept of the production of all layers, both pullets and hens, the cost of production by pullets and results of incubation. The New Brunswick Egg Laying Contest is operated on the plant and is now in its second year.

EGG PRODUCTION—HENS VERSUS PULLETS

A flock of Barred Plymouth Rock hens was carefully culled at the beginning of the poultry year and two pens selected because of their production, type and vigour for the season's work. On account of the limited number of Wyandotte hens on hand

it was not possible to make as close a selection from this breed. Records were also kept of the production of April and May hatched pullets. Only one pen of hens and one of pullets of each breed could be kept intact throughout the year, owing to the limited accommodation. The results were as follows:—

AVERAGE PRODUCTION PER MONTH

Month	Barred Plymouth Rocks				White Wyandottes				
	Hens Pen 6	Hens Pen 8	April hatched pullets Pen 2	May hatched pullets Pen 4	Hens Pen 6 B	Hens Pen 7	April hatched pullets Pen 1	May hatched pullets	
								Pen 3	Pen 5
November	2.2	7.8	5.1	0.2	3.2	4.2	8.4	0	5.3
December	5.0	6.5	7.1	4.0	2.5	2.4	11.1	2.4	3.6
January	3.0	3.1	5.7	8.5	2.0	1.0	9.9	14.5	12.8
February	4.6	4.1	11.0	10.0	2.0	5.1	9.8	13.5	10.8
March	14.0	10.7	12.7	19.1	15.4	10.0	12.8	15.6	17.2
April	16.2	19.5	16.5	19.5	15.4	13.3	15.3	15.6	18.5
May	13.1	16.6	17.1	14.7	11.8	10.9	20.3	.....	12.1
June	21.6	16.5	15.1	.....	6.1	12.4	14.9	.....	.....
July	14.1	.....	15.4	.....	.....	7.2	10.2	.....	.....
August	14.1	.....	15.3	.....	.....	9.6	10.5	.....	.....
September	10.5	.....	11.5	.....	.....	6.4	7.8	.....	.....
October	5.7	.....	9.2	.....	.....	2.0	3.4	.....	.....

SUMMARY.

Pen No. 6, average per month for 12 months, 10.3 eggs
" No. 8, " " " 8 " 10.6 "
" No. 2, " " " 12 " 11.8 "
" No. 4, " " " 7 " 10.8 "

Pen No. 7, average per month for 12 months, 7 eggs
" No. 6B " " " 8 " 7.3 "
" No. 1 " " " 12 " 11.2 "
" No. 3 " " " 6 " 10.2 "
" No. 5 " " " 7 " 11.4 "

Of the four pens whose records were kept throughout the year, two hens and two pullets, the yearly average for the hens was 104.3 eggs, and for the pullets, 138 eggs. For the six months of winter during which time all records were kept the average yield of the hens was 43.3, that of the April pullets, 62.7, and the May pullets, 63.7.

COST OF EGG PRODUCTION

Records were kept of the cost of producing eggs from April hatched pullets, Barred Plymouth Rock and White Wyandotte. The results were as follows:—

Month	Cost per dozen	
	Barred Rock	White Wyandotte
	cts.	cts.
November	52·5	32·8
December	36·3	25·5
January	48·7	28·8
February	26·4	31·2
March	22·0	23·5
April	11·5	12·4
May	13·0	15·5
June	8·5	10·7
July	11·7	18·9
August	13·8	18·8
September	13·3	22·3
October	19·9	53·2

These charges are for feed only. The system of feeding was as follows:—

Scratch feed, consisting of two parts cracked corn, two parts whole wheat and one part of oats, was fed in the litter morning and evening. In the summer only one part of corn was used.

Dry mash, consisting of one part of corn meal, one part middlings, one part wheat bran, one part ground screenings and fifteen to twenty per cent beef scrap was kept in hoppers before the birds at all times.

The same mash, moistened with water or skim-milk, was fed at mid-day.

Oyster shell, grit and beef scrap were kept in hoppers available for the birds at all times. Green feed and water also were provided.

INCUBATION

Hatching results are shown in the following tables.

HATCHING RESULTS FOR SETTINGS BY THE MONTH

Time set	Number of eggs set	Per cent fertile	Per cent total eggs hatched	Per cent fertile eggs hatched
February 26	64	85·9	50·0	58·1
March 8	253	77·4	33·2	42·8
March 20	601	86·0	48·2	56·0
April 2	594	91·7	38·3	40·0
April 17	526	85·7	50·3	59·0
May 3	483	74·1	37·4	50·5

HATCHING RESULTS FROM DIFFERENT INCUBATORS

Three incubators were used during the season, a 64-egg Buckeye, a 250-egg Tamlin and a 1,200-egg Candee. Considerable difficulty was experienced in getting the Tamlin regulated and the temperature in one section was about four degrees lower than in the second section.

Incubator	Number of eggs set	Per cent fertile	Per cent total eggs hatched	Per cent fertile eggs hatched
Candee	2,204	84·8	43·7	51·5
Buckeye	64	85·9	50·0	58·1
Tamlin	253	77·4	33·2	42·8

HATCHING RESULTS FROM HENS AND PULLETS

Age	Total Number eggs set	First Test			Second Test		Total hatched	Per cent fertile	Per cent fertile hatched	Per cent total eggs hatched
		Infertile	Blood rings	Left in	Dead germ	Left in				
Hens	1,895	290	102	1,503	173	1,330	871	84.7	54.2	46.0
Pullets	626	109	51	466	112	354	179	82.5	34.6	28.6

HATCHING RESULTS FROM DIFFERENT BREEDS

Breed	—	Total number of eggs set	First Test			Second Test		Total hatched	Per cent fertile	Per cent fertile hatched	Per cent total egg hatched
			Infertile	Blood rings	Left in	Dead germs	Left in				
Barred rock.....	Hens.....	1,090	175	64	851	98	753	479	83.9	52.3	43.94
"	Pullets....	403	43	29	331	84	247	119	89.33	33.05	29.52
White Wyandotte....	Hens.....	805	115	38	652	75	577	392	85.71	56.81	48.69
"	Pullets....	223	66	22	135	28	107	60	70.40	38.21	26.90

New Brunswick Egg Laying Contest

The first New Brunswick Egg Laying Contest began on November 1, 1920. Nineteen pens of ten hens each owned by different breeders throughout the province, and two pens owned by this Station were entered in the contest. Five different breeds were represented. The birds were housed in portable, shed-roofed, glass-and-cotton-front houses. The houses were ten by twelve feet in dimension and divided into two pens. Each pen accommodated ten hens.

The system of feeding was as follows:—

Scratch feed, consisting of two parts cracked corn, one part whole wheat and one part oats, was fed in the straw litter in the morning and afternoon. The birds were allowed all of this feed that they would pick up clean.

Dry mash, consisting of one part bran, one part middlings or feed flour, one part corn meal, one part ground oats, one part screenings and fifteen or twenty per cent beef scrap, was kept in a hopper before the birds at all times.

Wet mash, made by moistening the above dry mash with water or skim-milk, was fed to the birds at mid-day.

Grit, oyster shell, beef scrap and charcoal were kept in hoppers before the birds at all times. Green feed in some form and water were always provided.

A record was kept of the production of each bird. In the event of the death of a hen a substitute was allowed. All hens which laid 150 eggs and upwards were eligible for Record of Performance certificates. Those hens that laid 225 eggs and upwards were eligible for Advanced Record of Performance certificates. Those hens that laid 175 eggs or upwards that averaged 24 ounces to the dozen were eligible for registration.

This contest ended October 31, 1921. It is worthy of note that the average production per hen was second highest in all contests held in Canada. The pens entered, their production, the cost of feed for the year, the food cost of eggs per dozen and the profit over cost of feed were as follows:—

TABLE showing the total production of each hen and each pen in the Contest which was conducted by the Experimental Station, Fredericton, N.B., for the fifty-two weeks ending October 30, 1921.

Owner and Address	Breed	1	2	3	4	5	6	7	8	9	10	F	Total	Cost of feed per year	Food cost of eggs per doz.	Profit over cost of feed
															cts.	
1. D. Mersereau, Russiagornish....	B.R.	*89	163	142	228	206	193	151	168	178	175	7	1,700	$36.21	25.5	$33.49
2. Invicta Farm, Oromocto.....	"	188	135	*206	196	183	177	D102	180	209	161	19	1,756	39.02	26.6	33.82
3. Elmsville P. Club, Elmsville.....	"	183	62	167	168	160	222	226	*51	149	180	5	1,573	32.41	24.7	28.48
4. W. E. B. Tait, Dorchester.....	"	219	232	189	160	192	158	183	212	157	*156	6	1,864	35.83	23.0	33.82
5. Invicta Farm, Oromocto.....	"	130	146	105	90	181	170	220	226	216	37	5	1,526	33.74	26.5	29.22
6. H. McEwen, Chatham.....	"	160	148	118	142	160	197	165	175	170	160	7	1,602	38.67	28.9	22.86
7. Allen & Ferguson, Fredericton.....	"	210	110	175	199	92	131	139	132	244	124	8	1,564	35.88	27.5	24.43
8. G. E. Wilson, Centreville.....	"	140	186	160	157	162	153	228	181	209	128	2	1,706	36.12	25.4	33.42
9. N. W. Eveleigh, Sussex.....	"	164	200	166	167	162	186	190	198	*173	206	4	1,816	35.78	23.6	36.33
10. M. G. Robichaud, Bretagneville.....	"	139	133	117	96	139	161	86	128	82	94	8	1,183	36.91	37.4	9.89
11. M. A. Reid, Rollingdam.....	"	108	88	*79	103	141	84	23	*82	118	134	8	968	35.50	44.0	3.25
12. A. L. Lever, Leverville.....	"	178	164	172	157	82	179	167	*97	141	150	12	1,499	35.58	28.4	22.83
13. C. M. Peart, Havelock.....	"	249	134	D116	142	*42	136	93	*75	*139	176	13	1,315	34.23	31.2	18.40
14. A. T. Reid, Rollingdam.....	"	229	153	*179	191	180	154	116	208	50	214	11	1,685	36.88	26.2	32.49
15. Mrs. Geo. Danby, North Devon....	W.W.	247	187	253	132	158	97	D 66	183	*174	134	7	1,638	30.89	22.6	35.46
16. H. Williston, Newcastle.....	"	143	110	196	157	79	177	164	*134	147	171	3	1,481	32.32	26.1	25.58
17. A. Vye Gibson, Moncton.....	B.O.	85	153	176	*107	113	124	28	137	70	139	9	1,141	37.00	38.8	9.71
18. G. E. Wilson, Centreville.....	W.R.	96	136	71	176	105	144	133	68	127	168	3	1,227	38.03	37.1	5.14
19. R. A. Snowball, Chatham.....	W.L.	177	124	138	164	128	77	100	170	111	183	10	1,382	29.70	25.7	23.87
20. Exper'tl Station, Fredericton.....	B.R.	228	149	212	129	169	149	164	214	*97	229	6	1,746	32.15	22.0	39.31
21. Exper'tl. Station, Fredericton.....	W.W.	*176	177	173	D128	D162	134	102	170	122	*217	15	1,576	29.90	22.7	37.81

* Production of more than one bird. D—Dead but not substituted.
B.R.—Barred Plymouth Rock. W.W.—White Wyandotte. B.O.—Buff Orpington.
W.R.—White Plymouth Rock. W.L.—White Leghorn.

BEES

Eight colonies of bees were placed in winter quarters in a cellar on November 14, 1920. The average weight of these colonies (including bottom board but not cover) after feeding, was 62 pounds. The stores included mixed honey and sugar syrup. The bees were taken from their winter quarters on April 20. Seven of the colonies were in good condition and in one the stores were granulated and the bees were dead. The average weight of the colonies when removed from the cellar was 48 pounds. The average estimated weight of the stores at that time was 10 pounds.

Three of the colonies swarmed and these were captured and placed in new hives.

The best colony produced 105 pounds of honey and the average production spring count was 72 pounds, 13 ounces.

The receipts from the apiary were:—

Sales of honey	$99 22	
Increase of three colonies at $7	21 00	
		$120 22

The charges were:—

Labour	$36 00	
Sugar	9 35	
Honey fed back	6 90	
Supplies	9 99	
Loss of 1 hive	7 00	
		$ 69 24
Profit		$ 50 98

Ten hives were placed in winter quarters on November 15. Eight of these were placed in a cellar and two were packed in a box in the honey house. These were fed sugar syrup and the average weight of the ten colonies (including bottom board but not cover) after feeding, was 68.8 pounds.