DOMINION OF CANADA

DEPARTMENT OF AGRICULTURE

DOMINION EXPERIMENTAL FARMS

EXPERIMENTAL STATION

KENTVILLE, N.S.

INTERIM REPORT OF THE SUPERINTENDENT

W. SAXBY BLAIR

FOR THE YEAR ENDING MARCH 31, 1921

SPRING 1921—Commercial apple orchard. Planted, ~~1921~~ 12. Trees, 40-ft. x 20-ft. Wagener variety used as fillers. Trees just coming into bloom.

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EXPERIMENTAL STATION, KENTVILLE, N.S.

REPORT OF THE SUPERINTENDENT, W. SAXBY BLAIR

THE SEASON

The early spring months were favourable for seeding. The month of April was normal, and May was dry throughout, so that the preparation of the soil and the putting in of crops continued with little interruption until completed. Dry weather from May 10 to June 6 retarded crops somewhat, but seasonable rains following brought on crops very rapidly, and the yields were, on the whole, well up to the average. The fall was remarkably open, frost being recorded on only two nights up to November 1, the first being on October 16, of two degrees, and the same on the 21st. The fall weather favoured the gathering of crops, particularly the apple, all of which were secured in excellent condition.

The precipitation for six months from April 1 to September 30, for the seven years 1913 to 1919 inclusive, averaged 16·54 inches, whereas that for 1920 was 17·60 inches for the same period. The sunshine for the same period averaged 1,138·6 hours, while in 1920 it amounted to 1,249·61 hours.

METEOROLOGICAL RECORDS 1920–1921

1920 Months	Temperature					Precipitation			Hours bright sunshine
	Maximum		Minimum		Mean	Rainfall	Snowfall	Total	
	Date	Degrees	Date	Degrees	Degrees	Inches	Inches	In. in rainfall	
April	21st	61	2nd	17	38·14	2·94	7·25	3·66	128·55
May	28th	81	4th	24	48·7	1·69	.....	1·69	251·61
June	28th	84	18th	34	58·1	2·98	.....	2·98	232·65
July	14th	90	28th	43	66·05	2·70	.....	2·70	260·05
August	10th	91	20th	42	67·95	3·58	.....	3·58	207·25
September	24th	82	21st	33	58·55	2·99	.....	2·99	169·50
October	1st	78	16th	30	50·91	0·69	.....	0·69	182·45
November	3rd	63	21st	15	35·65	3·00	3·0	3·30	101·05
December	6th	55	26th	1 below	27·4	3·60	3·0	3·90	51·95
1921									
January	15th	52	29th	3 "	21·45	1·14	8·75	2·01	55·6
February	17th	43	22nd	11 "	18·28	0·65	35·75	4·22	112·15
March	21st	71	8th	10	35·95	2·47	5·5	3·02	129·23
						28·43	63·25	34·74	1,884·04

ANIMAL HUSBANDRY

The Shorthorn breed of cattle only is kept at Kentville. The object in view with this herd is to increase the production of milk while still retaining good beef qualities. Sires are being used from good producers, and it is hoped thereby to develop a strain of fair production. A record is being kept of the feed consumed, and of the production. The data presented herewith show the wide range in production of this herd, and the need for careful selection in order to get uniformly good producers. The aim has been to breed the cows so that a calf is obtained from each every year. This has not been possible, however, the herd having averaged 293 days milking and 94 days dry—a total of 387 days between calving periods—since established in 1913. This herd consists at the present time of 18 cows, 3 two-year-old heifers, 13 yearling heifers, 14 heifer calves, 3 bull calves and 1 herd bull, making a total of 52 head. The bulls are sold for breeding purposes, 8 having been so disposed of during the year.

Hedgyn Susan produced 10,864 pounds of milk in 384 days, an average of 28·29 pounds per day; Hillview Victoria, 6,188 pounds, an average of 19·21 pounds per day; Meadow Flower 24th, 6,623 pounds in 328 days, an average of 20·19 pounds per day; Kentville Jessamine, 6,008 pounds in 320 days, an average of 18·75 pounds per day; Burnbrae Fairy, the poorest milker of the mature cows, produced 2,754·4 pounds of milk in 214 days, an average of 12·87 pounds per day.

Cows having the same number of lactation periods since the establishment of the herd have been grouped together, and the table below shows the average feed consumption in pounds, and the production.

AVERAGE MILK PRODUCTION AND FEED CONSUMPTION

Lactation Periods	No. of Cows	Days Milking	Milk Produced	Daily Yield	Roots and Ensilage	Meal	Hay	Months on Pasture
1	10	300·6	3598	11·97	10576	1766	2614	1·22
2	4	299	4933	16·5	10820	1971	2864	2·05
3	4	347	5516	16	13557	2047	3768	3·03
4	3	272	4890	18	11071	2011	3064	2·66
5	1	318	8342	26	11980	3159	3147	2·5
6	4	260	5174	20	12193	2076	3301	3·1
8	1	263	3411	13	10908	1315	2897	2·5

The aim is to feed meal at the rate of one pound to every three pounds of milk produced, and, in addition, one pound of meal per day is allowed as a maintenance ration if, in the judgment of the herdsman, this is necessary to carry the cow in good condition. The meal ration consisted of a mixture of 300 pounds bran, 200 pounds crushed oats, 200 pounds cottonseed meal, and 100 pounds oil meal.

YOUNG STOCK

A record has been kept of the pounds of feed consumed by the young stock raised and this is summarized in the table attached. The meal mixture for young stock which has been found to be the most satisfactory is 100 pounds bran, 100 pounds crushed oats and 100 pounds of oil meal. Because of a shortage of pasturage the young stock has been barn fed. The aim has been to carry them as cheaply as possible and at the same time keep them in good, healthy, growing condition.

FEED CONSUMED BY YOUNG STOCK

Period	Number Raised	Whole Milk	Skim-Milk	Meal	Roots and Ensilage	Hay	Weight
	Heifers						
To six months	37	420	2071	319	382	199	336
Six months to one year	37		385	744	2330	757	602
One year to two years	24			1065	6736	1792	948
	Bulls						
To six months	29	425	2028	355	439	208	394
Six months to one year	14		637	839	2305	803	712

STEER FEEDING EXPERIMENT

Twenty grade steers purchased in the fall of 1920 were fed during the winter. It was not possible to conduct any comparative feeding tests, stabling conditions making it necessary to feed the whole lot alike. The steers were dehorned and divided into two lots of ten to a pen. They had access to water in the pen, and were given the range of a yard during fine days.

At the time of purchase, during early October, the price of good quality steers was high, the drop taking place at a later date after all stock came in from the pastures. In the spring it was found necessary to dispose of this stock at the same price per pound as was paid for it in the fall. This resulted in considerable loss, which could have been avoided only by a spread between the purchase and selling price. The gain made was good, and averaged 1·77 pounds per day. The price obtained was considerably above the market quotations at the date of sale, which was possible because of the steers being uniformly well finished for market.

Roots were fed during the early winter, and corn silage during the latter part. The meal mixture consisted of 100 pounds each of bran and crushed oats, and 200 pounds of cottonseed, this mixture costing $3 per hundred.

Feeding was started at the rate of 3 pounds each per day, which was gradually increased to 8 pounds at the finish of the test; an average of approximately 7 pounds per day. Corn silage was fed at the rate of 40 pounds per day, and roots 50 pounds. The hay fed averaged 5·5 pounds per day, and straw 2 pounds per day. The straw for bedding averaged 10 pounds per steer per day.

It is found that with corn silage, a meal mixture of half cottonseed can be fed to 8 pounds per day, or 4 pounds cottonseed per steer per day, in two feeds, without any bad effect, and a steady profitable gain is maintained. The results of this test were as given below:—

Number of steers in lot		20
First weight, gross, October 22, 1920	Lb.	18,497
First weight, average	"	924·85
Finished weight, gross, March 11, 1921	"	23,474
Finished weight, average	"	1,173·7
Number of days on feed	Days	140
Total gain in 140 days	Lb.	4,977
Average gain per steer	"	248·85
Daily gain per steer	"	1·77
Daily gain per lot	"	35·55
Gross cost of feed for period	$	1,083.79
Cost of 1 pound gain per lot	Cts.	21·77
Cost, original, October 22, at $9.75 per cwt	$	1,803.45
Total cost, March 11, 1921	$	2,887.24
Selling price, March 11, 1921, at $9.75 peer cwt	$	2,288.70
Loss on lot	$	598.54
Loss per steer	$	29.92
Average valuation per steer to start	$	90.17
Average sale price per steer at finish	$	114.43
Average increase in value	$	24.26
Average cost of feed per steer	$	54.18
Amount of meal eaten per steer at $3 per cwt	Lb.	1,000
Amount of hay eaten per steer at $18 per ton	"	765·5
Amount of straw eaten per steer at $10 per ton	"	275
Amount of roots eaten per steer at $5 per ton	"	1,260
Amount of ensilage eaten per steer at $5 per ton	"	5,110

FEED REQUIREMENTS TO PRODUCE A TWO-YEAR-OLD STEER

One Shorthorn grade cow gave a bull calf each year for four years, and these were carried as steer calves and a record kept of the feed consumed. The meal ration for the first year consisted of equal parts of bran, ground oats and oil meal, and for the second year 200 bran, 100 crushed oats, and 100 pounds each of cottonseed and oil meal. They were fed, while calves, with whole milk to one month of age, and gradually put on skim-milk, which was continued to about six months of age, ranging from 12 pounds to 20 pounds each per day.

Hay was placed for the calves to get at after the first month, and also a little meal mixture. A few pulped roots were given at the end of the second month, and gradually increased. Ensilage was not given until the calves were about five months old. The aim was to carry these calves in a healthy, growing condition with the least possible outlay. The calves were not on pasture the first year, and were grazed only 3·25 months in all, which would bring the cost somewhat above that on farms where pasturage is available, for the full summer months. With whole milk at $2 per hundred, skim-milk at 20 cents per hundred, roots and ensilage at $4 per ton, hay at $10 per ton and pasturage at $1 per month the cost of these steers to 23 months of age was $89.93 each, and the sales price averaged $93.79, a profit above feed cost, at the price stated, of $3.86 each.

The table below gives the average pounds of feed consumed per steer, the age when sold, and the gain per steer:—

Average age when sold	Days	691
" weight at birth	Lb.	78
" gain above birth weight	"	855
" weight when sold	"	933
" gain per day	"	1.23
" whole milk consumed	"	236
" skim-milk consumed	"	2,233
" meal consumed	"	1,928
" hay consumed	"	2,771
" roots consumed	"	5,619
" ensilage consumed	"	4,516
Months on pasture		3.25

SHORTHORN STOCK

All the cattle kept at this Station are the Shorthorn breed of Scotch foundation stock. None but registered animals are kept. The herd at the end of the fiscal year, March 31, 1921, was made up as follows: 18 cows; 3 heifers, two to three years; 13 heifers, one to two years; 14 heifer calves; 3 bull calves; 1 herd bull; making a total of 52 head.

Six mature females were sent to the Nappan Station during the year. Four were sold for beef. One herd bull was disposed of for beef, and 8 bulls were sold for breeding.

REARING OF YOUNG STOCK

Calves.—The calf is left with the mother two or three days after birth, when it is removed and fed on 3 to 4 pounds of whole milk three times per day until from three to four weeks old. The milk is fed fresh from the cow at milking time, and at noon warmed to about 95 degrees. After from three to four weeks of age calves are started on skim-milk, which feed is increased gradually as the calf grows, but at no time exceeds 20 pounds per day. They are fed skim-milk to five or six months of age. The calf is taught to eat meal when the change is made from whole to skim-milk, beginning with a very small quantity and increasing according to age. The meal is given to them immediately after feeding the milk. They soon learn to relish it, and at the end of two months will take 1 pound a day, which is soon increased gradually to 3 pounds per day at ten months old.

The grain ration is made up of equal parts by weight of crushed oats, bran and oil meal. Roots are given when the calf is quite young, and increased in quantity as it grows older. Corn ensilage is excellent feed for calves over six months of age, but roots are relished more by younger animals.

When possible, early cut clover hay, one of the best feeds for young stock, is fed, as much as they will eat in a short time. If water is not in the box-stall in which they are allowed to run, so that they can get it as wanted, they are given water at least once a day. Very often calves suffer from want of water; the milk given as a general thing does not satisfy their thirst, and in many cases better calves would be grown if they were watered more regularly and not too much given at any one time. The pails used for feeding the calves are washed clean after each feeding, and scalded once a day. The calves fed as above indicated have made excellent growth, and have been entirely healthy. The young stock is kept in box stalls, and allowed to run out during warm days in winter. During the summer the calves are kept in during the heat of the day and allowed to run out when it is cool.

YEARLINGS

During the summer the yearlings are allowed the run of the ravine pasture. This is not very good, but probably compares favourably with the average rough land pasture. They are stabled early in the fall, and fed on a ration of 8 pounds hay, 30 pounds of turnips or 20 pounds of ensilage, and from 3 to 5 pounds of meal mixture per day. The meal mixture is made up of 100 pounds crushed oats, 100 pounds of oil meal and 100 pounds bran. They have water before them to drink as they require it. Exercise is given in the yard once a day if weather is favourable. As soon in the morning as the milking in the stable is finished they are fed with roots or ensilage on which the meal is scattered, and after this is eaten the hay is given. They are fed roots and ensilage with meal in the afternoon about four o'clock, and when this is consumed they are given hay.

RAISING SHORTHORN CALVES

The feed required to raise the Shorthorn calves at this Station from one to six months and from one to two years is given in the table below. With feed cost at $2.25 per hundred pounds for meal mixture, $4 per ton for roots, ensilage and green feed, $10 per ton for hay, $1 per month for pasture, whole milk at $2, and skim-milk at 20 cents per hundred, the feed costs would be as stated. It has been the object to produce this stock as economically as possible, and what was considered a really satisfactory growing ration only was fed. The table below represents the average consumption and gain of the young stock reared at this Station:—

Average of feed consumed by 37 heifer calves from birth to six months—	Cost
Whole milk, 420 pounds	$ 8 40
Skim-milk, 2,071 pounds	4 14
Meal, 319 pounds	7 17
Roots, ensilage and green feed, 382 pounds	0 76
Hay, 199 pounds	0 99
Total cost	$21 46
	Pounds
Weight of calf at birth	72
Weight of calf at six months	336
Gain	264

RAISING SHORTHORN CALVES—*Concluded*

From six months to one year—	Cost
Skim-milk, 385 pounds	$ 0 77
Meal, 744 pounds	16 74
Roots and ensilage, 2,330 pounds	4 66
Green feed, 152 pounds	0 30
Hay, 757 pounds	3 78
Total cost	$26 25

	Pounds
Weight at 6 months	336
Weight at 12 months	602
Gain for 6 months	266

Average of feed for 24 heifer calves from one to two years—	Cost
Meal, 1,065 pounds	$23 96
Roots and ensilage, 6,736 pounds	13 47
Hay, 1,792 pounds	8 96
Green feed, 277 pounds	0 55
Pasture, 2¾ months	2 66
Total cost	$49 60

	Pounds
Weight at 1 year	602
Weight at 2 yeears	948
Gain for 1 year	346

Average of feed for 29 bull calves from one to six months old—	Cost
Whole milk, 425 pounds	$ 8 50
Skim-milk, 2,028 pounds	4 05
Meal, 355 pounds	7 98
Roots, ensilage, green feed, 439 pounds	0 87
Hay, 208 pounds	1 04
Total cost	$22 44

	Pounds
Weight of calf at birth	78
Weight of calf at 6 months	394
Gain	316

Average of feed for 14 bull calves from six months to one year of age—	Cost
Skim-milk, 637 pounds	$ 1 27
Meal, 839 pounds	18 87
Roots and ensilage, 2,305 pounds	4 61
Green feed, 70 pounds	0 14
Hay, 803 pounds	4 01
Total cost	$28 90

	Pounds
Weight at 6 months	394
Weight at 1 year	712
Gain for six months	318

SHORTHORN COWS

Eight cows and seven heifers completed their lactation period during the year. The meal mixture used was made up of and cost as follows:—

300 pounds bran at	$2 38	per cwt.
200 pounds crushed oats at	2 38	"
200 pounds cottonseed at	3 70	"
100 pounds oil meal at	3 50	"

This mixture averged $2.85 per hundred pounds.

Roots were fed during the early part of the winter, at the rate of 50 to 60 pounds per day. After December first, ensilage was fed along with the roots, using two pounds of ensilage to one of the roots, and this was fed at the rate of 40 to 50 pounds per day. The meal mixture was scattered on the roots and ensilage; the feed varying according to the milk yield, one pound being given to each 3 pounds of milk.

The work in the stable is done with as much regularity as possible. The cows are milked at 6.30 a.m., and 5 p.m. They are fed immediately after milking in the morning with succulent feed, the meal ration being scattered on it; and this is followed with hay. They are again fed at four o'clock with the same amount of succulent feed and meal, so that one-half is fed in the morning and the balance in the afternoon. After milking, hay is fed the same amount as in the morning. The stables are cleaned out twice daily and the cows are groomed once. The stock have access to water as they require it.

It has been the aim to use stock bulls from parents having milking qualities, with the object in view of increasing the milk flow and still retaining the beef qualities. It is not thought that high producers will be obtained for some time, but that a strain giving a fairly constant production of 5,000 to 6,000 pounds may be obtained. It is necessary in order to follow up this work to carry the heifers for two or three milking periods at least. The wide range of production in this herd will be noticed indicating clearly the importance of giving some attention to milk production as well as beef.

The results of the lactation periods completed during the year were as given in the following table:—

LACTATION RECORDS

Name of Cow	Age	Date of Dropping Calf	No. Days Dry	No. Days Milking	Total Milk	Daily Average Yield of Milk	Average % Fat	Lbs. of Butter Produced	Value of Butter	Value of Skim-Milk	Total Value of Product
											$ c.
Hillview Victoria	13	Aug. 12, 1919	96	322	6,188·2	19·21	3·96	288·86	$172 37	$29 71	202 09
Meadow Flower 24th	12	May 22, 1919	62	328	6,623·6	20·19	3·62	282·51	160·56	24 04	184 60
Burnbrae	9	May 28, 1920	121	214	2,754·4	12·87	3·79	122·81	72 16	13 25	85 41
Hedgyn Susan	8	Feb. 10, 1920	72	384	10,864·9	28·29	4·02	514·99	308 99	52 13	361 12
Kentville Jessamine	5	June 30, 1919	181	320	6,008·1	18·75	3·66	259·15	145 03	28 93	173 96
" Victoria	6	March 3, 1920	272	222	4,692·6	21·13	4·1	226·6	135 48	22 49	157 97
" Blossom	5	Dec. 11, 1919	82	188	2,135·6	11·36	4·24	106·57	67 87	10 22	78 09
" Fairy	3	April 27, 1920	31	315	4,195·6	13·31	4·41	217·72	125 99	20 05	146 04
" Mayflower	3	Dec. 24, 1919	First calf	344	5,446·7	15·83	4·24	272·17	168 81	26 07	194 88
" Jessamine 3rd	2	Dec. 3, 1919	" "	295	2,783·2	9·43	4·14	135·81	83 37	13 33	96 70
" Meadow Flower	2	Feb. 6, 1920	" "	291	2,651·6	9·11	4·65	145·25	90 25	12 64	103 22
" Princess 2nd	2	Nov. 30, 1919	" "	318	2,313·3	7·27	4·68	127·4	78 47	11 02	89 49
" Fairy 2nd	2	Dec. 3, 1919	" "	365	4,769	13·07	4·46	250·75	155 24	22 77	178 01
" Primrose	2	Jan. 17, 1920	" "	309	3,562·1	11·52	4·31	180·87	110 59	17 04	127 63
" Blossom 4th	2	May 4, 1920	" "	206	2,436·4	11·82	3·97	114·05	66 38	11 69	78 07
" Susan	2	May 29, 1920	" "	304	5,174·9	17·02	4·43	270·29	153 86	24 72	178 58

Name of Cow	Age	Date of Dropping Calf	Amount of Meal Consumed	Amt. of Roots & Ensilage consumed	Amt. of Hay Consumed	Amt. of Green Feed consumed	Months on Pasture	Total Cost of Feed	Cost to Produce 100 lbs. Milk	Cost to Produce 1 lb. Butter (skim-milk neglected)	Profit on 1 lb. Butter (skim-milk neglected)	Profit on Cow
			Lbs	Lbs	Lbs	Lbs		$ c.	$ c.	cts.	cts.	$
Hillview Victoria	13	Aug. 12, 1919	3,217	14,020	3,280	2,995	3·75	176 28	2 84	·61	— ·013	25 81
Meadow Flower 24th	12	May 22, 1919	3,149	12,680	2,950	2,895	3·5	160 21	2 41	·567	·001	24 39
Burnbrae	9	May 28, 1920	1,717	14,580	2,609	175	1	118 01	4 28	·964	— ·377	— 32 60
Hedgyn Susan	8	Feb. 10, 1920	4,500	20,150	4,689	175	1	238 47	2 19	·462	·137	122 65
Kentville Jessamine	5	June 30, 1919	2,570	18,610	4,036	2,795	1·75	163 33	2 71	·63	— ·07	10 63
" Victoria	6	March 3, 1920	2,456	13,750	3,662	.....	1	151 80	3 23	·669	— ·072	6 17
" Blossom	5	Dec. 11, 1919	1,188	10,945	2,490	.....	1·75	91 16	4 26	·855	— ·218	— 13 07
" Fairy	3	April 27, 1920	1,890	13,660	3,230	175	1	125 22	2 98	·575	·003	20 82
" Mayflower	3	Dec. 24, 1919	2,795	11,600	3,250	175	1	152 10	2 79	·595	·024	42 78
" Jessamine 3rd	2	Dec. 3, 1919	1,575	11,410	2,620	175	1	107 33	3 85	·79	— ·176	— 10 63
" Meadow Flower	2	Feb. 6, 1920	1,296	11,420	2,714	175	1	97 71	3 68	·672	— ·049	5 51
" Princess 2nd	2	Nov. 30, 1919	1,647	10,790	2,916	175	1	110 52	4 77	·867	— ·251	— 21 03
" Fairy 2nd	2	Dec. 3, 1919	2,075	13,680	3,460	175	1	134 96	2 82	·538	·08	43 05
" Primrose	2	Jan. 17, 1920	1,815	11,460	1,298	175	1	115 83	3 25	·64	— ·028	11 80
" Blossom 4th	2	May 4, 1920	1,481	6,105	1,892	175	1	77 27	3 17	·677	— ·09	80
" Susan	2	May 29, 1920	2,205	11,630	3,094	175	1	128 06	2 47	·473	·095	50 52

MILK PRODUCTION AND FEED CONSUMED BY SHORTHORN HERD

Since the establishment of the herd of Shorthorn stock at this Station a close record has been kept of the feed consumed by each individual, and also of the production. The practice has been followed to give 1 pound of meal to each 3 pounds of milk produced. It is necessary, however, with young cows to increase this somewhat, as a greater maintenance ration is necessary because of growth. A certain allowance is made, of approximately one pound per day, for a maintenance ration in addition to that based on the milk production.

The table below sets forth how this has worked out with the herd at this Station covering the period since 1914. The feeder naturally varies the amount of concentrated feeds given during different periods when the cow is milking, and also during the dry period, in order to keep the individual in good health and bring her through to the next calving in best condition.

		Milk Produced	Meal Consumed	Meal required at rate of 1 lb. to 3 lbs. Milk	Excess for Maintenance.
		lbs.	lbs.	lbs.	lbs.
10 Cows.	1 Lactation	3,598	1,766	1,199	567
4 "	2 "	4,933	1,971	1,644	327
4 "	3 "	5,516	2,047	1,838	209
3 "	4 "	4,890	2,011	1,630	381
1 "	5 "	8,342	3,159	2,781	378
4 "	6 "	5,174	2,076	1,724	352
1 "	8 "	3,410	1,315	1,137	178

It will be seen that the cow Hedgyn Susan, producing an average of 8,342 pounds of milk per years for five years, received 378 pounds of meal above the 1 pound for every 3 pounds of milk, this being necessary to carry her in good condition, as she dropped a calf every 372 days, or 7 days over the year. It will also be noticed that the ten yearling heifers with their first calf required 567 pounds of meal in addition to the 1 pound for each 3 pounds of milk, because of the fact that they were still growing, and required this additional amount to carry them to the next calving period without stunting them in their growth. It will be seen, on the other hand, that the cow Burnbrae Fairy required less than one-half pound per day for a maintenance ration above the 1 pound of meal to 3 pounds of milk. It will be found that the cows of low production require less attention in this regard than those of high production. This latter point cannot be too strongly emphasized, as too often young cows are checked in their development because of not having received sufficient concentrated feeds for the development of the calf they are carrying and milk at the same time. If the tendency of the cow is toward milk, this demand will be satisfied first at the sacrifice of body growth, and the following lactation period will be started under a physically weakened condition in the cow. This is particularly the case if the dry period is short. The aim with the Shorthorn stock at this Station is to have each cow produce a calf within the year, and, under such conditions, the providing of an additional concentrated ration above the 1 pound to 3 pounds of milk is highly necessary. The herd has averaged 293 days milking and 94 days dry period, or 387 days between calving periods.

In the table below, the cows having the same number of lactation periods are grouped together, and the average of their production and consumption of feed is given:—

AVERAGE OF TEN HEIFERS—FIRST MILKING PERIOD

Name of Cow	No. Days Milking	Milk Produced Lbs.	Butter Produced	Skim Milk Lbs.	Meal Consumed	Roots & Ensilage	Hay	Green Feed	Months on Pasture
K. Blossom 4th	206	2,436·5	114·05	2,339·46	1,481	6,105	1,892	175	1·0
K. Jessamine 2nd	250	2,331·5	123·27	2,226·73	1,224	7,520	2,028	1,945	1·75
K. Primrose	309	3,562·1	180·87	3,408·37	1,815	11,460	1·298	175	1·0
K. Susan	304	5,174·9	270·29	4,945·16	2,205	11,630	3,094	175	1·0
K. Jessamine 3rd	295	2,783·2	135·81	2,667·77	1,575	11,410	2,620	175	1·0
K. Princess 2nd	318	2,313·3	127·4	2,205·10	1,647	10,790	2,916	175	1·0
K. Maid	324	4,519·3	223·10	4,329·67	1,551	10,150	2,874	.....	2·5
K. Mayflower	344	5,446·7	272·17	5,215·36	2,795	11,600	3,250	175	1·0
K. Fairy 2nd	365	4,769·0	250·75	4,555·87	2,075	13,680	3,460	175	1·0
K. Meadow Flower	291	2,651·6	145·25	2,528·14	1,296	11,420	2,714	175	1·0
Average	300·6	3,598·81	184·296	3,442·16	1,766·4	10,576·5	2,614·6	334·5	1·225

AVERAGE FOUR COWS—TWO LACTATION PERIODS

Name of Cow	No. days Milking	No. days Dry	Milk Produced	Butter Produced	Skim Milk	Meal Consumed	Roots & Ensilage	Hay	Green Feed	Months on Pasture
			Lbs.		Lbs.					
K. Victoria 2nd	290·5	81·0	4,813·45	221·22	4,625·42	2,035·0	8·677·0	2,189·0	3,932·0	2·6
Stamford Countess	235·5	65·0	6,727·0	320·47	6,454·41	2,212·0	10,620·0	3,572·0	.....	2·0
K. Fairy	345·0	31·0	4,418·0	230·2	4,222·33	1,924·5	12,782·0	3,012·0	1,535·0	1·37
K. Countess	326·5	115·0	3,776·15	180·41	3,622·81	1,712·5	11,202·5	2,686·0	3,932·5	2·25
Average	299·375	73·0	4,933·65	238·075	4,731·24	1,971·0	10,820·37	2,864·75	1,349·87	2·055

AVERAGE FOUR COWS—THREE LACTATION PERIODS

Meadow Maid	348·0	92·0	6,364·5	307·77	6,102·4	2,147·0	16,364·0	4,133·0	643·0	4·3
Lady Roberts	285·0	97·0	3,921·1	198·1	3,752·72	1,686·0	9,656·0	2,926·0	2,473·0	2·25
K. Princess	402·0	92·0	6,061·0	333·37	5,777·64	2,091·0	12,828·0	3,741·0	3,202·0	3·58
K. Victoria	354·6	208·0	5,719·8	288·5	5,474·58	2,267·0	15,380·0	4,275·0	1,633·0	2·0
Average	347·4	122·25	5,516·6	281·935	5,251·835	2,047·75	13,557·0	3,768·75	1,987·75	3·03

AVERAGE THREE COWS—FOUR LACTATION PERIODS

Name of Cow	No. days Milking	No. days Dry	Milk Produced	Butter Produced	Skim Milk	Meal Consumed	Roots & Ensilage	Hay	Green Feed	Months on Pasture
			Lbs		Lbs					
Meadow Flower 24th	321·0	76·0	7,363·6	320·54	7,091·15	2,887·0	12,080·0	3,389·0	2,449·0	2·8
K. Blossom	187·5	183·0	1,890·3	94·69	1,809·82	1,009·0	8,900·0	2,503·0	954·0	2·75
K. Jessamine	308·5	123·0	5·418·8	241·6	5·213·44	2,138·0	12,233·0	3,302·0	2,424·0	2·44
Average	272·3	127·3	4,890·9	218·94	4,704·80	2,011·3	11,071·0	3,064·88	1,942·3	2·66

AVERAGE ONE COW—FIVE LACTATION PERIODS

Hedgyn Susan	318·2	54	8,342·2	397·76	8,004·11	3,159·6	11,980	3,147	1,994	2·5

AVERAGE FOUR COWS—SIX LACTATION PERIODS

Meadow Blossom	285·3	82·0	5,290·6	249·26	5,078·73	1,915·0	11,121·0	2,971	1,589·0	3·2
Louisa May 2nd	155·0	199·0	2,572·9	112·42	2,477·35	796·0	11,802·5	3,209	1,657·0	3·0
Hillview Victoria	293·6	107·0	6,956·03	327·93	6·677·29	2,579·6	13,780·0	3,616	1,649·0	3·33
Meadow Princess	310·0	82·0	5,879·05	305·38	5,619·93	3,016·0	12,071·0	3,411	1,632·0	2·9
Average	260·97	117·5	5,174·64	248·74	4,963·32	2,076·65	12,193·62	3,301·75	1,631·75	3·10

AVERAGE ONE COW—EIGHT LACTATION PERIODS

Burnbrae Fairy	263·7	76·6	3,410·9	167·2	3,288·78	1,315·0	10,908·0	2,897·0	618·0	2·59

SWINE

The Yorkshire breed of hogs is kept, and the stock on hand March 31, 1921, consisted of one sow three years old, three sows nine months old, and two boars of the same age. The breeding boar was transferred to Nappan. Two of the old sows were disposed of for pork, and thirty young pigs were disposed of largely for breeding stock. No feeding tests have been conducted with swine, the object being to carry this stock to aid in the breeding work.

Beginning on the 25th of November, 1920, the breeding swine were fed during the following five months on a feed mixture made up of 8 pounds bran, 4 pounds ground oats, 2 pounds fish meal, 32 pounds pulped mangels, 24 pounds corn silage, and 4 pounds clover chaff. This was mixed well together and given in two feeds to eight pigs, morning and noon. For the evening meal they were given a thin warm slop of scalded bran, allowing one pound to each pig. In this way each pig received during the day, in three feeds, 3·25 pounds meal, 4 pounds mangels, 3 pounds corn silage and one-half pound clover chaff, costing about 10 cents per day. This seemed a satisfactory ration to feed in cold weather and did away entirely with the nuisance of frozen feed in the troughs, as is generally the case when feeding wet feeds. The pigs came through the winter in a thrifty condition, and the young ones born on the first of May were a good lot.

FIELD HUSBANDRY

THE SEASON

The season of 1920 was a favourable one for all crops. Grasses and clovers wintered well, and although dry weather during the latter part of May and the early part of June checked the growth very much, this was made up by favourable rains from the 6th to the end of June, and a good crop was harvested. The season, except for the early dry spell, was about as ideal as one could wish for, and all crops made a steady, satisfactory growth.

The fall was good for crop harvest, and the only frost to November 1 was on the 16th and 21st October, when two degrees was recorded. The weather during October was too dry for satisfactory ploughing, and much less land than usual was fall ploughed because of this. November, however, was very open and free from frosts, and ploughing was possible nearly every day during the month.

HAY

The dry weather in May and early June did not materially reduce the yield of hay on newly seeded areas, but areas not recently ploughed were generally light. The rotations at this Station are short, being a hoed crop, grain and clover. The total yield of hay was 113 tons. The best yield was from a seven-acre area which averaged 2·59 tons per acre. A ten-acre area averaged 2·06 tons per acre, and the dyked area which has been down since 1915 yielded 2·57 tons per acre. An eleven-acre area recently acquired, and which has not been ploughed for many years, yielded 1·85 tons per acre. The following comparative table shows the actual yields:—

HAY YIELDS—1920

	Acres	Total Yield Pounds	Tons Per Acre
Lower Orchard	10	41,390	2·06
Upper Orchard	7	36,285	2·59
Other upland areas yielded		41,459	
Western farm areas		20,000	
Farm Marsh	8	46,370	2·57
Western Farm Marsh	11	40,830	1·85
		226,332	113·16 tons

CORN FOR ENSILAGE

The season was very favourable for this crop, the temperature being slightly above normal, and the crop was well matured at harvest, making a fine quality of ensilage. Eight and a half acres of clover sod matured during the winter, and spring ploughed, yielded 15 tons per acre. Seven and three-quarter acres on the newly acquired farm yielded 12 tons per acre. Duke's Improved Longfellow was used on these two fields. The total corn crop was 222 tons, which was secured in fine condition.

SUNFLOWERS

Three-quarters of an acre of sunflowers was grown and the yield was 16 tons per acre. The stock did not take kindly to this silage, but gradually became accustomed to it, and no difficulty was experienced in feeding. The cows showed no fluctuation in milk when the feed was changed from corn to sunflowers, and the only difference noted was that they did not eat it so readily as they did corn.

OATS

Two acres of Victory oats yielded 76 bushels per acre. Three and a half acres of Banner oats yielded 74 bushels per acre. These were seeded on corn and root land. 14·9 acres in a rear field yielded 41·6 bushels per acre, and 8 acres on the newly purchased farm yielded 66 bushels per acre. The total oat crop was 2,017 bushels.

Banner Oats.—Three and one-half acres of Banner oats south of grain plots yielded 259 bushels, a yield per acre of 74 bushels. The yield of straw per acre was 3,547 pounds.

2·6 acres north of grain plots yielded 174·1 bushels, a yield per acre of 67·1 bushels. The yield of straw was 3,626 pounds per acre.

An area of 14·9 acres of Banner oats in the south field yielded 620 bushels, a yield per acre of 41·6 bushels. The yield of straw was 1,742 pounds per acre.

Oats from an area of 8·01 acres on the Western Farm yielded 528·8 bushels, a yield of 66 bushels per acre.

The total yield of oats was as given below:—

	Acres	Per Acre	Total Yield
			bush.
Banner oats	3·5	74·0	259·0
"	2·6	67·0	174·5
Victory oats	2·0	76·0	152·0
Banner oats	14·9	41·6	620·0
" "	8·01	66·0	528·0
Hulless oats	1·0	46·0	46·0
Other oat areas			237·5
Total			2,017·0

Other grain areas yielded as follows:—

Wheat	91 bushels
Barley	66 "
Rye	15 "
Peas	15 "

Total grain yield amounted to 2,204 bushels.

MANGELS

The land on which the feed mangels were grown was in potatoes in 1919, and was manured at the rate of 15 tons of stable manure per acre in the spring of 1920, and ploughed. Acid phosphate, at the rate of 400 pounds per acre, was applied, and nitrate of soda at the rate of 150 pounds per acre. The seeding was done on May 21 and 22 with hand seed drill, in rows 2½ feet apart, and the plants were thinned to 10 inches apart. The crop was harvested on October 11 and 12.

1·33 acres Danish Sludstrup yielded 1,207 bushels or 905·2 bushels per acre.

1·8 acres Half Sugar White yielded 1,518 bushels or 843·3 bushels per acre.

TURNIPS

The turnip crops was light, largely due to the club-root disease, which is very bad on almost all lands at this Station. The yield was only 451 bushels per acre on the main crop areas.

FARM CROP YIELDS FROM ROTATIONS

A record has been kept of the yields from two fields known as rotation field No. 1 and No. 2. It should be pointed out that these were areas cleared in 1914 and 1915. In rotation No. 2 the yield of turnips was largely lost because of club-root in 1917.

ROTATION No. 1

Year	Crop	How fertilized per acre	Yield per acre
1916	Corn	15 tons Manure 1000 lbs. slag	11·59 tons
	Turnips	2000 lbs limestone	838·0 bushels
1917	Oats		42·0 bushels
1918	Clover and timothy		2·18 tons
1919	Corn	20 tons manure 450 lbs. acid phosphate 150 lbs. nitrate of soda	18·8 tons
1920	Oats	300 lbs. acid phosphate 100 lbs. nitrate of soda 2000 lbs. limestone	74·0 bushels

ROTATION No. 2.

1916	Oats	300 lbs. 4-8	30·0 bushels
1917	Turnips	15 tons manure 300 lbs. acid phosphate 100 lbs. nitrate of soda	357·7 bushels
1918	Oats	500 lbs. 4-8 2000 lbs. limestone	82·0 bushels
1919	Hay		3·0 tons
1920	Corn	15 tons manure 450 pounds acid phosphate 100 lbs. nitrate of soda	15·0 tons

HORTICULTURE

The experimental orchard is made up as follows:—

	Varieties	Number of Trees
Apples	227	2,616
Plums	92	367
Cherries	54	154
Peaches	47	106
Pears	55	223
Apricots and Quince	12	23
Total	487	3,489

The total area in orchard fruits is 46·7 acres.

In addition to this, 18·3 acres of mature trees were added by the purchase of the John Tully property, adjacent to the Station. This makes a total area in fruit of 65 acres.

APPLES

The yield of apples in 1920 was light. The table below gives the yield up to 1920, of varieties which have fruited, of the trees planted in 1912, the year the Station was established. The most of these varieties were planted 20 by 20 feet apart, and the yield per acre, as given, is calculated from 108 trees per acre.

VARIETY TEST APPLES.

Variety, planted 1912.	No. of trees fruiting.	Average Barrels Per Tree 1919.	Yield per acre trees 20 ft. apart 108 trees per acre.	
			Total Barrels.	1919.
Ben Davis	18	0·916	111·24	98·928
Gano	18	·900	108·0	97·20
Ribston	18	·433	50·064	46·764
Stark	18	·393	46·008	42·444
Wealthy	73	·553	83·160	59·724
Wagener	108	·523	68·040	56·484
Hubbardston	19	·416	58·644	44·928
Ribston	19	·406	46·764	43·848
Blenheim	39	·026	2·808	2·608
Rome Beauty	17	·233	27·324	25·164
Cox's Orange	10	·333	49·248	35·964
Duchess	17	·373	64·800	40·284
Nonpareil	17	·200	22·248	21·600
Golden Russet	16	·063	6·804	6·804
Milwaukee	21	1·160	165,564	125·280
Fameuse	18	·836	98·928	90·288
McIntosh	18	·093	10·024	10·024
Baldwin	36	·056	6·048	6·048
Tolman	24	·290	31·320	31·320
Greening	20	·333	35·964	35·964
Yellow Transparent	20	·390	64·044	42·120
Crimson Beauty	17	·176	20·088	19·088
Ontario	20	·556	62·640	60·048

PLUMS

The plum crop was a disappointment in 1920. It was light, and in addition the brown rot attacked the ripening fruit, resulting in considerable loss. European varieties are more susceptible to the disease than are the Japanese sorts. It has been found difficult to control the black-knot which has made heavy cutting of the plum orchard necessary.

PEACHES

The peaches under test, while still living, have suffered greatly from the tips of the branches being winter-killed. The wood, apparently, does not ripen up sufficiently to carry well throughout the winter, the frost drying out the immature branches. So far, very little fruit has been secured, and no report can be made as to which sorts may be the most useful. The varieties Mayflower and Bokara seem to carry through the winter best. It is hoped that some data may be available another season as to what varieties may be successfully grown.

SPRING 1921—Cherry and peach orchard. Planted, 1913. Cheries in full bloom. Peach trees to left not yet in bloom.

CHERRIES

The Montmorency sour cherry has been the most satisfactory of all the kinds tested. The crop of sweet cherries has been light, due to the trees having been greatly weakened in 1919 by the cherry leaf-spot, which defoliated many of the trees. This seems to have been well controlled in 1920 by a thorough spraying in the spring (early in April) using a lime sulphur spray of 1 gallon of concentrated lime sulphur to 9 gallons of water. This has also controlled the peach leaf curl which, in the early life of the peach orchard, gave considerable trouble.

SPRAYING EXPERIMENTS

Experiments were again conducted during the year to determine the value of dust for the control of apple scab, as compared with Bordeaux mixture and lime

sulphur. Two applications were made before bloom and two after. The results were as stated below:—

EXPERIMENT IN DUST SPRAYING.

Material used.	Per cent Scab.	Per cent Insect Injury.
Sulphur dust 90–10	5·0	0·6
Bordeaux dust	15·8	1·4
Lime sulphur arsenate spray	2·79	0·7
Bordeaux spray	7·3	0·2
Check—not treated	64·6	1·1

The cost of dusting materials required per acre was also determined and was as set forth below:—

COST OF DUST SPRAYING.

	Bordeaux Dust.	Sulphur Dust.	Spray.
Materials used per acre	220 lbs.	300 lbs.	640 gal.
Time to apply	1½ hrs.	1¼ hrs.	4⅔ hrs.
Cost of materials	$14 54	$22 34	$11 87
Cost of application	1 34	1 34	4 67
Total cost	15 88	23 68	16 54

The greater part of the spraying at this Station has been done with lime-sulphur arsenate spray, using 1 gallon of concentrated lime sulphur to 40 gallons of water, and arsenate of lime 1 pound to 40 gallons for the first and second spray and 1 to 50 gallons for the third and fourth spray. This spray has given good results throughout, without any foliage injury or fruit russeting, and, so far as it has been possible to determine, no loss of fruit has been caused by this spray.

ORCHARD ROTATION

The practice has been to use the land between the trees for field crops, leaving a strip of from five to six feet on each side of the trees for cultivation. The main orchard is spaced in rows 40 feet apart, and 20 feet apart in the rows. A record has been kept of the production from part of the cropped areas, and is as given below:—

YIELDS OF ORCHARD INTER-CROPS.

Year.	Crop.	How fertilized per acre.	Yield of crop Per acre.
1913	Potatoes	400 lbs. 4-8-10	117·3 bushels.
1914	Corn	15 tons manure 300 lbs. 4-8-5 1,500 lbs. Limestone	12 tons.
1915	Oats	400 lbs. acid phosphate 100 lbs. nitrate of soda 2,000 lbs. limestone	57·7 bushels.
1916	Clover and timothy		2·4 tons.
1917	Corn	15 tons manure 500 lbs. 4-10	15·8 tons.
1918	Mangels	10 tons manure 800 pounds 4-10	983 bushels.
1919	Oats	2,000 lbs. limestone	62·7 bushels.
1920	Clover and timothy		2·06 tons.

SMALL FRUITS

The old bush fruit plantation has been abandoned and a new one established, which has not yet come into fruiting. The raspberry plantation has not made very good growth; the most promising sorts are the seedlings developed by C. P. Newman, Lasalle, Quebec, which were sent here for trial. The Senator Dunlap strawberry seems still to hold first place amongst those so far tested.

POTATOES

The trial tests with potatoes have not been entirely satisfactory because of certain diseases which have appeared from time to time to reduce the yield of many of the plots. The two most prominent of these potato troubles is leaf-roll and mosaic. In order to gather information as to these troubles, tests have been made of Green Mountain seed from different sources, and the same has been done with Garnet Chili and Irish Cobbler. The results would show that much more care than that generally taken is necessary, in order to develop disease-free stock, and that close attention must be given to eliminate these diseases which so greatly reduce the potato crop yields. Davis Warrior yielded 316 bushels per acre, and is a strong, vigorous grower, well worthy of more general cultivation.

VEGETABLE TRIALS

The vegetable trial plots were continued during the season and much information of general value secured.

ORNAMENTAL PLANTINGS

The usual ornamental plants were again grown and notes taken as to their development. The shrubs and ornamental trees have made good growth during the year and information as to the usefulness of such plants for ornamental plantings has been secured.

CEREALS

THE SEASON

April was cool, with considerable rain, but May came in warm and dry, and, other than a rain of 1·48 inches on the 10th, the month continued dry throughout. The land on which the cereals were planted is rather late, and seeding was not possible until the 18th. The crop came on rapidly, and the weather was favourable throughout the summer for all cereal crops, resulting in above the average yield of well filled grain. The fall was favourable for harvesting.

The trial cereal plots were grown in plots of one-half acre each. The ground had been previously in corn, having been fall ploughed. Ground limestone was applied at the rate of 2 tons per acre before working, after which the ground was disced twice, leaving it fairly level. Acid phosphate was applied at the rate of 300 pounds per acre, and nitrate of soda at the rate of 100 pounds, after which the land was cultivated with the wheel cultivator.

The seeding was done with the disc drill, at the rate of 2 bushels per acre for wheat, barley and rye, and at the rate of 3 bushels per acre for oats.

The land was seeded at the rate of 18 pounds per acre with a mixture of timothy 8 pounds, common red clover 8 pounds, and alsike clover 2 pounds, which was scattered broadcast with an attachment to the seeder.

OATS

Banner No. 49 and Victory oats only are grown. The former has averaged 64·2 bushels per acre for five years, and the Victory 64·5 bushels for six years. The yield in 1920 was, for Banner, 74 bushels and 23 pounds per acre; and for Victory, 76 bushels and 10 pounds, in one-half acre plots.

Hulless Oats.—The variety Liberty, which is hulless, has produced an average of 41·8 bushels for three years. The yield for 1920 was 46 bushels and 10 pounds per acre.

WHEAT

Three varieties of wheat only are grown at the Kentville Station; Marquis, Huron and Red Fife. The average of Marquis for seven years has been 21·4 bushels per acre, and of Red Fife 21·19 for the same period. Huron has been grown for three years, and has produced an average of 24·1 bushels per acre. The yield in 1920 was: Red Fife, 23 bushels, 12 pounds; Huron, 20 bushels and 39 pounds; and Marquis, 20 bushels and 45 pounds.

BARLEY

The Manchurian, Duckbill, Canadian Thorpe and No. 80 barley have been tested. The No. 80, a two-rowed sort with long heads, has been the best producer, yielding 30·05 bushels per acre as the average for five years. The beards drop readily during threshing, which is a great advantage. The yield in 1920 was: No. 80, 37 bushels, 21 pounds; Duckbill, 26 bushels; and Manchurian, 23 bushels and 16 pounds.

PEAS

The Arthur and Golden Vine peas have been under test; the average for six years of the former has been 28·3 bushels, and of the latter 24·9 bushels. The Golden Vine is a smaller pea, quite suitable for grain, and is considerably earlier than the Arthur. The yield in 1920 was for Arthur 37 bushels and 35 pounds, and for Golden Vine 32 bushels and 10 pounds.

The pea moth makes it difficult to grow good peas, as many of the seeds are worm eaten in the pod.

SPRING RYE

The O. A. C. No. 61 variety was sown May 18, and harvested August 24, yielding at the rate of 28 bushels, 54 pounds per acre.

FORAGE PLANTS

THE SEASON

The winter of 1919-20 was excellent for clovers, which came through in good condition.

The month of April was normal in temperature and precipitation, and naturally well drained areas were fit for working at the end of the month. May was dry throughout, except on the 10th, when the putting in of crops was delayed by a rain of 1·48 inches; other than this, work was continued without interruption during the whole month and by June 1 practically all crops had been seeded. The dry weather from May 10 to June 6 resulted in some checking of growth at this time, but favourable rains following this period brought on all crops in vigorous condition, and the yields were well up to the average. The first frost was on the 16th of October, followed by another on the 21st, of two degrees, which were the only frosts recorded until after November.

INDIAN CORN—VARIETY TESTS, 1920

The land on which the corn was grown was in clover the previous year. Manure at the rate of 15 tons per acre was spread on the sod during the winter, as taken from the stable. This was ploughed under in the spring. The ground was disced once. Fertilizer was applied at the rate of 300 pounds of acid phosphate and 100 pounds nitrate of soda per acre, and again disced and levelled with the smoothing harrow. The seed was planted in rows with the disc grain seeder by closing all but two spouts, the rows being spaced 3½ feet apart. Seeding was done on May 28.

The season was a favourable one for corn, and the crop came on vigorously, and matured well. Harvesting was done on September 17. The plots were one-thirty-third acre each.

VARIETY TESTS—INDIAN CORN.

Name of Variety.	Height.	Maturity.	Yield per Acre.	
	Feet.		Tons	Lbs.
1 Golden Glow	9	Early milk	17	650
2 Longfellow	9	"	16	10
3 Wisconsin No. 7	8½	"	15	1,350
4 Compton's Early	8½	"	15	690
5 Longfellow, Duke	8½	Late	15	525
6 White Cap Yellow Dent	8½	Early	14	50
7 Early White Cap Yellow Dent, Duke	8½	Milk	14	50
8 Improved Leaming	9	Early Milk	14	50
9 Yellow Flint, Twitchells Pride	6	Dough	10	1,780
10 Canada Yellow	6½	"	13	1,060
11 Quebec No. 28	6½	"	9	1,880

MANGELS

The land on which the mangel tests were conducted is a sandy loam. The ground was manured in the fall with 15 tons stable manure per acre, and ploughed under. This was disced in the spring, and 600 pounds of acid phosphate and 200 pounds nitrate of soda per acre applied and harrowed in with a twelve-tooth, deep-set cultivator. The ground was smoothed with a smoothing harrow, and the seed planted in rows 2½ feet apart with a Planet Junior seeder on May 14. The seed did not start very regularly and the stand was not even. The plants were thinned to 10 inches apart in the row. The crop was harvested on October 13. The yield is calculated from plots one eighty-eighth acre each.

MANGELS—TEST OF VARIETIES.

——	Yield per acre.			
	Tons	lbs.	Bush.	lbs.
Selected Yellow Intermediate, Charlottetown	25	1,040	1,020	40
Yellow Intermediate, Charlottetown	25	600	1,012	
Half Sugar White, Charlottetown	24	400	968	—
Yellow Intermediate, Ottawa	23	1,520	950	20
Danish Sludstrup, Kentville	23	640	932	40
Yellow Leviathan, Agassiz	22	1,760	915	10
Danish Sludstrup, Summerland	22	880	897	30

SUGAR BEETS

Three varieties of sugar beets were grown on land similar to, and prepared in the same way as, that on which the mangels were grown. The plants were thinned to eight inches apart. The yield as given below has been calculated from plots of one

eighty-eighth acre. The crop was seeded and harvested on the same date as the mangels.

SUGAR BEETS—TESTS OF VARIETIES.

—	Yield per Acre.			
	Tons	lbs.	Bush.	lbs.
British Columbia	14	336	566	36
Chatham	13	1,016	540	16
Kitchener	12	640	492	40

CARROTS

The carrot tests were conducted on land similar to that on which the mangels were grown, and the preparation was the same. The plants were thinned to four inches apart. The stand was poor, conditions being unsatisfactory for germination. The crop was harvested on October 13. Seeding was done on May 14. The rows were 2½ feet apart. The plots were one eighty-eighth acre each. The yields were as follows:—

CARROTS—TEST OF VARIETIES.

—	Yield per Acre.			
	Tons	Lbs.	Bush.	Lbs.
White Intermediate, Summerland	12	840	496	40
Danish Champion, Ottawa	11	1,940	478	—
Danvers Half Long	9	—	360	—

TURNIPS

The land on which the turnip plots were grown was in potatoes the previous year. The potatoes in 1919 were fertilized with 730 pounds of acid phosphate and 270 pounds of nitrate of soda. The ground was manured in the spring of 1920 with 10 tons stable manure per acre, and ploughed. This was disced, and 300 pounds of acid phosphate and 100 pounds of nitrate of soda scattered broadcast and harrowed in with the smoothing harrow. Rows were run with the horse hoe 2½ feet apart, and the turnips were seeded on May 15. The plants were thinned to ten inches apart. The yields are calculated from plots one twenty-fifth of an acre each. The crop was harvested on October 14.

The yield was poor throughout. The plants made a weak growth, and considerable club-root developed.

Club-foot Control.—Additional information was secured from the experiment undertaken in 1916 to determine the value of lime if applied to the soil for checking the development of the organism causing this disease. After being cropped with turnips in 1916 and 1917, the land was in grain in 1918, and seeded to clover. On one-half of the area the same quantity of lime as used in 1916 was again applied; also, quicklime was applied on part of the plot not limed in 1916. No manure was used after this test was started, and the whole area was fertilized alike. The results were as tabulated below, and show a decided gain from heavy applications of lime.

The lighter applications do not seem to give the results one would expect. From these results it would appear that 6 tons of quicklime or 12 tons of ground limestone per acre are necessary if it is hoped to eliminate this disease.

CLUB-ROOT CONTROL

Pounds used per acre	Limed 1916, p.c. infested			Limed 1916 and 1918, p.c. infested 1920
Quicklime—	1916	1917	1920	1920
1,500	80·5	100	88·4	59·5
3,000	80	98·5	72·2	65·7
4,500	83·8	96·4	68·8	79·8
6,000	72	96·3	26·4	9·2
Ground limestone—				
3,000	75·5	100	95·6	89·6
6,000	86·8	99·1	76·4	48·9
9,000	69	94·9	69·1	28·4
12,000	67·7	100	44·6	7·4
Check (not limed)	85·1	100	100	
Check, quicklime in 1918				64·0

TURNIPS: TEST OF VARIETIES

Name	Yield per acre		
	Bushels	Tons	Lbs.
Ditmars	600	15	
Magnum Bonum	585	14	1,250
Sutton's Caledonia	585	14	1,250
Imp. Lord Derby, Sutton	580	14	1,000
Sutton's Green Top Swede	577·5	14	875
" Up-to-date	575	14	750
" Crimson King	575	14	750
" Champion	565	14	250
Weibull's, Swedish	500	12	1,000
Good Luck, Fredericton	490	12	500
Good Luck, St. Annes	460	11	1,000
Sutton's Hardy White Swede	445	11	250
Champion, Charlottetown	402·5	10	125
Canadian Gem, Kentville	390	9	1,500
Corning Green Top, Kentville	430	10	1,500
Weibull's, Bangholm	360	9	
Dales, hybrid	260	6	1,000
Bortfelaher, purple top	230	5	1,500

Turnip Seed Production

Because of difficulty in growing turnips free from club root, no progress has been made during the year in this line of work. The stecklings produced in 1919, and again this season, were of no value because of this disease rendering the roots useless for the purpose.

Mangels for Seed

Because of a heavy frost of 12 degrees on the 20th October, 1919, the mangels grown for seed purposes were injured so badly that they did not keep, and a seed plot was not possible, no selected roots being available for this purpose.

GRASSES AND CLOVERS

GRASS MIXTURES

In order to gain information as to the value of red top and meadow fescue in hay production, a series of half-acre plots was seeded as given below. The clover and timothy were seeded through the grass seed box on the grain drill, and the other grasses were scattered broadcast before seeding with grain. The stand was good, clover predominating on all the plots. The yield of oats from these plots was 74 bushels per acre.

The kind of seed used and the pounds of each used per acre is given below:—

GRASS MIXTURES—KINDS OF SEED AND RATES OF SEEDING

No. of Plots	Seed used per acre pounds	Seed used	Seed used per acre pounds	Seed used	Seed used per acre pounds	Seed used	Seed used per acre pounds	Seed used
1	10	Red clover	8	Timothy				
2	8	"	8	"	2	Alsike		
3	5	"	8	"	5	"		
4	8	"	6	"	2	"	2	Red Top
5	8	"	4	"	2	"	4	"
6	8	"	6	"	2	"	2	" 6 Meadow Fescue
7	8	"	4	"	2	"	2	" 6 " "

CLOVER AND TIMOTHY SEED PRODUCTION

In order to obtain information as to the best methods to follow in clover and timothy seed production, a series of tests was planned whereby seed could be harvested from rows twenty-four inches apart, twelve inches apart, and broadcast. Plans have been made also for securing seed from the second crop, from cuttings made at different dates. These plots are all in good condition, and some information of value should be available from them next season.

Timothy Seed Crop

An area was used of 1½ acres, which was in clover in 1919, having been seeded with grain in 1918 with red clover at the rate of eight pounds per acre, timothy at eight pounds and alsike at two pounds. The growth in 1920 was an even stand of clear timothy. This was cut on August 7th with the binder, and was threshed with the grain threshing mill. The yield of seed was 235 pounds, a yield of 196·1 pounds per acre. The weight of hay, as taken from the field, was 2,350 pounds. It will be seen that ten pounds of cured timothy produced one pound of seed. The hay from this harvest was fed to stock, and was of good feeding quality, having been stored without having weathered.

ALFALFA

One acre was seeded to Grimm alfalfa. One-half this area was seeded broadcast at the rate of twenty pounds per acre, and the other was seeded in rows twelve inches apart, using about ten pounds of seed per acre. On one-half of each of these areas oats were sown, and yielded at the rate of 65 bushels per acre. The area on which a nurse crop was not sown was cut on August 7th, and yielded 1,340 pounds of hay per acre on the broadcast area, and 1,420 pounds hay where sown in rows twelve inches apart. The whole area was in good condition in the fall.

The second crop clover was cut for seed, and yielded 1,699 pounds. The dry weather directly following the harvest of the clover hay crop resulted in a thin stand, and the clover which came on later did not mature seed of good quality. The clover hay crop was cut during the first week in July.

POULTRY

The poultry plant was enlarged during the year by the erection of a breeding house, 72 by 12 feet, divided into twelve pens. The Barred Plymouth Rock and White Wyandotte breeds only are kept. The best producers during their pullet year were mated up in the breeding house, their production being as follows:—

SPRING 1921.—Breeding house for poultry erected 1920-21, 72-ft x 12-ft. 12 pens in this house.

Pen 1 to 4, White Wyandotte with 4, 5, 7 and 7 females, averaging respectively 254, 209, 187 and 161 eggs each during their pullet year. Pens 5 to 12, Barred Plymouth Rocks, with 4, 6, 7, 8, 5, 6, and 5 females, averaging 252, 222½, 200, 174, 239, 267½, 192 and 170 eggs each respectively during their pullet year. Eight of the heaviest layers were selected for pedigree work, and from these it is hoped to secure uniformly good producers.

BEES

Thirty-six colonies of bees were wintered in eight quadruple, one double and two single cases. On April 30 the colonies were removed from their winter cases. On May 1 the bees were removed to a new location; this moving did not cause any

drifting, although the day was warm. On May 4 a thorough examination was given the colonies, and one was found dead. The remaining colonies covered, on an average, 4½ combs. Of these, three, not being strong, were united to other colonies, leaving 32 spring count.

Weather conditions, especially during the height of the fruit-blooming period, were not favourable for the gathering of nectar, only 184 pounds of fruit bloom honey being extracted.

The value of bees for orchard pollination was again studied, and orchard experiments covering this work and results are outlined in this report.

The Dutch and alsike clovers came in bloom on the 9th and 10th of June respectively, but owing to the very dry period during which they were in bloom they did not secrete as much nectar as in other years; also the clover blossoms were withered by July 15 for want of rain; this made the clover season very short. The total production for the season from this source was 985 pounds.

On June 21, twenty-four nuclei were made from twenty-four of the colonies, and by the middle of September these nuclei were strong colonies, bringing the total number of colonies up to 56.

During the season eight Italian queens were received from the Central Experimental Farm, Ottawa. Of these, six were accepted when introduced and the other two were destroyed.

Weather conditions during the fall flow were quite favourable for the gathering of honey. In this section, however, there is very little golden rod, while in other sections of the province where bees are kept golden rod can be fairly well relied upon as a good honey plant. Bees brought in some nectar from the wild aster and other fall flora, but it was impossible to obtain any surplus, the bees generally storing the honey in the brood chambers.

Five colonies of the fifty-six at this Station are being wintered on natural stores, viz., clover honey and honey gathered in the fall. The remainder are being wintered on natural stores plus a given amount of sugar syrup.

Sugar syrup, consisting of two parts sugar and one of water, was fed to bees from October 12 to 20. Ten-pound honey tins, with tops perforated with from thirty to forty holes, were used to feed the syrup to the bees. Also a few "Miller" feeders were used. The former method was found to be the quicker and better.

On October 20, thirty-six colonies were placed in single, double and quadruple cases, and packed in shavings. Three half-inch holes were made directly opposite the hive entrances. Twenty colonies were put in the old honey house under practically the same conditions as those packed in winter cases.

During the fall, honey displays were put up at three exhibitions, Yarmouth, Bridgewater and Kentville; also, the exhibtion at Amherst was attended and the honey judged.

ORCHARD POLLINATION EXPERIMENT, 1920

The object of the experiment was to ascertain whether the honey bee helps to pollinate the blossoms, giving a consequent better set of fruit. To carry on this work sufficient cheese cloth was obtained to cover a limb on each of seven different trees.

On the 29th of May, when the apple buds were showing a little colour, seven trees were selected, to be used for the experimental work. The number of apple clusters was counted on two limbs of each tree; one limb was then covered with cheese cloth, and the other left uncovered. The apples that set on both the covered and uncovered limbs were counted.

It should be pointed out that no account was taken of wild bees and other insect visitors to the blossoms, which investigation it is hoped to follow up next year, as, without a doubt, insects other than the honey bee are an important factor in the distribution of pollen.

The following table gives the results obtained:—

POLLINATION RECORD

Variety	Covered		Not covered	
	Number of Clusters	Number of Apples set	Number of Clusters	Number of Apples set
1919				
Bishop Pippin	263	13	272	49
Greening	200	6	222	14
1920				
Ben Davis	54	7	38	72
Ben Davis	118	2	87	108
Wealthy	213	3	148	115
Wealthy	222	0	316	284
Baldwin	90	3	204	136
Bishop Pippin	152	0	102	22
King	163	5	122	18

HONEY PRODUCTION

The production of honey during the year has not been high, as compared with that of other seasons. This is clearly indicated in the table below:—

HONEY PRODUCTION

Year	Number of Colonies	Number of Colonies in fall	Pounds of Honey produced	Average per Colony Spring count
1919	21	36	2,577½	122·7
1920	32	56	1,168	36·5

FRUIT BLOOM HONEY PRODUCTION

Records have been kept of the honey gathered during the apple blossom periods in 1919 and 1920, as given below. In 1919 there were seven days favourable for bees to work, and three of these occurred during the height of bloom. In 1920 there were nine favourable days, but during the height of bloom there were three days unfavourable, because of dark, damp weather, and no honey was gathered.

FRUIT BLOOM HONEY PRODUCTION

Year	Number of Colonies	Honey produced	Average per Colony	Period of Bloom
1919	21	701	33·4	May 25 to June 11
1920	32	184	5·8	May 28 to June 15

FERTILIZER EXPERIMENTS

A series of tests is being conducted, having commenced in 1913, to determine the relative value of nitrate of soda and sulphate of ammonia as sources of nitrogen. These tests are being carried on with and without limestone, and a three-year rotation is followed.

An orchard fertilizer experiment embracing 51 plots of different combinations started in 1913, is being continued, and results from the crops grown between the trees secured.

A series of tests with Nebraska potash as compared with the German muriate of potash is being continued; also, cyanamide as compared with nitrate of soda as a source of nitrogen is also being experimented with.

Some sixty-six trial plots of different fertilizer mixtures, applied at different rates per acre, are likewise being conducted and data secured.

LIMESTONE EXPERIMENTS

Most striking results have been obtained from the use of ground limestone, particularly in the development of red clover, and the yields of this crop have been doubled from the application of two tons per acre when seeding down to clover.

FARM IMPROVEMENTS

Fifteen acres of new land was broken during the season, and part of it seeded to timothy and clover during August. This has resulted in a good stand, and is being developed to increase the pasturage area.

BUILDINGS CONSTRUCTED

A new horse barn was constructed during the year, meeting a much felt want. This building is 70 by 30 feet.

EXCURSIONS AND EXHIBITIONS

There were no large excursion parties to the farm during the summer, but small picnic parties of from 5 to 50 people were quite common throughout the entire season.

Exhibits were arranged at Bridgewater, Yarmouth and Kentville, and a honey and poultry exhibit was shown at Amherst.