DOMINION OF CANADA
DEPARTMENT OF AGRICULTURE
DOMINION EXPERIMENTAL FARMS

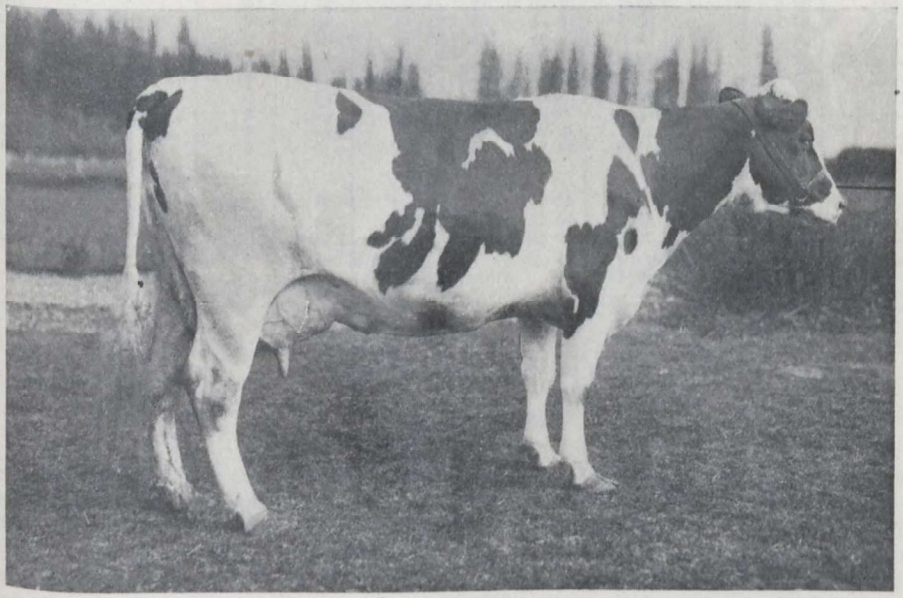
EXPERIMENTAL FARM

AGASSIZ, B.C.

INTERIM REPORT OF THE SUPERINTENDENT

W. H. HICKS, B.S.A.

FOR THE YEAR ENDING MARCH 31, 1921



Agassiz Piteje Kondyke, 26407. Sire, Natoze Kondyke, 13540. Dam, Pietze Priscilla Mechthilde, 14123. R.O.P., 4 years, 6 months, 5 days. Milk, 19·935 pounds, 933·75 butter.

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29401—1

EXPERIMENTAL FARM, AGASSIZ, B.C.

REPORT OF THE SUPERINTENDENT, W. H. HICKS, B.S.A.

FOR THE YEAR ENDING MARCH 31, 1921

SEASON

April of 1920 was unusually cold, with much wet, and very little seeding was done before the last few days of the month. This backward spring, followed, as it was, by the wettest June experienced in twenty years, militated against satisfactory crop production. However, most of the crops were hastened to maturity by an extremely hot July and August—though of course grains did not fill sufficiently to produce maximum yields, such as might have been obtained under more favourable conditions.

The heaviest precipitation during the year occurred in September and October, 1920, being, respectively, 12.42 inches and 11.35 inches during those two months. January, 1921, was the coldest month, with a mean temperature of 37·55 F.

METEOROLOGICAL RECORDS, 1920-21

Month	Date	Temperature				Precipitation			Sunshine Hours
		Max.	Date	Min.	Mean	Rain	Snow	Total	
1920						Inches		Inches	
April	26	74	3	27	47·31	9·95	.....	9·95	116·3
May	7	84	13	30	54·64	4·56	.....	4·56	162·6
June	3	86	24	40	60·	8·39	.....	8·39	122·4
July	7	94	19	46	66·73	1·21	.....	1·21	243·9
August	11	92	31	43	66·72	1·67	.....	1·67	220·7
September	3	82	28	41	56·28	12·42	.....	12·42	80·2
October	9	63	21	30	46·77	11·35	.....	11·35	62·3
November	7	61	1	25	40·01	4·8	.....	4·8	75·9
December	3	51	20	18	41·82	8·46	.....	8·46	11·4
1921									
January	29	49	11	25	37·55	9·83	.....	9·83	38·2
February	26	64	16	20	39·94	9·82	.....	9·82	62·3
March	30	62	11	25	42·99	5·21	.....	5·21	90·3
						87·67	.....	87·67	1,286·5

ANIMAL HUSBANDRY

DAIRY CATTLE

The herd of dairy cattle at the end of the year comprised sixty-three head, forty-eight of which are pure-bred and fifteen grade Holsteins. The pure-breds are: two bulls rising three years old, one bull fourteen months, one bull nine months, sixteen mature cows, three three years old, eleven two years old, eight yearlings and six heifer calves. The grades are: five three years old, five two years old, two yearlings and three heifer calves. The pure bred herd is about the same size as last year, but the grade herd has been reduced. The two young bulls at the head of the herd are Maplecrest DeKol Henry —248550— and Agassiz Sir Inka Sylvia. The latter was bred on this farm, is a son of Inka Slyvia Beets Posch, and is thus a brother to May Echo Sylvia. His dam is Lady Lyons Faforit, a cow with an R. O. P. record of 18,829

pounds of milk and 801 pounds of butter, and having a 19,000 pound two-year-old daughter.

Of the twenty-four cows that finished a lactation period during the year, only 37.5 per cent produced heifer calves. The average milk production per cow for the entire herd was 11,134 pounds of milk and 372 pounds of fat for an average lactation period of 340 days. Four mature cows completed R. O. P. records, averaging 18,131 pounds of milk and 770 pounds of butter, while two two years old averaged 13,543 pounds of milk and 650 pounds of butter. The best individual record was made by Agassiz Pietje Korndyke —26407— as a five-year old. She gave 19,798 pounds of 3·74 per cent milk, and this after doing just a little better as a four-year-old the previous year.

The herd is entered in the Accredited Herd scheme and passed all tests except the final double test. Some suspicious cases were located, but upon a triple retest they passed, and the herd is now eligible for accreditation.

The Empire mechanical milker has been used throughout the year with fair satisfaction. Another year's feeding of clover and pea and oat silage demonstrates further their suitability as substitutes for corn silage. Sunflowers also gave fair results as a silage crop, but did not yield so well as corn.

The following list shows the performance of all cows finishing a lactation period during the year. In this table feeds were charged at market value. Butterfat is computed at 70 cents per pound, and skim milk at 50 cents per hundred pounds.

Cows which have Completed Lactation Periods during 1920-1921

Roman figures signify Pure-Bred.
Black figures signify Grade.

Cow No.	No. of Lactation Period	Number of days in Milk	Total Milk produced in period	Daily Average yield of Milk	Average percentage of Fat in Milk	Pounds of Fat for Period	Pounds of Butter for Period	Amount of Meal consumed	Amount of Roots and Roughage consumed	Amount of Hay Consumed	Months on Pasture at $2.00 per month	Total Cost of Feed for Period	Total Value of Product	Profit on Product	Cost to produce 100 lbs. Milk	Cost to produce 1 lb. butter	Sex of Calf
			Lbs.	Lbs.				Lbs.	Lbs.	Lbs.	$ cts.	$ cts.	$ cts.	$ cts.	Cents	Cents	
52	4	365	19,798	54·35	3·74	741	926·25	8,149	44,900	2,234	5·30	406·50	607·79	201·29	205·32	43·89	F.
115	1	293	14,375	49·06	3·71	533	666·25	5,256	23,555	1,355	·34	262·48	437·79	165·31	182·59	39·39	M.
90	4	329	18,829	57·22	3·4	641	801·25	7,263	31,605	1,704	.....	368·87	533·43	164·56	195·9	46·03	F.
113	1	365	12,711	34·82	4	508	635	4,931	30,046	958	5·05	259·88	412·80	152·92	204·45	40·92	F.
46	5	365	19,060	52·22	3·06	584	730	7,658	30,376	1,615	.....	361·00	495·57	133·57	189·4	49·45	F.
124	**1**	**365**	**1,1393·6**	**31·21**	**3·2**	**364·73**	**455·91**	**4,545**	**19,695**	**575**	**3·82**	**173·96**	**306·58**	**132·62**	**152·69**	**38·15**	**M.**
70	3	318	9,395	29·54	3·27	307·52	384·4	5·283	23,424	875	4·13	192·69	299·82	107·13	205·09	50·12	M.
77	3	331	13,585·1	41	2·9	397·16	496·45	5,766	24,729	999	3·82	237·36	339·14	101·78	174·72	47·81	M.
85	3	365	14,838	46·52	3·35	497	621·38	6,627	29,160	830	5·51	314·45	414·67	100·22	211·92	50·6	M.
122	**1**	**343**	**9,090**	**26·52**	**3·33**	**303·3**	**379·12**	**4,280**	**17,945**	**730**	**3·82**	**168·95**	**253·21**	**84·86**	**185·68**	**44·56**	**M.**
86	3	407	11,578·2	28·44	2·91	337·78	422·22	5,177	21,172	730	3·37	206·53	288·54	82·01	178·37	48·91	M.
81	3	312	9,550·5	30·61	3·5	313·45	391·81	4,554	19,565	725	3·82	180·77	262·39	81·62	189·27	46·13	M.
51	**5**	**282**	**9,304·7**	**33**	**3·22**	**299·98**	**374·97**	**5,110**	**20,788**	**575**	**4·53**	**172·02**	**251·85**	**79·83**	**184·87**	**46**	**M.**
121	**1**	**354**	**8,893·2**	**25·12**	**3·24**	**288·25**	**360·31**	**4,409**	**18,665**	**725**	**3·82**	**170·04**	**241·78**	**71·74**	**191·2**	**47·19**	**M.**
56	4	332	9,740·3	29·34	3·3	321·73	402·16	5,485	22,812	875	5·30	198·01	269·04	70·85	198·21	48	F.
128	**1**	**300**	**8,091**	**26·97**	**3**	**250·51**	**313·13**	**3,890**	**15,894**	**355**	**3·82**	**142·48**	**211·76**	**69·28**	**176·09**	**45·50**	**M.**
118	1	332	7,757·8	23·34	3·58	277·93	347·41	4,279	18,040	636	3·82	168·47	229·43	60·96	217 33	45·61	F.

COWS WHICH HAVE COMPLETED LACTATION PERIODS DURING 1920-1921—*Con.*

Roman figures specify Pure-Bred.
Black figures specify Grade.

Cow No.	No. of Lactation Period	Number of days in Milk	Total Milk produced in period	Daily Average yield of Milk	Average percentage of Fat in Milk	Pounds of Fat for Period	Pounds of Butter for Period	Amount of Meal consumed	Amount of Roots and Roughage consumed	Amount of Hay Consumed	Months on Pasture at $2.00 per month	Total Cost of Feed for Period	Total Value of Product	Profit on Product	Cost to produce 100 lbs. Milk	Cost to produce 1 lb. butter	Sex of Calf
			Lbs.	Lbs.				Lbs.	Lbs.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	Cents	Cents	
95.....	2	454	14,184·5	31·24	3·25	461·37	576·71	6,740	31,501	1,337	6·29	328·27	386·78	58·51	231·42	56·9	M.
123.....	**1**	**293**	**7,563·4**	**25·81**	**3·14**	**238·14**	**297·67**	**3,823**	**14,565**	**600**	**3·82**	**146·62**	**200·72**	**54·70**	**193·32**	**49·05**	**F.**
93.....	3	345	6,967·3	20·19	3·76	262·76	328·45	4,857	17,723	410	6·00	161·38	215·28	53·90	231·6	49·13	F.
114.....	1	324	6,520·1	20·12	3·6	235·49	294·36	3,210	20,400	365	3·50	144·81	194·18	49·38	222·09	49·19	M.
72.....	**3**	**297**	**8,434·3**	**28·39**	**3·2**	**270·47**	**338·08**	**4,550**	**23,608**	**560**	**3·50**	**181·45**	**227·27**	**45·82**	**215·13**	**53·67**	**F.**
110.....	1	390	7,820·2	20·05	3	234·79	293·48	3,882	26,120	270	4·25	173·93	199·54	25·61	222·41	59·26	M.
75.....	8	298	7,749·6	·26	3·28	254·47	318·09	5,639	25,242	691	16·60	225·48	213·00	−12·48	290·95	70·08	M.

COMPARISON OF THE PERFORMANCES OF THE FIVE MOST PROFITABLE AND THE FIVE LEAST PROFITABLE COWS; ALSO OF THE BEST AND THE POOREST COW; ALSO THE FIVE MOST PROFITABLE PURE-BRED COWS AND THE FIVE MOST PROFITABLE GRADE COWS

—	Most profitable cow	Least profitable cow	Average 5 most profitable cows	Average 5 least profitable cows	Average 5 most profitable pure-bred cows	Average 5 most profitable grade cows
Duration of lactation period..... days	365	298	343·4	330·8	343·4	328·8
Yield of milk..... lbs.	19,798	7,749·6	16,954·6	7,498·3	16,954·6	9,354·5
Yield of fat..... lbs.	741	254·47	601·4	251·6	601·4	301·35
Cost of food..... $	406·50	225·48	331·74	177·4	331·74	165·49
Profit over food consumed $	201·29	— 12·48	163·53	32·44	163·53	87·66

LIST OF RECORDS MADE BY COWS IN THE CANADIAN RECORD OF PERFORMANCE DURING 1920-21

Name	Age at start of test	Month starting test	Duration of test	Amount of milk	Amount of fat	Per cent of fat
	yrs. days		Days	Lbs.	Lbs.	
Agassiz Pietje Korndyke.....	5	June. 1919....	365	19,798	741	3·74
Agassiz Lina Korndyke.....	6	Jan. 1920....	365	19,060	584	3·06
Lady Lyons Faforit.....	6	Nov. 1919....	329	18,829	641	3·4
Ottile DeKol Artis.....	4	Feb. 1920....	365	14,838	497	3·35
Agassiz Pietje Queen.....	2 159	July 1919....	365	12,711	508	4·0
Agassiz Faforit Canary.....	2 206	Nov. 1919....	282	14,375	533	3·71

LIST OF RECORDS MADE BY COWS OF THE HERD IN RECORD OF MERIT

Name of Cow	Duration of test	Age of Cow			Milk	Fat	Butter
	Days	Y	M	Dy.	Lbs.	Lbs.	Lbs.
Agassiz Lulu Sylvia.....	7	2	3	15	325·4	13·57	16·97
Agassiz Faforit Sylvia.....	7	2	5	4	434·7	13·33	16·66
Agassiz Faforit Canary.....	7	3	5	7	361·5	12·51	15·64
Agassiz Priscilla Sylvia.....	7	2	2	26	428·4	12·0	15·0
Agassiz Mechthilde Sylvia.....	7	2	2	5	367·8	11·47	14·33
Agassiz Walula Sylvia.....	7	2	4	1	374·3	10·44	13·05

COST OF RAISING PURE-BRED HOLSTEIN HEIFERS

FEED COST OF RAISING CALVES TO SIX MONTHS OF AGE

Whole milk, 989 lb. at $3 per 100	$29 67	
Skim-milk, 2,434 lb. at 50c. per 100	12 17	
Silage, 954 lb. at 25c.	2 39	
Grain, 180 lb. at 3·22c. per lb.	5 79	
Hay, 169 lb. at 1·5c. per lb.	2 54	
		$ 52 56

FEED COST OF RAISING CALVES FROM SIX MONTHS TO TWELVE MONTHS

Skim-milk, 4,847 lb. at 50c. per 100	$24 23	
Silage, 4,729 lb. at 25c. per 100	11 82	
Grain, 559 lb. at 2.98c. per lb.	16 15	
Hay, 378 lb. at 1·5c. per lb.	5 67	
		57 87
Average cost of raising 5 heifers to 12 months		$110 43

The above figures show how expensive it is to raise good calves, with feed prices as shown. The most expensive feed during the first six months is whole milk, and, during the second six months, skim-milk. The heifers were a fine lot, and always in good condition.

There seems to be some difference of opinion in the minds of dairymen with regard to the advisability of clipping their calves in the fall or winter, with the idea of controlling lice. In an effort to get some data on the question, four heifers were clipped and four left unclipped. They were stabled in the same stalls and got the same kind of general care and attention. The results are in favour of non-clipping.

CLIPPED VS. UNCLIPPED CALVES

		Clipped calves	Unclipped calves
No. of calves in experiment		4	4
Average age at commencement of experiment	days	240	232·5
Average weight at commencement of experiment	lbs.	491	486·5
Weight at end of three months	"	656	682·5
Average gain per calf in 3 months	"	165	196
Average amount grain consumed	"	294	283
" " roughage consumed	"	3,376	3,292
" " skim milk consumed	"	2,136	2,136
" " hay consumed	"	104	97
Average cost feed consumed per calf	$	26.60	26.03

Dairy Cow Feeding Experiments

Three tests were conducted with cows, relative to milk and butter production:—
First.—Sunflower silage versus corn silage.
Secondly.—Potatoes versus mangels.
Lastly.—Grain mixture versus brewers' grains.

SUNFLOWER SILAGE VS. CORN SILAGE

This experiment was conducted during the months of December and January, the cows used being all two-year-old heifers in their first lactation. They were fed ten pounds of grain per cow per day throughout the experiment, the mixture being five parts crushed oats, two parts bran, and one part oil cake, it costing 2·37 cents per pound. They were also given twenty pounds of mangels and fifty-five pounds of ensilage. They were milked by the milking machine. No difficulty was experienced in getting the cows to eat the sunflower silage. It was of fair quality, but not so bulky as the corn silage. The results obtained were in favour of corn, as it produced more milk and butter, as well as producing them more cheaply. One hundred pounds of milk cost 8·9 cents, and a pound of butter 49 cents more when sunflower silage was fed.

SUNFLOWER SILAGE VS. CORN SILAGE

		Sunflower Silage	Corn Silage
No. of cows in experiment		9	9
Total milk produced by all cows	lbs.	1,377·4	1,437·7
Amount of milk produced per cow per day	"	21·861	22·81
Percentage of fat in milk produced		3·242	3·135
Amount of fat produced per cow per day	lbs.	0·708	0·715
Corn silage consumed per 100 lbs. milk produced	"	.....	241
Sunflower silage consumed per 100 lb. milk produced	"	251·7	
Corn silage consumed per 1 lb. fat produced	"	.....	76·87
Sunflower silage consumed per 1 lb. fat produced	"	77·595	
Grain mixture consumed per 100 lb. milk produced	"	45·76	43·82
Grain mixture consumed per 1lb. fat produced	"	14·1	13·97
Roots consumed per 100 lbs. milk produced	"	91·525	87·64
Roots consumed per 1 lb. fat produced	"	28·215	27·954
Total cost of food	$	28·90	28·90
Cost to produce 100 lbs. milk	$	2·099	2·01
" " 1 lb. fat	cts.	64·72	64·11
" " 1 lb. butter	"	51·77	51·28

POTATOES VS. MANGELS

Eight uniform heifers in their first lactation were used in this experiment Potatoes were almost unsaleable, but when picked over, sacked, hauled and pulped they were valued at $6 per ton. Mangels were charged at the same price, and the grain was the same as in the former experiment. The results obtained show considerable advantage in favour of mangels. Milk was produced at 6·52 cents per hundred pounds and butter at 2·184 cents per pound less when mangels were fed. No ill effects were noticeable from feeding pulped potatoes at the rate of twenty pounds per cow per day, in two feeds.

POTATOES VS. MANGELS FOR DAIRY COWS

		Potatoes	Mangels
Number of cows in experiment		8	8
Total milk produced by all cows	lbs.	1,344·9	1,396·3
Amount of milk produced per cow per day	"	24·01	24·93
Percentage of fat in milk produced		3·35	3·4
Amount of fat produced per cow per day	lbs.	0·805	0·847
Clover silage consumed per 100 lbs. milk produced	"	208·25	200·53
Clover silage consumed per 1 lb. fat produced	"	62·21	58·97
Grain consumed per 100 lbs. milk produced	"	41·645	40·1
Grain consumed per 1 lb. fat	"	12·44	11·79
Mangels consumed per 100 lbs. milk produced	"	.....	80·21
Mangels consumed per 1 lb. fat produced	"	.....	23·58
Potatoes consumed per 100 lbs. milk produced	"	83·3	
Potatoes consumed per 1 lb. fat produced	"	24·88	
Total cost of food	$	23·63	23·63
Cost to produce 100 lbs. milk	cts.	175·75	169·23
" " 1 lb. fat	"	52·51	49·77
" " 1 lb. butter	"	42·0	39·816

GRAIN MIXTURE VS. BREWERS' GRAINS

This experiment was conducted with a view to getting some information on the value of brewers' grains as a feed for dairy cows. The brewers' grains cost $7 per ton f.o.b. Vancouver, with a carriage charge of $4.40 per ton added. The grain mixture fed to the cows at that time cost $67 per ton. Each cow in the experiment was getting at that time from ten to twelve pounds per days of this expensive mixture. In the trial half the dry grain ration was replaced by from thirty to thirty-five pounds of brewers' grains, with good results. Not only did the brewers' grain produce much more milk, i.e., almost four pounds per cow per day, but 100 pounds of milk cost 19·7 cents less, and a pound of butter 7 cents less when the brewers' grains was fed. Alfalfa hay cost $53.00 per ton, and was fed at the rate of five pounds per cow per day. The brewers' grains were shipped in cars, fifteen tons at a time, and stored by salting and packing well in a silo that had previously been divided. Very little spoiled when handled in this manner.

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DRY GRAIN MIXTURE VERSUS BREWERS' GRAINS

		Grain Mixture	Brewers' Grains
Number of cows in experiment		10	10
Total milk produced by all cows	lbs.	2,393·25	2,661·6
Amount of milk produced per cow per day	"	34·19	38·02
Percentage of fat in milk produced		3·081	3·246
Amount of fat produced per cow per day	lbs.	1·132	1·234
Silage consumed per 100 pounds milk produced	"	156·62	140·7
Silage consumed per 1 lb. fat produced	"	50·835	43·334
Alfalfa hay consumed per 100 lbs. milk produced	"	14·635	13·149
Alfalfa hay consumed per 1 lb. fat produced	"	4·745	4·049
Grain consumed per 100 lbs. milk produced	"	31·03	13·93
Grain consumed per 1 lb. fat produced	"	10·065	4·292
Brewers' grain consumed per 100 lbs. milk produced	"	.....	81·529
Brewers' grain consumed per 1 lb. fat produced	"	.....	25·109
Total cost of feed	$	43·49	43·43
Cost to produce 100 lbs. milk	cts.	182·895	163·191
" " 1 lb. fat	"	59·02	50·259
" " 1 lb. butter	"	47·21	40·207

Contagious Abortion

The greatest problem contended with in the herd during the year was contagious abortion. Much time, study, labour and expense have been devoted to this problem, with, up to the present time at least, very little satisfactory result. Careful mechanical washing and irrigation were carried on, also some vaccination, but little improvement has taken place. This is one of the most difficult problems confronting dairymen of the province at the present time.

For the past two years there has been trouble in the Station's dairy herd with contagious abortion. It started at first with cows returning to the bull once or twice, and then quite often. An odd cow would retain her afterbirth; then they began calving a week or so ahead of time and, later, the disease made itself known in its true form. Now, any cow in the herd is considered an aborter that is irregular in periods of oestrum, that shows any unnatural discharge, that takes on male characteristics, that retains afterbirth, or that aborts or prematurely calves (whether the calf lives or not).

Prior to August, 1920, the disease was handled in a careful way by using mechanical treatments, douching, irrigating, and using disinfectants. The results obtained were frequently encouraging, though at other times discouraging. An aborter might receive careful treatment, clean up, be bred and be healthy afterwards, while the next one might be bred, and abort, might have ovary trouble, and become sterile or might go full time and have a weak calf and retain her afterbirth. The treatment was not what might be termed satisfactory. No isolation was attempted, other than keeping the unhealthy cows together as much as possible in one portion of the barn.

Just before attempting some vaccine work in August, 1920, all animals in the herd over five months of age were blood tested with the aglutination and compliment fixation tests. Judging from the history of the animals prior to testing, as well as to date since testing, it is believed that these tests are fairly accurate in that they seldom mark non-infected cows as diseased. Of the 24 reactors of breeding age, there is no doubt that 22 of the animals were infected. The other two animals, however, have shown no signs of the disease before or since testing; though this is no proof that they are clean. From these results, then, it would appear that the tests are at least 91·77 per cent correct, in that they seldom mark a healthy cow as an aborter. On the other hand, the tests appear to be less correct when labelling healthy cows, as, judging from the history of these cows, some were actually infected. Nothing certain can be proven in this respect, but several non-reactors have aborted since testing, and several had aborted before testing. They may have, however, become infected since testing, or cleaned up before.

It was decided at this time to vaccinate all the grade animals in the herd with the Health of Animals Branch vaccine treatment, leaving the pure-bred animals as checks on the work. The vaccines were double doses to non-pregnant cows of, first, killed culture, and then double doses to non-pregnant cows, of, first, killed culture and then live culture. The animals were not bred till at least two months after vaccination. The following results are apparent at time of writing:—

REACTORS TO BLOOD TESTS

No. of Cow	Date given 2nd dose	Remarks
130	Sept. 3, 1920.....	Bred 7 times since, not pregnant.
131	" 3, 1920.....	Bred 5 times since, apparently pregnant.
132	" 3, 1920.....	Bred 7 times since, not pregnant.
134	Oct. 1, 1920.....	Bred once and pregnant, Due Sept. 8, 1921.
136	Sept. 3, 1920.....	Bred once and pregnant. Due Aug. 14, 1921.
146	Mar. 18, 1921.....	Not bred.
148	Sept. 3, 1920.....	Virgin heifer, bred once, pregnant. Due Sept. 19, 1921.

NON-REACTORS TO BLOOD TESTS

No. of Cow.	Date given 2nd dose	Remarks
128	Sept. 3, 1920.....	Bred once, pregnant. Due Aug. 21.
133	Oct. 15, 1920.....	Bred 3 times, not pregnant.
141	Dec. 17, 1920.....	Bred twice, may or may not be pregnant.
150	Sept. 3, 1920.....	Virgin heifer, bred once. Due Aug. 18, 1921.

Time will demonstrate what happens to the vaccinated cows. Difficulty was experienced in getting at least four of the eleven vaccinated cows bred. At time of writing none of these cows that were pregnant have aborted.

Dairying

The work carried on in the dairy was of three kinds, viz.: milk testing, buttermaking and cheesemaking.

Milk Testing has consisted of the usual weekly composite test for each cow in the herd, and of some special records for the Record of Merit in connection with the Holstein-Friesian Association. In addition to this, milk samples have been tested for any farmer who is desirous of having this work done, while others were submitted by the Health Officer of a neighbouring town.

Buttermaking was confined to that needed for local sale, and was not carried on experimentally. An average of forty-five pounds per week was manufactured, the yield of butter being usually a satisfactory one.

Cheesemaking.—The varieties made were English Stilton, Cream cheese, Caerphilly, and Agassiz Wensleydale. A considerable part of the work was a continuation of that done the previous year, but a variation in conditions enabled some more observations to be made regarding English Stilton. An extremely wet spring seemed to make it additionally clear that excessive moisture in the air has a tendency to produce a cheese too soft in texture, very strong in flavour, and dark coloured; these faults were aggravated by an incorrect bacterial condition in the milk. The remedy of an increased acidity in the milk, which had sometimes been found useful, proved unreliable in this case. The manufacture was discontinued from the 14th of May till the end of July. When it was resumed, both weather and the condition of the milk were

improved, and the Stilton made from that date till November 3 was of satisfactory quality, and is selling now at 50 cents a pound.

During November and December some trials were made with Caerphilly cheese. This is a cheese suited to the farmer who wishes to make cheese at home, but does not wish to set up an elaborate plant. The trials showed that this cheese can be made with success under the average climatic conditions prevailing on this coast, and gave further data as to best methods to follow. The experiment, however, is not yet complete, as the cheese has only been sold locally, and has not been put to the test of the city market.

The manufacture was temporarily discontinued in favour of Agassiz Wensleydale, as the latter was thought to be more useful. No difficulty was experienced in placing this cheese on the market. It is neat in appearance, measuring about 4½ inches by 3½ when ripe, and averaging 2½ pounds in weight. The bandage used here is a plain cheese cloth one, but the addition of a printed label or the use of a printed bandage adds to its attractiveness.

The manufacture of cream cheese remains the same, and, with present price, gives a return of 80 cents per pound butterfat, 10 cents in advance of sweet cream.

During the year a new separator was installed, a DeLaval steam turbine machine. Tests of the separated milk show an average loss of fat of 0·015 per cent; in some cases no more than a trace is visible. Two rooms of the dairy have been painted with a hard enamel paint, which seems to be giving most satisfactory results, whether applied to wood or cement. When thoroughly hard it is as easily washed as porcelain, and is both sanitary and effects saving of labour, besides being of pleasing appearance.

HORSES

The horses on hand March 31, 1921, total fourteen head. They consist of four mature mares, three two-year-old, one yearling filly, and one horse colt, all pure-bred Clydesdales; also three grade geldings, one grade mare, and a driver. On account of a decrease in farm work, the purchase of a tractor, and the fact that there are three fillies to break in, four of the older work horses were sold. Two foals were born in May. One of these contracted a severe attack of rheumatism during the wet fall, and, when almost recovered from this trouble, it accidentally broke a leg and had to be killed. All horses on the farm old enough to harness are worked, whether pure-breds or grades, including the brood mares. The latter, after foaling, as well as the young stock, were pastured during the year when possible.

A new departure was made last season with the Clydesdales in the way of exhibition work. The following prizes were won: At Vancouver: Yeld mare, 1st; filly two-year, 1st, 2nd and 3rd; filly yearling, 3rd; two animals from one dam, 1st. At Victoria: Yeld mare, 2nd; filly two years, 1st and 3rd. At Westminster: Yeld mare, 3rd; filly two years, 1st and 2nd. The first prize two-year-old was also reserve champion.

No experimental work was done with the horses, but figures were compiled on the cost of raising and maintaining.

Average cost of wintering four idle horses from November 20 to March 1, 100 days:—

Amount of oats consumed—500 lb. at $50 per ton	$12 50
Amount of hay consumed—2,000 lb. at $30 per ton	30 00
Amount of roots consumed—500 lb. at $5 per ton	1 25
Amount of bran consumed—100 lb. at $43 per ton	2 15
	$45 90

These horses were wintered in a field with plenty of shelter provided by a shed in the bush. They were in excellent condition to start work in March, weighing twenty pounds each more than when turned out in November, besides having feet and legs in good condition.

COST OF MAINTAINING BROOD MARE FOR TWELVE MONTHS

"Melita:" Weight in good condition, 1,800 pounds

Amount of grain consumed, 2,996 lb. at 2·775c. per lb.	$ 83 14
Amount of hay consumed, 5,655 lb. at 1·45c. per lb.	82 00
Amount of roots consumed, 637 lb. at ¼c. per lb.	1 60
Months on pasture, 5, at $2 per month	10 00
	$176 74

COST OF RAISING CLYDESDALE FILLY FROM BIRTH TO SEVEN MONTHS

"Melita's Pride:" Weight at 2½ months, 445 lb. Weight at 7 months, 790 lb.

Amount of grain consumed, 608 lb. at 2·64c.	$16 05
Amount of hay consumed, 972 lb. at 1·5c.	14 58
Amount of roots consumed, 312 lb. at ¼c.	0 78
	$31 41

COST OF RAISING CLYDESDALE FILLY FROM SEVEN TO NINETEEN MONTHS

"Princess Melita:" Weight at 7 months, 770 lb. Weight at 19 months, 1,235 lb.

Amount of grain consumed, 2,030 lb. at 2·896c.	$ 58 78
Amount of hay consumed, 3,281 lb. at 1·575c.	51 68
Amount of roots consumed, 507 lb. at ¼c.	1 27
Months on pasture, 5, at $2 per month	10 00
	$121 73
Total cost of raising Clydesdale filly from birth to 19 months of age	$153 14

SHEEP

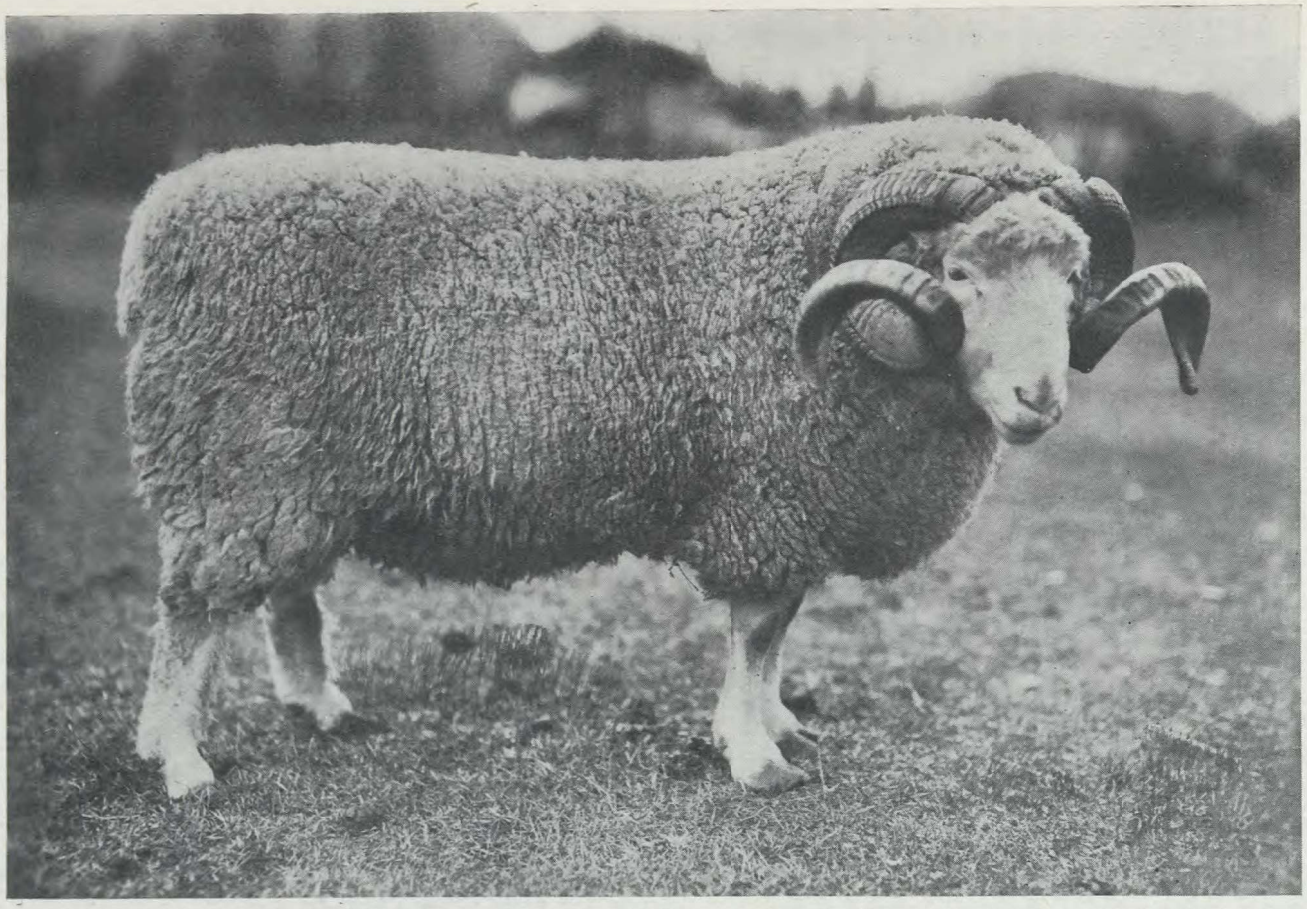
The flock has passed another successful year with very little trouble or sickness. Three ewes died of haermorrhagic septicemia but not further trouble was recorded from this source. The following animals were on hand at the close of the year:—Two Dorset rams, fifty-one Dorset ewes, eight first cross Dorsets, twenty second cross Dorsets, one-third cross Dorset, one Oxford Down ram, and seven first cross Oxford Down ewes, a total of ninety breeding sheep, besides the fifty-four spring lambs. Twenty of the most mature lambs were sold early for Easter lamb. The lambing results this year are satisfactory, but not so good as in some previous years, because of the larger percentage of one-shear ewes, and also the fact of their being bred for early lambs. The results are as follow:—

BREEDING RESULTS WITH SHEEP

	Lambs	Alive	Raised	Per cent lambs raised
32 pure-bred ewes dropped	50	47	43	134·3
8 Dorset first-cross dropped	15	15	14	175·
9 Dorset second-cross dropped	13	13	12	133.3
6 Oxford first-cross dropped	7	5	5	99.9
Total	85	80	74	

55 ewes percentage dropped 154·5 lambs, raised 134.5.

A special effort was made this year in Easter lamb production. All the ewes that would breed were bred to lamb early in January. The result was that thirty lambs, averaging close to fifty pounds, were prepared for Easter market. Twenty of these were all the market would absorb at that time, although the remainder were sold aftedwards. The price secured was thirty cents per pound, live weight, or an average



Miner 1938, owned by Dominion Experimental Farm, Agassiz, B.C. Seven times a champion and never defeated. This is the type of ram used in the pure-bred and grading experiment.

of $14.60 per lamb for twenty lambs. The following statement shows the feed consumed by an average ewe, raising one lamb, from January 1st to Easter:—

Meal mixture: 8 parts oats, 2 parts bran, 1 part oil meal.

148 lbs. meal at $50 per ton	$ 3 70
552 lbs. roots and silage at $5 per ton	1 38
276 lbs. clover hay at $25 per ton	3 45
Total cost of feed for ewe and lamb	8 53
Receipts from sale of lamb	14 60
Balance	$ 6 07

CO-OPERATIVE WOOL SELLING

The 1920 wool clip was 77 fleeces, 632 pounds, or an average of 8·2 pounds per fleece. It was sold co-operatively by the Canadian Wool Growers, Limited, and returned fourteen cents per pound net. The following is the grading statement:—

Grade	Pounds
Medium combing (staple)	177
Medium clothing	10
Low medium combing (staple)	399
Low combing (staple)	24
Medium tags	22
	632

In order to get some figures on wool yields from early shorn lambs, as compared with later shown, three pure-bred Dorset lambs were shorn in December and compared with five shorn in March.

DECEMBER VERSUS MARCH LAMB SHEARING

	December shorn	March shorn
Number of lambs	3	5
Average weight of lambs, December 31	126·3	119
" " March 11	140·0	130·6
Average gain in weight per lamb	13·7	11·6
Total yield of wool lbs.	21·8	46·5
Average yield of wool per lamb "	7·26	9·3

The lambs shorn in March yielded slightly over two pounds more wool per lamb than those shorn in December, but the latter made an average gain per lamb of 2·1 pounds more.

GRADING WORK

A grading experiment has been carried on here for several years, using Dorset Horn rams on smaller, dark faced, hornless grade ewes. After a sufficient number of first cross Dorset ewes were reared an Oxford grading experiment was commenced, using the same original ewes as a foundation. Not only will this allow of a comparison of Dorset and Oxford rams with regard to their suitability in improving flocks, but results from two trials will be available. The foundation ewes were sold during the year, on account of their age. The following results were obtained in wool yields, averaged for a number of years.

	Average weight per fleece
	lbs.
Original foundation ewes (mature)	7·7
Dorset Horn first cross (Shearlings)	8·78
Dorset Horn second cross "	10·36
Oxford Down first cross "	11·34

In the Dorset grading experiment not only is improvement noted in wool yields, but it is showing in the white faces and horns on the offspring as well as in the fleshing qualities and general conformation.

Original Ewe No. 7, with her First Cross Daughter No. 35, showing white feet and horns

PURE-BRED DORSETS VERSUS SECOND-CROSS DORSETS ON RAPE PASTURE

	Pure-bred Dorsets	Second-cross Dorsets
Number of lambs on experiment	13	5
Average age at commencement ..... days	191	203
Total weight at commencement ..... lbs.	1,121	434
Average weight at commencement ..... "	86·2	87·4
Number of days on trial	60	60
Total weight at end of trial ..... lbs.	1,299	494
Average weight at end of trial ..... "	99·9	98·8
Average gain per lamb ..... "	13·7	11·4

In a sixty-day trial the pure-bred Dorsets gained only 2·3 pounds more than the second cross lambs.

PURE-BRED DORSETS VERSUS SECOND-CROSS DORSETS ON CLOVER PASTURE

		Pure-bred Dorsets	Second-cross Dorsets
Number of lambs on experiment		12	7
Average age at commencement	days	224	206
Total weight at commencement	lbs.	1,162	692
Average weight at commencement	"	96·83	98·86
Number of days on trial		60	60
Total weight at end of trial	lbs.	1,218	704
Average weight at end of trial	"	101·5	100·57
Average gain per lamb	"	4·67	1·71

In a sixty-day trial the pure-bred Dorsets gained only 2·96 pounds per lamb more than the second-cross lambs.

CLOVER PASTURE VERSUS RAPE PASTURE FOR FATTENING LAMBS

		Clover	Rape
Number of animals in group		20	18
Average weight at birth	lbs.	8·3	8·3
Total weight, October 1	"	1,968	1,558
Average weight, Oct. 1	"	98·4	86·55
Average age, Oct. 1	days	217	194
Number of days on trial		60	60
Total weight at end of trial	lbs.	2,030	1,792
Total gain in weight	"	62	234
Average gain per lamb	"	3·1	13
Total amount of grain consumed	"	830	747
Average amount of grain consumed per lamb	"	41·5	41·5
Value of gain per lamb at 15c. per lb	cts.	46·5	195
Advantage in favour of rape pasture per lamb for a 60-day period	"	.....	148·5

This comparison of rape and clover for fattening lambs is not exactly a fair one, as the clover-fed lambs were heavier at the commencement. The clover group did not make sufficient gains to pay for the grain they ate. The clover pasture was last spring's seeding after the grain crop had been removed. This seems to be too soft a feed to make good lamb gains.

VALUE OF RAPE PASTURE FOR FATTENING OLD CULL EWES

Number of ewes in experiment		9
Weight at commencement of trial	Lbs.	1,266
Length of trial	Days	30
Weight at end of trial	Lbs.	1,500
Total gain	"	234
Total value of gain at 10c. per lb	$	23 40
Total amount of grain consumed	Lbs.	270
Total value of grain consumed	$	5 40
Value of rape pasture consumed, $23.40—$5.40	$	18 00
Value of rape pasture per ewe per day	Cts.	6·666

This trial shows a handsome return from the rape pasture when used for fattening old ewes for market that had just weaned lambs, and were in low condition.

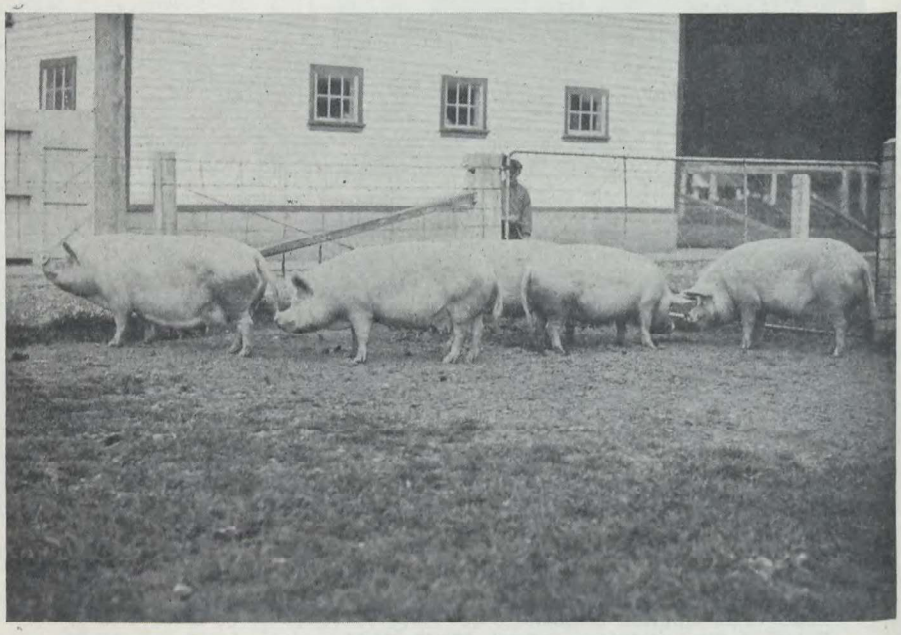
WHOLE OATS VERSUS CRUSHED OATS FOR WINTERING LAMBS

		Whole Oats	Crushed Oats
Number of lambs in trial		17	17
Length of trial	days	60	60
Total weight at beginning of trial	lbs.	1,936	1,936
Average weight at beginning of trial	"	113·9	113·9
Total weight at end of trial	"	2,228	2,219
Average weight at end of trial	"	131·6	130·5
Total gain	"	292	283
Average gain per lamb for period	"	17·7	16·6

The object of this experiment was to secure information with regard to the advisability of crushing oats to feed to lambs which were being retained for breeding purposes. The lambs were started on the trial when about a year old. They were given the run of a field when weather permitted; otherwise they were fed hay and straw inside. They were fed one pound of grain per lamb per day, the grain consisting of 400 pounds of oats and 100 pounds of bran, with the oats crushed for one group. For all practical purposes there was no difference.

SWINE

There were seventy pure-bred Yorkshire swine on this farm on March 31, 1921. They consisted of the following: Two aged boars, nine brood sows, four gilts, nineteen experimental feeders and thirty-six sucking pigs. There were sold for breeding purposes during the past year seven males and twenty-five females. These animals were shipped into various localities in British Columbia, and should have a beneficial effect upon the type of hogs produced in those districts to which they were sent.



Agassiz, B.C. A group of Yorkshire Breeding Sows.

The housing facilities of the breeding herd are such that any farmer desiring to raise pigs could duplicate. Their quarters are cheaply constructed portable cabins, easily built, and mostly of the A-shaped type. The cots are situated on the south side of a mountain, and well sheltered by the bush. The breeding herd is kept on enclosed land, which is of no value at present, except for some such purpose.

From a week to ten days prior to farrowing the sows are transferred to the piggery, where they receive the best of attention till litters are weaned. It is more convenient to have the sows in this building, and, if several sows are due about the same time, the labour in caring for them is minimized.

The piggery is 68 feet long by 30 feet wide. It has a feed room at one end, and a 6-foot aisle down the centre, with 5 pens, 10 feet by 10 feet, on each side. The floors are cement, the building is well lighted, and the ventilation good. A food cooker and floor scales are installed. This building is also used for experimental feeding as well as for a farrowing house.

The bulk of the grain ration for the breeding herd consisted of three parts screenings, one part shorts, one part bran and one part oat chop. When possible during the winter they were also fed mangels. Up to nearing farrowing time the dry sows were fed from four to five pounds per pig per day. During the first ten days after farrowing the ration was increased from very light feeding to from six to eight pounds per day as required.

LIFE RECORD OF PRODUCING SOWS IN HERD FROM APRIL 1, 1920, TO MARCH 31, 1921, OR ANY PART THEREOF

Sow No.	Age	Total No. of Litters	Total No. of		Average No. of		Per cent pigs farrowed raised
			Pigs farrowed	Pigs raised	Pigs per litter farrowed	Pigs per litter raised	
49	5	8	97	74	12·12	9 25	76·32
43	5	8	92	58	11·50	7·25	63·04
53	4	6	70	51	11·66	8·50	72·89
54	4	5	50	37	10·	7·40	74·0
56	4	6	58	44	9·66	7·33	75·87
26	4	6	63	46	10·50	7·66	72·95
36	4	6	64	46	10·66	7·66	71·85
40	1	1	8	8	8·	8·	100·0
1	1	1	8	8	8·	8·	100·0
Total average					10·23	7·89	78·54

RECORD OF PRODUCING SOWS, APRIL 1, 1920, TO MARCH 31, 1921

Sow No.	Date of Farrowing	No. of pigs farrowed	No. of pigs raised	Per cent of pigs farrowed raised	
49	Sept. 21, 1920	14	10	71·42	
43	Mar. 13, 1921	14	9	64·28	67·85
	April 9, 1920	4	4	100·	
	Oct. 30, 1920	14	10	71·42	85·71
53	Sept. 9, 1920	17	9	52·94	
54	Mar. 4, 1921	11	5	45·45	49·19
56	Dec. 4, 1920	7	4	57·14	
26	Oct. 15, 1920	12	6	50·	
36	Sept. 12, 1920	12	7	58·33	
	Mar. 4, 1921	14	7	50·	54·16
	April 19, 1920	14	10	71·42	
40	Nov. 6, 1920	13	9	69·23	70·32
1	Mar. 4, 1921	8	8	100·	
	Mar. 1, 1921	8	8	100·	
Average of 9 sows for year		18·	11·77	65·38	

A total of 14 litters gave 162 pigs farrowed, and 106 raised, which gives an average of 11·57 pigs farrowed per litter, and 7·57 raised.

The feed cost per year of an average sow raising two litters a year is given below. This includes the feed of her young pigs to ten weeks of age.

1,090 lb. screenings at $45 per ton	$24 52
345 lb. oats at $50 per ton	8 62
345 lb. shorts at $35 per ton	6 03
345 lb. bran at $35 per ton	6 03
1,680 lb. skim-milk at 50c. per 100 lb.	8 40
	$53 60

FEED COST TO RAISE SOW TO BREEDING AGE (1 YEAR)

Feed of brood sow weaning to farrowing:—	
340 lb. screenings at $45 per ton	$7 65
126 lb. oats at $50 per ton	3 15
130 lb. shorts at $35 per ton	2 27
126 lb. bran at $35 per ton	2 30
	$15 37

FEED OF BROOD SOW FARROWING TO WEANING, INCLUDING FEED OF YOUNG PIGS

224 lb. screenings at $45 per ton	$5 04
184 lb. oats at $50 per ton	2 10
132 lb. shorts at $35 per ton	2 31
84 lb. bran at $35 per ton	1 47
740 lb. skim-milk at 50c. per 100 lb	3 70
	$14 62
Feed cost of 8 pigs to 10 weeks of age, including the cost of sow since weaning former litter	$29 99
Feed cost per pig	3 75

FEED COST FROM TEN WEEKS TO SIX MONTHS

168 lb. shorts at $35 per ton	$2 94
56 lb. screenings at $45 per ton	1 26
56 lb. oat chop at $50 per ton	1 40
56 lb. bran at $35 per ton	0 98
320 lb. skim-milk at 50c. per 100 lb	1 60
	$8 18

FEED COST FROM SIX MONTHS TO ONE YEAR

320 lb. screenings at $45 per ton	$ 7 20
107 lb. shorts at $35 per ton	1 87
107 lb. oats at $50 per ton	2 67
107 lb. bran at $35 per ton	1 87
546 lb. skim-milk at 50c. per 100 lb	2 73
	$16 34

SUMMARY OF FEED COST TO RAISE YOUNG SOWS TO ONE YEAR

Brood sow and litter to weaning, per pig	$ 3 75
Young sow 10 weeks to six months	8 18
Young sow 6 months to 1 year	16 34
	$28 27

TANKAGE VS. VARYING QUANTITIES OF SKIM-MILK

A feeding experiment was carried on to compare tankage as a substitute for skim-milk. The pigs were divided into three lots, each lot being separated into two groups containing three and six pigs respectively. They were all fed the same grain ration, of one part corn meal, three parts screenings, and three parts shorts, lot one receiving in addition four pounds of skim-milk per pig per day, lot two eight pounds of skim-milk per pig per day, and lot three ten per cent tankage.

SWINE FEEDING EXPERIMENT

		Lot 1		Lot 2		Lot 3	
		A	B	A	B	A	B
Number of pigs in pen		3	6	3	6	3	6
Average age at beginning of experiment	Days	108	74	108	74	108	74
Duration of feeding period	"	67	67	67	67	67	67
Average weight at beginning	Lbs.	90	47	88	48	92	43
Average weight at end	"	171	119	174	126	169	109
Average gain for period	"	81	72	86	78	77	66
Average daily gain	"	1·20	1·07	1·28	1·16	1·14	0·98
Average daily gain per lot	"	1·13		1·22		1·06	
Feed consumed per 100 lbs. gain—							
Corn meal at $58 per ton	"	59·42	47·10	56·20	43·37	58·87	46·32
Screenings at $45 per ton	"	178·26	141·30	168·60	130·11	176·61	138·90
Shorts at $35 per ton	"	178·26	141·30	168·60	130·11	176·61	138·90
Skim milk at 50c. per 100 lbs	"	329·50	353·59	623·25	651·28	.....	.....
Tankage at $66 per ton	"	.....	.....	.....	.....	45·45	35·94
Cost to produce 100 pounds gain	$	12·95	12·13	13·33	12·42	13·31	12·19
Average cost per lot to produce 100 pounds gain	$	12·54		12·87		12·75	

The results indicate that the gain increased as the amount of milk was increased, the most profitable gains being made when feeding four pounds of skim-milk per pig per day, while tankage gives evidence of being a valuable substitute for skim-milk.

Relative to the foregoing experiment, a series of experiments was set on foot in the winter of 1917-18 with the object of determining the most profitable quantity of skim-milk to feed weanling pigs. Similar experiments have been carried on every winter since, as a result of which it is interesting to note that, in every case, the larger the amount of mik fed, the greater are the gains. Skim-milk was fed at the rate of two, four, six and eight pounds per pig per day, the most economical gains centering around the groups receiving from four to six pounds per pig per day. Feeding any of the various meal mixtures employed in the experiments without skim-milk or substitute, but with water only, gave unsatisfactory results, and proved that water is no substitute for skim-milk.

SELF FEEDER VS. TROUGH FEEDING

Thirteen young pigs were given a small clover paddock to run on, and were fed, feeding any of the various meal mixtures employed in the experiments without skim-milk, and all the fresh clean water they required to drink. Lot 2, in which there were eleven pigs, were grown under exactly the same conditions, except that they were fed from a trough in the ordinary way. The grain ration consisted of two parts screenings, one of rice meal and one of barley, for a portion of the time, and latterly two parts screenings and one part rice meal.

SELF-FEEEDER VERSUS TROUGH FEEDING

		Lot 1 Self Feeder	Lot 2 Trough
Number of pigs in pen		13	11
Average age beginning of experiment	Days	84	84
Duration of feeding period	"	56	56
Average weight at beginning	Lbs.	53·0	57·27
" weight at end	"	157·53	134·45
" gain for period	"	104·53	77·18
" daily gain	"	1·86	1·37
Feed consumed per 100 lbs. gain—			
Screenings at $45 per ton	"	187·16	202·0
Barley at $55 per ton	"	46·13	9·18
Rice meal at $48 per ton	"	74·58	100·94
Skim-milk at 50c. per 100 lbs	"	372·0	254·96
Cost to produce 100 pounds gain	$	8·91	8·48

The results obtained show a greater daily gain per pig in favour of the self-feeder, whereas cheaper gains were made by the trough fed lot. Taking labour into consideration, the value of the self-feeder is greatly enhanced. Were a self-watering device installed it becomes unnecessary to attend to the pigs more often than to fill the feeder, while with the trough feeding system they must be cared for at least twice daily. When the place of feeding is some distance from the barn the amount of labour saved is great.

FIELD HUSBANDRY

The month of April, 1920, was cool, cloudy and very wet. The rainfall of 9·95 inches was a record for the month. May was not so wet, but was cool. These weather conditions caused a late, backward spring. June was also the wettest for twenty years, and during this month crops and weeds made rank, rapid growth; the latter were very difficult to control, owing to the continuous rainfall. July, August and the first week of September were dry and hot. This weather afforded better conditions for weed control, allowed the harvesting of an average crop of hay in excellent condition, ripened the cereals somewhat too rapidly for heavy yields, but made harvesting a rapid process, and allowed some of the early grain to be threshed. On September 8 the rains commenced, and continued almost without ceasing to the end of October. About fifty per cent of the grain in the Fraser valley was destroyed in the stook, and many potatoes rotted in the ground; while harvesting of corn and roots was a difficult task. The early part of November was dry, thus affording good conditions for completing the root harvesting. The winter was mild, cloudy and wet. The closing days of March give every indication of an early spring. The heavy rainfall in June followed by the heat of July caused the Fraser river to flood. The floods, coupled with the heavy rains of September and October, were the direct cause of the loss of several thousands of dollars' worth of crops. The total precipitation for the year was 87·67 inches—a record for all years in the history of the farm. Field crop yields on the Experimental Farm, however, were good. They were as follows:—

FIELD CROP YIELDS, 1920

Crop	Yield	
	tons	lbs.
Corn silage	266	1,020
Clover silage	169	1,850
Pea and oat silage	63	513
Sunflower silage	53	135
Clover hay	63	1,365
Mangels	141	1,000
Carrots	3	200
Sugar beets	.....	1,230
Potatoes	8	.....
Mixed grain	81	1,400
Oats	16	450
Wheat	.....	575
Peas	2	638

This gave a total of 697 tons 1,948 pounds of silage and roots, 63 tons 1,365 pounds of hay, 100 tons 1,063 pounds of grain, and 8 tons of potatoes.

ROTATION WORK

The four-year rotation carried on here has continued to give good results; it consists of: first year, hoed crop; second year, grain seeded down; third year, hay; fourth year, pasture.

HOED CROPS

The crops grown in this section were corn, sunflowers, roots and potatoes. This land, which had been in pasture the previous year, was manured in the fall, and the largest portion of it autumn ploughed.

The variety of corn grown was Longfellow. The corn is usually sown in check rows, but this year it was sown in drills. A twenty-acre field yielded at the rate of 10 tons, 188 pounds per acre, which was below the average. A smaller section used to compare with sunflowers yielded 15 tons, 1,807 pounds per acre, as compared with a yield of 14 tons, 300 pounds per acre of sunflowers. These crops were sown in drills. This was the first time sunflowers were grown under field conditions here. The yield was not as good as was expected.

The root section was reploughed again in the spring, and well worked. The varieties grown were Danish Sludstrup and Yellow Leviathan. The seed was sown in drills, thirty inches apart, set up with a double mouldboard plough. The roots were sown between May 7 and 22, and harvested by November 5. An application of commercial fertilizer was put on the root land when the drills were set up, at the rate of 350 pounds of superphosphate and 150 pounds of nitrate of soda per acre. On account of the extremely wet weather in June, weeding and thinning were impossible. When this task was finally completed in July the crop did not do well, and the yields were only 14 tons, 1,043 pounds per acre, which is lower than usual.

GRAIN

The grain was sown on land that had been in hoed crop the preceding year, and had been fall ploughed after the hoed crop was harvested. It was then well worked in the spring, sown during the last of April, and harvested the second week in August. A twelve-acre section of the grain field was sown to Banner oats at the rate of 100 pounds of seed per acre; the crop secured amounted to 12 tons 500 pounds. A thirty-seven and one-half acre block sown to two bushels of oats and one-half bushel of peas per acre yielded 23 tons 1,250 pounds of mixed grain. A clover and grass mixture was sown at the same time as the grain, at the rate of 9 pounds Red clover, 3½ pounds alsike clover, 1½ pounds White Dutch clover, 2 pounds Italian rye grass, and 2 pounds orchard grass per acre. The catch was an excellent one, the aftermath producing some good sheep feed in the fall.

HAY

One portion of the field in hay for 1920 is very poor land. During the dry July and August of 1919 the clover and grass secured a very poor catch, which indirectly resulted in half the field being winter killed. This portion was ploughed and sown to peas, oats and rape, the pea crop being placed in the silo and the rape affording some little pasture later in the season. The yield of ensilage was poor, only 63 tons 513 pounds coming off eight acres. That portion of the field that did not winter-kill yielded a good crop of clover ensilage, which was harvested from June 17 to 30. The second crop of clover, a light one, was made into hay during the middle of August.

PASTURE

One of the best pasture crops on record grew during the 1920 season. The heavy rainfall in April, although cool weather prevailed, produced an early heavy growth of grass. The June rains kept the grass fresh and, although pastures were somewhat dry during August, they were greatly revived again in September, and were good for the rest of the season. One portion of the pasture meadow yielded a crop of hay, a rather unusual occurrence on this farm.

CULTURAL INVESTIGATIONS

In 1914 one hundred and forty plots were prepared for Cultural Investigation work. They were devoted to a four-year rotation in an endeavour to ascertain:—

(1) The best method of preparing land for hoed crops.
(2) The best seasons for applying barnyard manure.
(3) Methods of applying chemical fertilizers to mangels.
(4 The best after-harvest cultivation of root land in preparation for a grain crop to be seeded with clover.

In 1911 this land was ploughed from sod and planted to corn; in 1912 it was sown to grain and seeded to clover; in 1913 two crops of clover were harvested and the third ploughed under; and in 1914 it was laid off in plots and sown to oats as a control crop. In 1915 range number three was sown to mangels and corn, receiving the experimental treatment. This work has been carried on for six years, but weeds and weather influenced the sixth crop so much that it is not recorded and the work is now discontinued.

The treatment given, and the average results obtained from five-years crops, are given herewith. The commercial fertilizers used were 350 pounds of superphosphate of lime, 150 pounds of sulphate of potash, and 100 pounds nitrate of soda per acre.

CULTURAL WORK—AVERAGE OF FIVE YEARS

Plot	Crop	Treatment	Average yield per acre 5 yrs.
			lbs.
1	Mangels....	*Apply manure* (1,000 lbs. green) *early autumn* (Aug. or Sept.) Plough. Topwork. Replough later. Spring work. Sow mangels in drills 14 by 18. Apply commercial fertilizer	24,432
2	Corn.....	*Apply manure.* (1,000 lbs. green) *early autumn* (Aug. or Sept.). Plough Topwork. Replough later. Spring work. Sow mangels in drills 14 by 18. Apply commercial fertilizer	15,968
3	Mangels....	*Plough early. Topwork. Apply manure.* Replough late. Sow mangels. Commercial fertilizer	24,680
4	Corn.....	*Plough early. Topwork. Apply manure.* Replough late. Sow mangels. Commercial fertilizer	16,896
5	Mangels....	Check	3,304
6	Corn.....	No manure, no fertilizer. Work as 1	14,316
7	Mangels....	Plough early. Topwork. Replough late. *Apply manure in winter.* Spring work. Commercial fertilizer	25,976
8	Corn.....	Plough early. Topwork. Replough late. *Apply manure in winter.* Spring work. Commercial fertilizer	22,960
9	Mangels....	Plough early. Topwork. Replough late. *Apply manure in spring.* Spring work. Commercial fertilizer	35,112
10	Corn.....	Plough early. Topwork. Replough late. *Apply manure in spring.* Spring work. Commercial fertilizer	18,088
11	Mangels....	Plough in autumn. Topwork. *Apply manure in autumn.* Plough in spring. Topwork. Commercial fertilizer	14,340
12	Mangels....	Plough in autumn. Topwork. *Apply manure in winter.* Plough in spring. Topwork. Commercial fertilizer	22,056
13	Mangels....	Plough in autumn. Topwork. *Apply manure in spring.* Plough, work and sow. Commercial fertilizer	24,616
14	Mangels....	Plough in autumn. Topwork. Plough in spring. *Apply manure and disc in.* Sow mangels. Commercial fertilizer	21,968
15	Mangels....	No manure or fertilizer. Work as plots 11, 12, 13, 14	1,576
16	Mangels....	Plough in autumn. Topwork. Plough in spring. Sow mangels. *Topdress with manure on grain stubble.* Commercial fertilizer	16,304
17	Mangels....	Work the same as 16. *Apply manure as topdressing between first and* second clover crops. Commercial fertilizer	16,272
18	Mangels....	Work same as 16. *Apply manure as top-dressing in autumn on clover sod.* Commercial fertilizer	17,040
19	Mangels....	Work same as 16. *Apply manure ½ with hoed crop in Spring, ½ as top-dressing on grain stubble.* Commercial fertilizer	17,985
20	Mangels....	*Plough, work and* manure same as No. 1. *Apply commercial fertilizer in drills as set up*	17,256

CULTURAL WORK—AVERAGE OF FIVE YEARS—*Continued*

Plot	Crop	Treatment		Average yield per acre 5 years
				lbs.
21	Mangels....	Same as 20 only *apply commercial fertilizer broadcast before drills are set up*		18,715
22	Mangels....	Same as 20 only *apply commercial fertilizer in drills ½ of nitrate applied after mangels are thinned*		20,156
23	Corn.....	Same as 20 only *apply commercial fertilizer in hills* and sow corn		19,400
24	Corn.....	Work same as 20. Check. No fertilizer		16,456
25	Corn.....	Same as 20 only apply *commercial fertilizer broadcast. 5 year average grain.*		
26	Mangels....	Plough, work, manure and plant same as 20. After harvest plough in autumn. Commercial fertilizer	1,146	20,632
27	Mangels....	Same as 26. After harvest *plough in spring*	1,254	23,160
28	Mangels....	Same as 26. After harvest disc *harrow in autumn.* Commercial fertilizer	1,220	27,058
29	Mangels....	Same as 26. After harvest *disc in spring.* Commercial fertilizer	1,308	27,680
30	Corn.....	Plough early. Topwork. *Replough.* Spring work...Apply manure on grain stubble		14,850
31	Corn.....	*Plough early deep.* Topwork remainder of season. Manure as in 30		15,120
32	Corn.....	*Plough early.* Topwork. Disc and plough in spring. Manure as in 30		16,480
33	Corn.....	*Plough late.* Disc and plough in spring. Manure as 30		14,340
34	Corn.....	*Apply manure* in spring, plough under. Topwork		19,832
35	Corn.....	*Apply manure* in late spring. *Plough under,* work and sow corn		19,680

Some of the more important results are herewith mentioned.

Control plots receiving the same treatment as other plots, except that they did not receive manure, gave very poor crops.

For mangels, plough in autumn, topwork, apply manure in spring, plough, work and sow, and add commercial fertilizer. This treatment gave better results than same cultivation with no manure or fertilizer, and it also gave better results than winter applied manure ploughed in spring, or than manure disced in after autumn and spring ploughing.

In treating sod prior to corn, the best crop was secured by applying manure in the spring, ploughing under and topworking. Commercial fertilizer applied to corn in hills gave better results than when sown broadcast or when no fertilizer was applied.

For mangels, commercial fertilizers applied in drills, a half of the nitrate after the plants are up, yielded better crops than when applied broadcast or in drills at seeding time.

For mangels, on land ploughed in the autumn, topworked and ploughed again in the spring, and fertilized, two applications of manure, a half in the spring and a half as top dressing on grain stubble, gave better results than one application as a top dressing on the grain stubble, between first and second clover crops, or in the autumn on clover sod.

For mangels on sod land that was twice ploughed, topworked well, and fertilizers applied, manure applied in the spring and worked in gave better results than manure applied in the winter after the second ploughing, applied in the autumn between ploughings or in the early autumn before the first ploughing. For corn, applying the manure in the winter after the second ploughing gave better results than any of the other three methods.

The after-harvest cultivation of the root crop is shown in plots 26 to 29. The five-year average yields of grain grown after the root crops show spring working root land preferable to autumn working, and discing better than ploughing.

HORTICULTURE

The horticultural work done this year consisted of variety tests of vegetables, flowers and fruits, and experiments in the cultures of various vegetables and potatoes. The cold, wet season was unfavourable to the work in the garden and the extremely heavy and continuous rains prevented any seed being saved.

POTATOES—TEST OF VARIETIES

Name of Variety	Size	Season	Date of planting	Date of digging	Total yield per acre marketable		Total yield per acre unmarketable		Form and Colour
					tons	lbs.	tons	lbs.	
Dalmeny Beauty	Small	Late	May 13	Oct. 16	19	1,072	3	864	Oblong flat, white
Agassiz Special	Medium	Early	"	"	16	1,528	3	336	Long, white
Dreer's Standard	"	Late	"	"	16	1,264	–	1,848	Round, white
Table Talk	"	"	"	"	16	1,000	2	1,016	Oblong, white
New Queen	Large	Medium	"	"	15	1,416	1	1,168	Round, pink
Morgan Seedling	Medium	Late	"	"	15	1,152	1	640	Oval, white
Rawling Kidney, I.H.	"	"	"	"	14	1,832	3	1,788	Round, white
University of B.C.	"	"	"	"	14	1,568	6	672	Flat oval, white
Jones White U.B.C.	"	Very late	"	"	12	1,872	2	750	Long flat oval, white
Irish Cobbler I. H.	"	Early	"	"	12	112	1	152	Round, white
Dakota Red	"	Late	"	"	12	24	2	1,940	Round, dark red
Rawling Kidney H. G.	"	"	"	"	11	528	3	1,040	Round, white
Vick's Extra Early	Small	Early	"	"	11	440	2	1,808	Long, pink
Early Hero	"	"	"	"	10	1,120	4	1,240	Oblong, light rose
Wee McGregor	Large	Late	"	"	10	988	–	1,452	Oval, white
Houlton Rose	Small	Early	"	"	10	908	1	265	Round, rose
American Wonder	Medium	Late	"	"	10	328	1	1,760	Long, white
Manitoba Wonder	"	Medium	"	"	9	1,800	1	1,168	Round, pink
Netted Gem, Rennie	Small	Late	"	"	9	1,536	5	560	Oblong, russet
Early Rose	Medium	Early	"	"	9	1,272	3	600	Long, rose
Netted Gem, Ashcroft	Small	Late	"	"	9	480	3	1,920	Oblong, russet
Gold Coin	"	Medium	"	"	9	216	–	1,848	Round, white
Irish Cobbler H.G.	Medium	Early	"	"	8	1,800	1	1,036	" "
Empire State	"	Late	"	"	8	1,688	1	1,960	Long, white
Bermuda Early	Small	Early	"	"	8	1,160	1	1,960	Round, dark rose
Late Puritan	Medium	Late	"	"	8	1,160	1	1,432	Long, white
Jessica	Small	Medium	"	"	7	1,180	1	564	Oblong, rose
Green Mountain	"	Late	"	"	7	784	1	640	Round, white
Early Ohio	"	Early	"	"	6	1,200	1	376	Round, pink
Arran Chief	"	Late	"	"	6	540	2	1,544	Oval, white
Eureka Extra Early	"	Early	"	"	4	876	3	236	Round, white

H. G. signifies Home Grown seed.
I. H. Seed obtained from Indian Head.

Dalmeny Beauty was by far the biggest yielder of all the potatoes in the test of varieties; it is a good main crop variety, white, and with fairly smooth skin. Agassiz Special was second in point of yield, and first of all the early varieties; it is a great favourite wherever it has been tried, both from the points of earliness and quality.

The old favourite, Dreer's Standard, and also Table Talk, did very well. The new varieties tried, U.B.C. and Jones White, were quite a success, and will no doubt be valuable additions to our collection of varieties.

Wee McGregor, the leading potato here for the last two years in succession, did not do so well this year, being fifteenth in order of production.

POTATOES—CULTURAL TESTS

An experiment was made in the planting and growing of potatoes in various ways for early crop.

First.—From seed consisting of whole tubers *sprouted.*

Second.—From seed consisting of whole tubers *unsprouted.*

Third.—From seed consisting of cut tubers *unsprouted.*

Ten varieties of potatoes were used in this experiment, four of which were early varieties, and six late. Drills were 30 feet long for each variety, and 30 inches apart. Sets were planted 1 foot apart in the drills.

There were 30 sets of each variety in each class, i.e. 90 sets. Land was manured in drills at the rate of 16 tons of barnyard manure to the acre.

Potatoes were harvested at intervals of two weeks, 10 feet of each variety and each class at one time.

All seed was planted on March 22.

In the following tables:—

No. 1 represents whole tubers, *sprouted.*

No. 2 represents whole tubers *unsprouted.*

No. 3 represents cut tubers *unsprouted.*

POTATOES—CULTURAL TESTS

RESULT OF TEN FEET HARVESTED

Test No.	Amount seed planted 30′	July 5		July 19		Aug. 2		Total weight of crop	
		Marketable	Not marketable	Marketable	Not marketable	Marketable	Not marketable	Marketable	Not marketable
	lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.
Early Rose—									
1	6	17 10	— 2	19 —	1 —	22 —	1 8	58 10	2 10
2	6	10 8	2 4	15 12	1 4	18 8	1 12	44 12	5 4
3	3	7 —	— 12	16 12	2 —	18 —	— 8	41 12	3 4
Agassiz Special—									
1	6	10 —	— 12	15 12	1 8	16 4	— 2	42 —	2 6
2	6	2 12	1 4	8 —	— 12	11 2	1 2	21 14	3 2
3	3	4 8	— 12	6 —	— 1	27 —	8 8	17 8	2 —
Irish Cobbler—									
1	6	12 8	— 2	18 8	— 2	18 4	— 4	49 4	— 8
2	6	9 —	— 2	12 8	— 12	11 4	1 —	32 12	1 14
3	3	5 8	— 8	11 —	1 —	15 12	— 4	32 4	1 12
Early Ohio—									
1	6	19 4	1 —	23 —	— 8	22 8	1 —	64 12	2 8
2	6	15 —	1 4	16 4	— 12	15 8	1 4	46 12	3 4
3	3	14 8	— 8	15 12	— 8	13 —	— 12	43 4	1 12
American Wonder—									
1	6	9 4	— 4	12 8	— 8	14 —	1 —	35 12	1 12
2	6	4 10	— 8	6 8	1 4	13 8	1 8	24 10	3 4
3	3	3 10	— 8	2 6	— 1	24 2	1 —	10 2	2 4
Arran Chief—									
1	6	8 10	— 4	11 8	1 8	10 —	— 2	30 2	1 14
2	6	3 8	1 4	6 10	1 4	7 8	2 —	17 10	4 8
3	3	2 12	— 8	2 10	1 2	2 2	1 4	7 8	2 14
Dreer's Standard—									
1	6	9 2	— 2	13 —	— 4	11 12	— 4	33 14	— 10
2	6	5 8	— 12	7 2	1 4	11 8	— 8	24 2	2 8
3	3	4 10	— 8	7 6	1 —	12 12	— 12	24 12	2 4
Gold Coin—									
1	6 —	9 4	— 4	8 10	— 2	10	— 4	27 14	— 10
2	6 —	4 8	— 12	6 2	1 4	9 12	— 8	20 6	2 8
3	3 —	4 —	— 8	5 4	— 8	6 4	— 8	15 8	1 8
Late Puritan—									
1	6 —	11 12	— 4	11 12	2 2	19 8	— 2	43 —	— 8
2	6	6 4	1 —	9 12	1 4	16 —	1 —	32 —	3 4
3	3	2 4	— 12	8 4	— 2	12 2	— 8	22 10	1 6
Table Talk—									
1	6	8 —	— 4	12 4	1 12	17 4	— 12	37 8	2 12
2	6	7 8	— 2	10 12	1 —	14 8	1 —	32 12	2 2
3	3	5 8	— 8	12 12	— 12	14 4	— 12	32 8	2 —

SUMMARY OF RESULTS—POTATO CULTURE TESTS

Dates of harvesting	Weight of crop seed No. 1	Weight of crop seed No. 2	Weight of crop seed No. 3	Totals
	lbs. oz.	lbs oz.	lbs. oz.	lb. oz.
4 Early Varieties—				
July 5	59 6	37 4	31 8	128 2
" 19	76 4	52 8	49 8	178 4
Aug. 2	79 0	56 6	53 12	189 2
Totals	214 10	146 2	134 6	495 8
Late Varieties—				
July 5	56 0	31 14	22 12	110 10
" 19	69 10	46 14	38 10	155 2
Aug. 2	82 8	72 12	51 10	206 14
Totals	208 2	151 8	113 0	472 10
Early and Late Varieties combined—				
July 5	115 6	69 2	54 4	238 12
" 19	145 14	99 6	88 2	333 6
Aug. 2	161 8	129 2	105 6	396 0
Totals	422 12	297 10	249 12	968 2

Only marketable potatoes were considered in above tables. From them it is clearly demonstrated that the whole sprouted seed is by far the best kind to plant where an early crop is required.

EXPERIMENT IN DISTANCE OF PLANTING

	Sets 12 inches apart		Sets 14 inches apart	
	Yield per acre marketable	Yield per acre not marketable	Yield per acre marketable	Yield per acre not marketable
	tons lbs.	tons lbs.	tons lbs.	tons lbs.
Rows 2½ ft. apart	9 1,536	3 336	10 1,120	4 448
Rows 3 ft. apart	11 170	2 1,280	12 228	2 224

Variety experimented with: American Wonder.

Length of rows, 66 feet. Size of plot, one-two hundred and sixty-fourth of an acre.

Date planted, May 13.

Date harvested, October 20.

Sets planted in rows three feet apart, and fourteen inches apart in the rows, have proved that those are best distances apart at which to plant potatoes.

CUT AND PLASTERED SEED VERSUS CUT AND UNPLASTERED SEED AND FRESH CUT AND SEED CUT AND KEPT 14 DAYS

Coated with Plaster				Uncoated			
Fresh cut and planted		Cut and coated 14 days before planting		Fresh cut and planted		Cut and coated 14 days before planting	
Yield per acre marketable	Yield per acre not marketable	Yield per acre marketable	Yield per acre not marketable	Yield per acre marketable	Yield per acre not marketable	Yield per acre marketable	Yield per acre not marketable
tons lbs.	tons lbs.	tons lbs.	tons lbs.	tons lbs.	tons lbs.	tons lbs.	tons lbs.
10 1,648	4 448	8 368	2 224	10 64	3 1,392	7 784	2 224

Variety experimented with, Gold Coin.

Length of row, 33 feet. Size of plot, one-five hundred and twenty-eighth of 1 acre.

Planted 12 inches apart in the rows. Rows 2½ feet apart.

Planted May 13.

Harvested October 20.

Seed freshly cut and plastered has proved to be better than any of the other methods of treating potato seed, and the feshly cut and not plastered seed comes second, the experiment showing that freshly cut seed is in all cases better than seed cut and kept fourteen days before planting.

EXPERIMENT IN DIFFERENT WAYS OF CUTTING SEED

Kind of Setts	Seed from potatoes havning strong buds from seed end to base			Seed from potatoes having strong buds near seed end only		
	Weight of seed planted per acre	Yield per acre		Weight of seed planted per acre	Yield per acre	
		Marketable	Not marketable		Marketable	Not marketable
	lbs. oz.	tons lbs.	tons lbs.	lbs. oz.	tons lbs.	tons lbs.
Whole small potato	874 8	7 1,576	1 112	1,138 8	7 1,038	1 640
Cut to 1 eye	280 8	7 1,038	0 528	379 8	7 1,982	0 528
Cut to 2 eyes	379 8	9 1,536	0 1,584	577 6	8 1,160	1 112
Cut to 3 or more eyes	1,072 8	10 1,648	2 224	808 8	8 1,952	1 1,168

Variety experimented with, Gold Coin.

Planted in rows 30 inches apart; sets planted 12 inches apart.

Length of rows, 66 feet. Size of plots, one-two hundred and sixty-fourth of 1 acre.

Date planted, May 13.

Date harvested, October 20.

Seed from potatoes having strong buds from seed end to base gave a considerably better yield than seed from potatoes having strong buds near seed end only.

HILLED VERSUS LEVEL CULTIVATION

Hilled Cultivation		Level Cultivation	
Yield per acre		Yield per acre	
Marketable	Not Marketable	Marketable	Not Marketable
tons lbs.	tons lbs.	tons lbs.	tons lbs.
12 288	3 864	10 1,120	3 336

Setts used have all three eyes.

Variety experimented with, Gold Coin.

Size of plot, one-five hundred and twenty-eighth of 1 acre.

Planted in rows 30 inches apart; setts 12 inches apart in rows.

Planted May 13.

Harvested, October 20.

Hilled cultivation improves the yield of potatoes in an ordinary year, as this was. In an exceptionally dry year either level or nearly level cultivation is better, as the potatoes do not get dried out.

FOUR CULTIVATIONS VS. EIGHT CULTIVATIONS

Four Cultivations				Eight Cultivations			
Yield per acre				Yield per acre			
Marketable		Not Marketable		Marketable		Not Marketable	
tons	lbs.	tons	lbs.	tons	lbs.	tons	lbs.
10	1,648	3	1,392	11	1,232	3	336

Variety experimented with, Gold Coin.

Size of plots, one-five hundred and twenty-eighth of 1 acre.

Planted in rows 30 inches apart; setts planted 12 inches apart in the row.

Planted May 13.

Harvested, October 20.

Increased cultivation is beneficial, and at ordinary potato prices will repay the extra labour it entails.

PLOUGHING ON DIFFERENT DATES

Date planted	Date harvested	Yield per acre marketable		Yield per acre not marketable		Date planted	Date harvested	Yield per acre marketable		Yield per acre not marketable	
		tons	lbs.	tons	lbs.			tons	lbs.	tons	lbs.
May 1	Oct. 16	10	592	3	864	May 1	Oct. 16	12	288	4	1,768
" 8	" 16	10	628	3	600	" 8	" 16	10	628	4	976
" 15	" 16	9	480	4	448	" 15	" 16	10	1,704	3	1,688
" 22	" 16	7	784	4	448	" 22	" 16	8	896	4	448
" 29	" 16	5	560	4	1,638	" 29	" 16	7	256	5	560
June 5	" 16	5	1,166	5	560	June 5	" 16	5	1,616	5	1,088

Length of rows 33 feet, rows 2½ feet apart.

Size of plot, one-five hundred and twenty-eighth of 1 acre.

Both the early and main crop varieties gave the best results when planted about the first week in May. Main crop potatoes, as a rule, when planted between the 15th and 21st of May, give the best yield.

DISTRIBUTION OF POTATO SEED

No. of samples sent out.. 243
No. of reports returned.. 123

BEANS

Name of Variety	Date of Sowing	Date ready for use	Height	Yield per 30 ft. row
			inches	lbs.
Canadian Wonder	May 6	July 16	13	18⅞
Kentucky Wonder Wax	" 6	" 28	14	18⅛
Refugee	" 6	" 25	14	18
Masterpiece	" 15	" 18	12	17½
Hodson Long Pod	" 6	" 29	14	16½
Davis White Wax	" 6	" 16	12	13⅞
Bountiful	" 6	" 15	12	13⅛
Pencil Pod Black Wax	" 15	" 20	12	12¾
Extra Early Red Valentine	" 6	" 18	12	11¾
Grennel's Rustless Wax	" 15	" 20	11	11⅛
Yellow Eye	" 6	" 16	12	10½
Plentiful French	" 6	" 14	12	10⅜
Wardwell's Kidney Wax	" 6	" 18	12	10⅛
Fordhook Famous	" 6	" 16	13	10
Round Pod Kidney	" 6	" 18	12	8¾
Stringless Greenpod	" 6	" 19	12	7⅛

Of the sixteen varieties tried, the old favourite, Canadian Wonder, was the best, followed by Kentucky Wonder Wax and Refugee. Hodson's Long Pod is a good bean, and is worthy of a place in every garden. Of the varieties tried here for the first time, Masterpiece, grown from Ottawa raised seed, was the best, and matured in shorter time than any other variety.

Beans—Cultural Test

To determine the best time of year at which beans should be planted. Four plantings are made at intervals of one week between plantings.

Name of Variety	Date of sowing	Date ready for use	Yield per 30 foot row
			Lbs.
Round Pod Kidney	May 6	July 18	8¾
"	" 13	" 20	10⅛
"	" 20	" 23	10⅝
"	" 27	" 26	15

From the above table it would appear that the most favourable time to plant beans is the end of May.

BEETS

Name of Variety	Date of sowing	Date ready for use	Yield per 60 foot row
			Lbs.
Detroit Dark Red "A" 0 9520	April 6	July 10	140
Early Wonder	" 6	" 10	83¼
Crimson Globe	" 6	" 2	82½
Eclipse	" 6	" 10	81
Crosby's Egyptian	" 6	" 5	78
Detroit Dark Red "B" 0 8886	" 6	" 12	77
Black Red Ball	" 23	" 15	72
Early Model	May 14	" 31	61

The best of the eight varieties tried this season was Detroit Dark Red "A," grown from seed raised at the Central Experimental Farm, Ottawa. This variety is of good colour and flavour. Black Red Ball is quite the best for flavour and colour, though not yielding as well as some of the others. Crosby's Egyptian and Crimson Globe are both good.

CARROTS

Name of Variety	Date of sowing	Date ready for use	Yield per 60 foot row
			Lbs.
Chantenay (Ottawa)	April 6	July 10	181
" (Commercial)	" 6	" 5	157
Improved Danvers	" 23	" 10	150
Early Scarlet Horn	" 23	" 20	144
Danvers (Kentville)	" 6	" 5	125
Nantes Half Long Scarlet	" 23	" 15	109
Danvers Half Long	" 23	" 17	90

Carrots grown from seed raised at the Central Experimental Farm, Ottawa, were the best, in point of quantity and quality, among the seven varieties in the above test, in which nearly all were good.

CELERY

Name of Variety	Date of sowing	Date ready for use	Yield of 30 plants dug in fall	Yield of 30 plants dug after frosts
			Lbs.	Lbs.
Winter Queen	Mar. 23	Sept. 20	105	85
White Plume	" 23	" 26	71½	60
Giant Pascal	" 23	" 30	65¼	51
Sandford Easy Blanching	" 23	" 18	75	Nil
Paris Golden	" 23	" 22	67½	"

Winter Queen proved the best yielder, both in the fall and spring digging. It is of very good quality, and suitable to the district, being able to withstand extreme moisture very well; 60 plants of each variety were planted, one half of each due in November, and the balance in February. Winter Queen, White Plume and Giant Pascal all survived the frost of winter and the extreme precipitation, which completely destroyed the Sandford variety and also Paris Golden.

CITRONS

Three hills of citron were planted on April 15th, from Ottawa grown seed, but the germination was poor, probably owing to the early sowing, and though the plants arrived at the blooming stage by July 1st, the wet, cold season prevented the fruit maturing.

CORN

Name of Variety	Date of planting	Ready for use	Height	Yield
				Lbs.
Golden Bantam	May 14	Aug. 28	4	24
Extra Early Cory	" 14	" 28	5	23
Early Fordhook	" 14	" 29	4½	21¾
Early Malcolm	" 14	" 27	4½	21
Early Sweet Squaw	" 14	" 21	5	21
Will's Gehu	" 14	" 28	5	17½
Pocahontas	" 14	" 27	4½	16¾
Black Mexican	" 14	Sept. 16	6	15¼
Earliest Catawba	" 14	Aug. 31	4½	15
Early Mayflower	" 14	" 23	3	13½
Stowell's Evergreen	" 14	Sept. 20	6½	11
Golden Giant	" 14	" 1	2½	10
Early Sweet Klootchman	" 14	Aug. 17	4½	8¾
Otta	" 14	" 19	4½	8½
Golden Tom Thumb	" 14	" 21	4	7¾
Country Gentleman	" 14	Sept. 12	4	8½
Howling Mob	" 14	" 16	6½	5¾
Picaninny	" 14	Aug. 12	2½	4½

No. of hills, 10. Hills are 4' x 4' apart.

Golden Bantam heads the list of all varieties of corn this season, both for largest yield and flavour. This corn is a general favourite, and the best to grow for a commercial crop. Early Sweet Squaw, Early Malcolm, Earliest Catawba and Black Mexican are all very good. The following did not germinate at all well: Early Mayflower, Early Fordhook, Country Gentleman and Picanniny.

CUCUMBERS

Name of Variety	Date of sowing	Date ready for use	Yield
			Lbs.
Davis Perfect (Summerland seed)	May 6	July 29	84½
Giant Pera	" 6	" 30	62
Davis Perfect (Commercial seed)	" 6	Aug. 4	50½
Early Russian	" 6	July 31	50
Boston Pickling	" 6	" 29	48⅞
Improved Long Green	" 6	" 29	44⅝
West India Gherkin	" 6	No germination	

No. of plants, 12.

Cucumbers, on the whole, did very well this season, Davis Perfect being the heaviest cropper; it and Giant Pera are both good table varieties, but for the market, which is mostly the canning factories, the small pickling varieties are the best, such as Boston Pickling. Most cucumber growers contract with the canning companies to supply a certain amount weekly during the season, pickling two or three times a week and shipping in sacks, $40 to $60 a ton being the usual price given for the cucumbers. Two lots of Davis Perfect variety were sown, that from the Experimental Farm at Summerland being much the better. West India Gherkin was a total failure, as there was no germination, though sown twice.

LEEKS

Only one variety of leeks was sown this year, viz., Carentan. This was sown on April 23, transplanted to trench June 5, and was ready for use August 18. The yield to an eighty foot row was 73 pounds, which is fairly satisfactory.

LETTUCE

Name of Variety	Date of sowing	Date of thinning	Date ready for use	Yield
				Lbs.
Cos	April 23	May 17	July 25	49¼
Hanson	" 1	" 8	" 3	42½
Iceberg	" 1	" 8	June 28	32¾
Crisp as Ice	" 23	" 17	" 30	29¼
Dreer's All Heart	" 23	" 17	July 3	27
Simpson Black Seeded	" 1	" 8	June 28	27
Early Wayahead	" 23	" 17	" 28	25½
Grand Rapids Forcing (Ottawa)	" 1	" 8	" 21	17¼
" (Summerland)	" 1	" 8	" 21	16¾
Salamander	" 1			

Quantity sown, 30 feet.

Cos, of which there was only one variety tried, was the best yielder, though it took the longest time in maturing; it is firm and crisp, and of good flavour. Of the cabbage-shaped lettuce, all the varieties tried were good, Hansen being the best. Of the forcing open leaved varieties, Grand Rapids, grown from Ottawa raised seed, was better than that grown from Summerland raised seed. Only one variety, Salamander, failed through non-germination.

MUSK MELON

Five varieties of musk melon were planted, and of these only one ripened, viz., Montreal Improved Nutmeg, which yielded 13½ pounds to three hills. The season was too wet and cold for musk melons to ripen in the open.

ONIONS

Fourteen varieties of onions were sown this season, 120 feet of each. The land was divided into two sections, sixty feet was manured and dug in the autumn, and sixty feet was manured and ploughed in the spring; each variety was sown one-half on each sixty feet, and the results compared.

VARIETY TEST—ONIONS

Name of Variety	Date of sowing	Date ready for use	Yield 60′ manured and dug in autumn	Yield 60′ manured and ploughed in spring	Total yield 120′
			Lbs.	Lbs.	Lbs.
Mammoth Silver King	Mar. 20	July 24	80	88	168
Yellow Globe Danvers Ottawa	" 20	" 30	73½	76	149½
Giant Prizetaker	" 20	" 29	67½	81	148½
Southport Yellow Globe	" 20	" 30	74	72	146
Extra Early Flat Red	" 20	" 16	69½	57½	127
Ailsa Craig	" 20	" 21	69	55¾	124¾
Southport Red Globe	" 20	" 16	64¼	53¾	118
Large Red Wethersfield, Ottawa	" 20	" 30	61¼	55	116¼
Yellow Globe, Danvers, Com	" 20	" 24	65¼	49½	114½
Large Red Wethersfield, Com	" 20	" 22	64	48½	112½
Australia Brown	" 20	" 21	50½	58	108½
Yellow Globe Danvers, Agassiz	" 20	" 21	58¾	37	95¾
Southport White Globe	" 20	" 18	47¼	38½	85¾
White Barletta	" 20	" 16	38½	44	82½
Totals			956¼	881¾	1,838

In the test of varieties Mammoth Silver King was the best yielder, both in the manured in autumn and manured in spring tests. Yellow Globe Danvers is a good second. The Yellow Globe Danvers, Ottawa grown seed, was a long way ahead of the commercial Yellow Globe Danvers. The best all round onion for the country is the Yellow Globe Danvers, which is a universal favourite. The Australian Brown, though not a particularly good yielder, is a remarkably good keeper—perhaps the best that has yet been tried. The Southport Globes are all good, also Prizetaker and Ailsa Craig. The latter, being of large size and mild flavour, is good for use as a vegetable, boiled, and is a good onion for exhibition purposes. Ottawa raised seed again defeated commercial raised seed in the case of the Red Wethersfield variety.

Onion Sets

Only one variety of onion sets was planted this season, viz: Yellow Dutch, which yielded 46 pounds to a ninety-foot row planted.

PARSNIPS

No commercial raised seed was used to grow parsnips this season, but a test was made of Hollow Crown variety, Ottawa raised seed, versus Agassiz raised seed, sixty feet of each row being sown.

Agassiz raised seed produced 118 pounds of parsnips, and Ottawa raised seed produced 114 pounds.

PARSLEY

Four varieties were tried this year, Champion Moss Curled proving the best in size of yield, quality, and colour; also, it is the quickest grower, maturing eight days earlier than the next variety; Triple Curled is a poor yielder, and of too light a colour.

VARIETY TEST—PEAS

Length of row, 30 feet

Name of Variety	C K O A	Date of sowing	Date of blooming	Date ready for use	Height	Weight of crop
					Ft.	Lbs.
Gradus	C	Mar. 26	June 18	July 10	3	27¼
Thomas Laxton	C	April 3	" 2	June 30	4½	19¾
English Wonder	O	Mar. 26	" 5	July 5	1½	18¾
Gradus	K	" 26	" 8	" 10	4½	18
American Wonder	C	" 26	" 1	" 5	2	15¾
Heroine	O	April 23	" 22	" 14	2½	15½
Sutton's Excelsior	A	Mar. 26	" 5	June 28	2	13½
Blue Bantam	A	" 26	" 1	" 30	2	12
Stratagem	C	" 26	" 8	July 10	2½	11¼
Eight Weeks	C	" 26	" 1	" 25	1½	11¼
Pioneer	C	" 23	" 13	" 12	2	10¾
Blue Bantam	C	May 12	" 28	" 14	2	9¼
Early Morn	C	April 23	" 9	" 5	2½	9¼
Sutton's Excelsior	C	Mar. 26	" 8	" 10	2	6¾
Gregory's Surprise	C	April 23	" 11	" 12	2¾	6¾
The Pilot	C	May 12	" 26	" 10	3	5¼
McLean's Advancer	O	Mar. 26	" 5	June 28	1½	5¼
Telephone	C	May 12	July 7	July 22	5	5
Little Marvel	C	Mar. 26	May 30	June 25	1	4¾
Laxtonian	C	" 26	June 1	" 28	1	4¼

NOTE:—"C" means Commercial seed, "O" seed raised at Central Experimental Farm, Ottawa, "A" seed raised at Experimental Farm, Agassiz, "K" seed raised at Experimental Station, Kentville.

Of the twenty samples of seed tested, six were seed raised on the Experimental Farms, and these held their own with the commercial seed, Agassiz raised seed in both cases beating the commercial seed of the same varieties.

Gradus proved the best yielder by a wide margin, though taking a longer time to mature than many of the others; it is a good pea, and of good flavour.

Of the early varieties, Blue Bantam is the best pea; it matures quickly, is of exceptionally large size, and the flavour is exceptionally good. Heroine is also a good pea, perhaps the best of the later varieties.

Peas—Cultural Experiment

An experiment in planting peas at different dates, with intervals of one week between sowings, was made, the variety used being Thomas Laxton. Thirty feet was sown at each sowing.

Date of sowing	Date of Blooming	Date ready for use	Height	Yield	
			ft.	lb.	oz.
March 26	May 30	July 1	4½	7	8
April 3	June 2	June 30	4½	10	12
April 10	" 2	July 3	4¾	13	8
April 17	" 9	" 5	4½	14	4

From the above table of results it would appear that the best time for planting peas is during the first week in April; seed sown before April fails to do nearly as well as that sown in April.

PEPPERS

Two varieties of peppers were tried this season: Harris Early and Neapolitan. Both were sown in the hotbed on April 5, and transferred to open ground on June 4; but the cold, wet season was too severe for them, and all plants died.

PUMPKINS

Two varieties of pumpkins were tried: Connecticut Field and Small Sugar; both of these were sown on May 18. Connecticut Field were ready for use on August 20, and yielded 71 pounds. Small Sugar were ready for use on September 3, and yielded 51 pounds. Two hills of each were sown. For quick growth and quality of yield Connecticut Field is the better of the two varieties.

SQUASH

Number of hills sown, 2

Name of Variety	Date sown	Date of Germination	Date ready for use	Yield
				Lbs.
Delicious	May 18	June 1	Aug. 20	93½
Hubbard	" 18	" 1	" 20	70½
King of Mammoths	" 18	" 1	" 25	59½
Golden Hubbard	" 18	" 3	" 25	59½

Delicious, in point of yield, were the best, but the Hubbards, both Queen and Golden, are the best to grow commercially; they are both good keepers, and command a good price in the spring. When kept in a temperature of about sixty degrees they will remain sound until April.

VEGETABLE MARROW

Long White Bush yielded 112½ pounds to two hills, and English Vegetable Marrow 73 pounds to two hills. The former is the best in point of yield, and has the further advantage of taking up much less ground than the trailing variety, thereby increasing the yield per acre considerably.

RADISHES

Five varieties of radishes were tried out this year, in two ways; one lot was grown under cheese cloth and one lot unprotected. The lot grown under cheese cloth did fairly well, and were used as they matured. The unprotected lot were all destroyed by the cabbage root maggot. It is demonstrated that it is not possible to grow radishes unless protected from the maggot.

SALSIFY

Quantity sown, 60 feet.

Name of Variety	Date sown	Date ready for use	Yield
			Lbs.
Mammoth Sandwich Island	April 6	Aug. 10	84
Long White Commercial 0 9271	" 6	" 3	64
Long White 0 8891	" 6	" 3	42

Mammoth Sandwich Island (Ottawa-grown seed) was a long way ahead of the other varieties in yield, but took seven days longer in maturing. In the Long White variety the commercial seed gave the better results.

SPINACH

Only one variety, Victoria, was grown, but though the germination was good, no results could be obtained as the crop ran to seed before maturing, owing to the cold, wet weather.

VARIETY TEST—TOMATOES

No. of plants 5

Name of Variety	Date of sowing	Date of planting out	Date of Blooming	Date of Ripening	Yield	
					Ripe	Green
					lbs.	lbs.
Burbank Early	March 21	May 20	June 12	Aug. 20	39	14
Bonny Best	" 21	" 20	" 20	" 22	37¾	17¼
Danish Export	" 21	" 20	" 10	" 12	30¼	15
Earlibell	" 21	" 20	" 9	" 16	30½	11
Prosperity	" 21	" 20	" 19	" 16	30⅛	8
Chalk's Early Jewel	" 21	" 20	" 18	" 22	28½	19
Alacrity 1919 A 1	" 21	" 20	" 9	" 18	26½	6½
Victoria Whole Salad	April 6	" 25	" 28	" 26	20⅝	12¾
Red Head	March 21	" 20	" 16	" 14	19½	10½
Langdon Earliana	" 21	" 20	" 18	" 12	19¼	7
Alacrity	" 21	" 20	" 16	" 22	16	12½
John Baer	" 21	" 20	" 18	" 20	11	7¼

Burbank Early was the largest producer of ripe fruit, and Bonny Best the largest producer of ripe and green fruit combined; while Langdon Earliana, grown from seed raised at the Summerland Experimental Station, was the quickest maturing variety. The Ottawa raised seed was responsible for the Burbank Early results, also for the Danish Export variety, which is third in order of production.

Bonny Best is of excellent flavour and good shape and size, and is perhaps the most suitable variety to grow in this neighbourhood.

In the cultural test of tomatoes, pruning and training was tried versus non-pruning and non-training, two varieties being used in each case, viz., Bonny Best and Alacrity.

PRUNING VERSUS NOT PRUNING

No. of plants 5

Pruned to one stem and trained				Not pruned and not trained			
Variety	Date ripened	Yield		Variety	Date ripened	Yield	
		Ripe	Green			Ripe	Green
Bonny Best	Aug. 22	37¾	17½	Alacrity	Aug. 18	36⅜	9½
Alacrity	" 22	16	12½	Bonny Best	" 26	30½	17½

From the above table we get contradictory results; in the case of Bonny Best the pruning and training method is the better, while in the case of Alacrity the opposite is the better. As a rule the training method produces more ripe fruit, and the untrained method more green fruit with a larger combined crop.

TURNIPS

Quantity sown 30 feet

Name of Variety	Date of sowing	Date of thinning	Date ready for use	Yield
				lbs.
Red Top Strap Leaf	April 27	June 1	June 14	13¼
Golden Ball	" 27	" 1	" 20	11½
Extra Early Purple Top Milan	" 27	" 1	" 12	10½
Early Snowball	" 27	" 1	" 9	7½
Invicta	" 27	" 1	All killed by flea beetle	

Red Top Strap Leaf was the best yielder of the five varieties sown, and resisted the attacks of the flea beetle better than the others; the Early Snowball suffered from the attacks of the cabbage root maggot, or would have done better.

ONIONS, CULTURAL TEST

An experiment was tried as follows: Onion seed was sown in the hotbed, and the young onions were transplanted to the open when about a month old, alongside onions sown in the open and not transplanted. The results show that those sown in the open and not moved were much greater yielders than those grown in the hotbed and transplanted.

Variety	Sown in open. Yield 120′ row	Sown in hotbed and transplanted. Yield 120′ row
	lbs.	lbs.
Giant Prizetaker	148½	98½
Ailsa Craig	124½	93½
Yellow Globe Danvers	114½	65
Long Red Wethersfield	108½	76½

ORCHARD

Apples.—The orchard is coming into full bearing now, and most of the trees are yielding fruit. The Northern Spy has not even bloomed yet. The fruit gathered was of good quality, and almost free from blemish. Lime sulphur sprayings were effectual in preventing the scab. Some trees have suffered severely from sunscald, and are in bad shape. The following table shows the results obtained:—

Variety	No. of Trees	Yield	Remarks
		lbs.	
Lowland Raspberry	1	25	1 tree dead
Duchess	2	78	
Wealthy	1	49	1 tree dead
Gravenstein	2	Nil	Did not bloom this year
McIntosh Red	2	Nil	No marketable apples
Delicious	2	Nil	Small amount of bloom
Winter Banana	2	Nil	" "
Jonathan	2	75½	
Yellow Transparent	2	103	
King	6	22	
Grimes Golden	6	107	
Belle de Boskoop	6	105	
Northern Spy	6	Nil	Not bloomed yet
Cox's Orange Pippin	6	121	
Wagner	6	336	
Ontario	5	119	1 tree dead

Pears.—A few of the varieties of pears yielded a crop of fruit, but there have been many failures, most of the trees being small and undersized for the time they have been planted. The best results have been obtained from three trees of the Dr. Jules Guyot variety, viz., 56½ pounds of fruit, Bartlett, three trees, 22 pounds fruit, being second best.

Plums.—The plum crop was very heavy, but the weather was so bad when it was ready to pick, incessant rains splitting the fruit and rendering it unfit for anything, that no accurate records could be kept of the weight of the crop. Throughout the Fraser valley there was an enormous loss through the rains ruining the plum and cherry crops.

English Damsons were perhaps our heaviest bearers, three trees yielding 301 pounds of fruit; and this does not represent fifty per cent of the fruit borne by these trees. Diamond, with 246 pounds plums to three trees, was next best to the Damsons, and these would only represent fifty per cent of crop. Italian prunes suffered more severely from the rain than any other variety; they split open and dropped the stone out of them; 130 pounds were gathered from three trees.

Cherries.—Cherries of the sweet varieties yielded good crops, but were destroyed by rain in many instances, the White Hearts splitting and rotting badly. Bings and Royal Annes were the best. All the sour cherries had good crops, but were utterly ruined by the rain. Morello and Olivet were the best.

Small Fruits.—All the small fruits are being removed from the orchard to the garden, a new plantation being made for them. Of the few blackberries left, Evergreen was the largest yielder, and of the raspberries, Cuthbert and Golden Queen were the best.

Currants, Black.—Boskoop Giant, Buddenborg and Black Naples were the best; and of the *Red* varieties, Perfection, Pomina and Fay's Prolific gave very large crops. *White Grape* as usual had an excellent crop.

Gooseberries.—All except the Champion were ruined by mildew, and by a yellow worm which ate into the fruit. These bushes will all be moved to the garden next season.

Strawberries.—A new plantation of strawberries was made in the garden in the autumn of 1919, the following varieties being put out: Magoon, Sharpless, Paxton, Royal Sovereign and Dollar. All these have made good growth, and the flowers having been removed during summer, are of good healthy size, and promise well for the coming season.

FLOWERS

Roses.—The roses were very good this summer, the blooms and foliage being bright and clear, very little mildew and aphis being seen; and what were discovered were easily controlled. Out of a good lot, the following may be chosen for special mention:—

Hybrid Perpetual.—Alfred K. Williams, carmine red.
Baroness Rothschild, pale flesh.
Black Prince, blackish crimson.
Ben Cant, deep crimson.
Hugh Dickson, crimson.
Mrs. J. Laing, rose pink.
Reynolds Hole, maroon.

Hybrid Teas.— Admiral Dewey, almost pure white.
Captain Christy, flesh.
Carine, carmine.
Kaiserin Augusta Victoria, creamy white.
Killarney, pink.
Jas. Coey, lemon yellow.
His Majesty, dark crimson.

Some 36 new rose bushes were received, and most of these are doing well. Very few died, and some bloomed quite freely, the white Maman Cochet and Daily Mail making a good show for such young bushes. The climbing roses on the front of the Superintendent's house bloomed very well and very early; quantities of blooms being out by the middle of May. The best showing was made by Gloire de Dijon and Papa Gontier.

Annuals.—Of a large number of annuals sown this year the best were:—

Salpiglossis,
Schizanthus,
Antirrhinum
Zinnias,
Phlox Drummondii,
Petunias,
Stocks,
Asters,
Shirley poppies,
Larkspur.

All of these were exceptionally good, and made a brilliant show. Sweet peas were not as good as usual, owing to the cold, wet spring, many seeds rotting in the ground, thus causing vacancies.

Perennials.—The perennial border, having been entirely renewed last autumn, was not so good as usual, though it has been too crowded of late years; with more room the plants should do well in the future. The spring bulbs, Narcissi of all kinds, and late flowering Tulips, Irises and Delphinums were fairly good.

Bulbs.—The tulips this year were better than they have been for years. Of the early ones, Artus, Pottebakker White, Keizerskroon and Chrysolora were the best, and of the May flowering ones Gesneriana Spathulata and the Darwin, Clara Butt, were excellent. The Gladioli were all good.

Shrubs.—Of the flowering shrubs, the Azalea mollis and the Rhododendrons were excellent, and the most admired of all. Deutzia, Philadelphus, Hydrangea paniculata and Ceanothus also were good in their seasons. The Blue Hydrangeas did not flower this year, being nipped by late June frost, and were missed very much. The first shrubs to flower here are the Daphne and Golden Bell (*Forsythia suspensa*) and these did well. The evergreen shrubs are in good condition.

Trees.—Magnolias, Japanese dogwoods, Japanese flowering cherries and Crab-apple, Mountain ashes and Laburnums blossomed profusely, and were the pick of the flowering trees. The Pterostyrax hispida was also much admired.

Of the shade trees, the cut-leaved beeches and copper beeches are the best. Horse chestnuts, weeping birches (Young's), lindens and maples were also good.

All the conifers are making good growth, their dark foliage contrasting well with the lighter deciduous trees.

Hedges.—Among the hedges, the Caragana and Deutzia are the best, from the point of beauty, but of the more serviceable varieties the holly, European maple and hawthorn are the best.

POULTRY

The stock on hand at the end of the year consisted of the following: 143 Barred Plymouth Rocks and 203 White Leghorns, or a total of 346 birds. All these hens have been trapnested throughout the year, and accurate records kept of the egg production and cost of feed.

INCUBATION

The 1,200 egg "Candee" incubator was used, the first chicks being hatched on March 21, and the last on May 12.

A considerable amount of custom hatching was done, with varying results, a charge of three cents per egg being made. Of the total 570 eggs set for custom hatching, 335 chicks, or 58·77 per cent were hatched.

The Effect of Winter Production on Fertility and Hatchability.—Hatching experiments were carried on to ascertain the effect of heavy winter egg production on fertility and hatchability. Eggs from the heaviest winter layers, and from the later and poorer layers, were marked, and fertility and hatchability compared.

The results indicate generally that heavy winter layers give lower fertility and hatchability than do those that have not produced as heavily before their eggs are set.

PEDIGREE LINE BREEDING

To determine hereditary tendencies, both in breeding up heavier egg laying strains, and as to the size of eggs and vigour of birds, pedigree records are kept of every bird producing 150 eggs or over in her first laying year, and results of matings recorded. All birds are trapnested continuously until marketed or dead.

The following table gives a report on the standing of the breeding hens at present:—

REPORT OF BREEDING HENS, AGASSIZ, B.C.

Breed	Total Year-lings	No. of Hens Older	No. of Hens laying 150 to 175		No. of Hens laying 176 to 200		No. of Hens laying 201 to 225		No. of Hens laying 226 to 250		No. of Hens laying over 250	
			Year-lings	Older	Year-lings	Older	Year-lings	Older	Year-lings	Older	Year-lings	Older
Rocks	73	12	14	4	20	6	25	2	10	—	4	—
Leghorns	67	.....	27	—	17	—	10	—	11	—	2	—

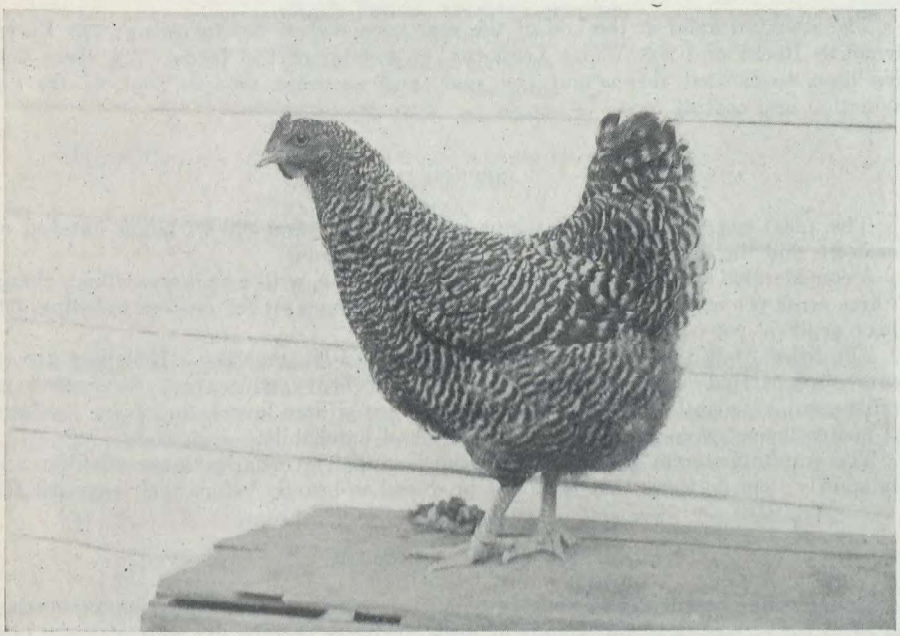
Egg production for flock has been raised from an average of 120 eggs to 175, with individuals from 250 to 282 eggs.

SAND LITTER VS. STRAW LITTER

In comparing sand as a substitute for straw, to save expense of straw where sand is easily procurable, it is found that the latter is satisfactory in dry weather. In wet weather it becomes too cold and damp, and is difficult to keep clean. Where grain is scattered in the litter, sand is not so satisfactory, but where a self-feeder hopper is used, it may be quite satisfactory. For brooder chicks, when it is impossible to secure clean straw free from mould, sand seems to be a good substitute.

EGG PRESERVATIVES

Different methods of preserving eggs were compared, with a view to finding a satisfactory, cheap, and convenient egg preservative.



Agassiz, B.C. Barred Plymouth Hen, No. 155. 282 eggs in a year.

Several eggs were put into water-glass solution, others in dry salt, and a third lot were smeared with a patent egg preserver known as Fleming Egg Preserver.

The best results were obtained with water-glass, the dry salt being somewhat cleaner to use, but there was more evaporation. The Fleming preserver is convenient, but there was too much evaporation of contents as a result.

GREEN FEED FOR POULTRY

Several kinds of green feed were fed, the purpose being to find satisfactory green feeds which can be utilized for poultry and grown extensively during the greater part of the year.

Two varieties of kale were seeded in spring:—Thousand Headed and Lapland. Swiss chard was also grown. These were seeded in alternate rows in the front yard of the Poultry Plant. Some seed was sown in hotbeds and transplanted, while the rest of the seed was sown in the open and thinned. Droppings from the birds were scattered along the rows during the growing season.

Seeding in the open and thinning proved most satisfactory, the thinnings being fed to the birds. Thousand Headed kale and chard proved the heaviest croppers, and were much relished by the birds. If put through a cutter there is little waste. These crops continue growing on the Pacific Coast until frost comes. When frost comes mangels prove to be the best green feed. Cut clover is another satisfactory green feed for poultry.

ROLLER CURTAIN FOR CONTINUOUS HOUSE

To find a quickly operated and portable front for poultry house winter protection, a curtain the full length of the long house, which is 150 feet in length, has been installed. Factory cotton, the same width as the depth of the open front of house, is tacked along the full length of house above the wire netting. A continuous roller is tacked along the bottom of the curtain. This roller is composed of two inch half-rounds tacked together to break joints. The curtain is rolled up by means of loops of cord passing through pulleys at the top of building, and attached to a main guy wire which is wound up at one end of the building.

This curtain has proved most satisfactory, and is easily operated up to 150 feet long. The curtain can be readily rolled up out of dust and dirt, and when down leaves no cracks for drafts or snowdrifts.

GLASS BACK TO POULTRY HOUSE

Glass windows about 12 inches high were put in rear of the house under dropping-board, bottom of windows being on the floor of the house. Windows are from four to five feet long, and set two to four feet apart according to length of house.

These windows proved most desirable, were very effectual in giving more light on the floor, and prevented piling of litter at back of building. Also, on account of there being no dark corners, there were fewer floor eggs.

FEEDING GERMINATED OATS

The following method of germinating oats has been carried out very successfully. A home made sprouter is composed of a soaking can so pivoted as to dump soaked oats into a lower compartment, four compartments being provided, one below the other, with a slide bottom to each. The germinated oats are taken from the bottom compartment each day, those above being dumped to the lower one. A lamp is provided in the main compartment to heat same. Oats are spread about eight inches deep.

Oats are germinated to one-sixteenth inch sprouts in four days. Birds relish them in this condition, and they are fed every morning in the litter.

EGG LAYING CONTEST

On November 1st, an Egg Laying Contest was started at this Farm. Altogether there are twenty-six pens in the Contest, with ten birds in each pen, or a total of 260 birds. The main object of the Contest is for Record of Performance as conducted under the Dominion Experimental Farms system.

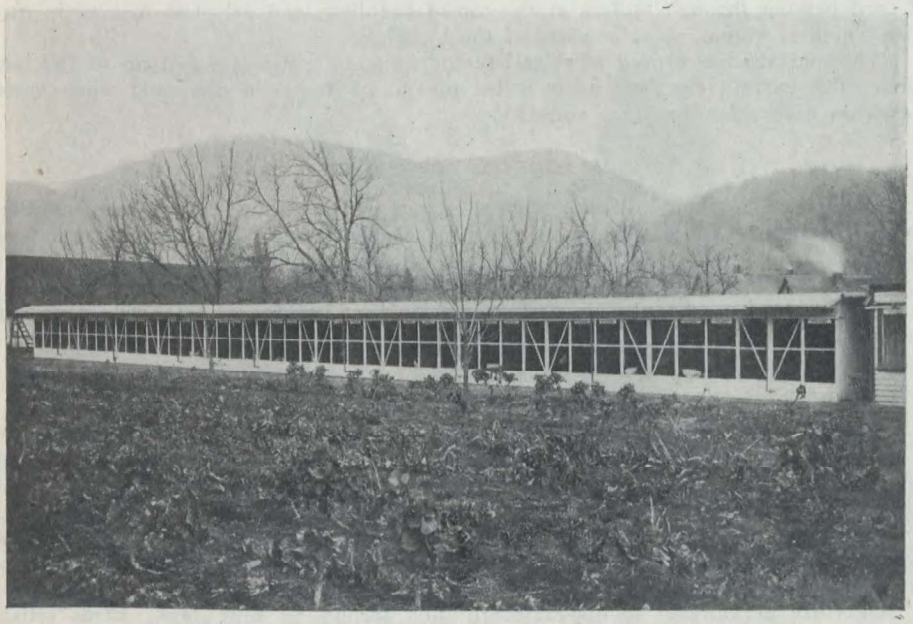
The birds are housed in one long house, and confined for the duration of the Contest. The house is eight feet high in front and six feet high at the back, each pen being six feet wide by sixteen feet deep, and facing south. Fronts of pens are of wire netting, with a cotton front so constructed that it can be rolled down from the outside all in one piece, the whole length of the building. The roller curtain, which is raised or lowered with a crank at one end of the building, is one of the best features about the house.

The window space (wire netting) takes up the whole front of each pen, at a distance of one and one-half feet from the floor and one and one-half feet from top of building.

Each pen is provided with five trapnests, placed at the rear under dropping board, above which is the roosting perch, running the width of the pen. At the rear of each pen, down at the floor, there is a glass window five feet by one foot, taking up practically the entire width of pen.

The doors at front of each pen allow of entering when necessary, while the doors which run through towards the rear from pen to pen, are handy when trapnesting. in front of the building there is an overhang, three feet wide, which is an excellent protection during wet weather. The floor is of cement, which is found to be of great advantage in cleaning, while it is also rat proof.

Near the front door of each pen a box of earth (dust bath) is placed. Straw is used for litter, and the scratch grains are fed in this litter. Scratch grains consisting of equal parts cracked corn, whole wheat and oats are fed twice daily, at noon and evening, care being taken not to have much grain in the litter at any time. Sprouted oats are also fed in the litter once a day in the morning. Dry mash (a mixture of



Agassiz, B.C. Poultry Contest House.

bran 100 parts, shorts 100, crushed oats 100, corn meal 50, beef scrap 50, charcoal 25) is kept before the birds at all times, and fed from a well self-feeding hopper divided into three compartments, the other two containing grit and oyster shell respectively, both of which are also kept before the birds at all times. Green feed is provided in the form of kale, mangels, or cut clover. Skim milk is fed daily, and water is before the birds at all times. The method of feeding green feed, milk, and water, is by having troughs for the purpose placed on the outside of pen, leaving room enough at bottom of wire netting to enable the head of the hen to gain access to trough, one trough being for green feed and milk, with a smaller trough for water. This plan of handling the green feed is very convenient.

There are nine breeds represented in the contest. These are as follow: 12 pens of S.C. White Leghorns, 1 pen Brown Leghorns, 1 pen Blue Andalusians, 4 pens White Wyandottes, 1 pen White Plymouth Rocks, 1 pen Rhode Island Whites, 1 pen Rose Comb Rhode Island Reds, 1 pen S.C. Rhode Island Reds, 1 pen Buff Orpingtons, and 3 pens Barred Plymouth Rocks.

The majority of the birds were well matured when they entered the contest, and several had already commenced to lay.

The inception of this contest has raised considerable interest throughout the province and elsewhere. Unquestionably this is a means whereby the poultry industry of the province will benefit. The results go to show that conditions in this vicinity are ideal for poultry. The impetus that the Egg Laying Contest has given to the poultry branch of the work on the Farm speaks well for its introduction, while it will be of great benefit to the contestants in their future work.

BEES

The spring of 1920 found the apiary composed of three colonies of hybrid bees. They wintered well in ten-frame Langstroth hives placed in individual wintering cases in which they were left until May for spring protection. On May 14 one colony swarmed; the swarm, however, later deserted the hive. Seventy pounds of honey were taken from one colony. The other two colonies required what they collected during the summer for winter feed. By September all three were affected with European foul brood. Two of the colonies were put into Kootenay hive cases, while the third was wintered in the same manner as previously.

On April 6 the three colonies were examined and were found fairly strong, but two were short of stores. European foul brood was beginning to appear in one of the colonies that was short of stores. Abundant stores were supplied to all the colonies and it is intended to treat the disease by requeening with Italians.

CEREALS

WEATHER

April was so exceptionally wet and cold that no cereals were sown until the 26th of the month. The backward spring, followed by the wettest June for twenty years, was not the best weather for cereal production. July and August were dry and hot; this weather rushed these crops to maturity. They did not fill sufficiently to get maximum yields, but all grain crops were threshed before the rain came.

LAND AND TREATMENT

The land upon which the cereal crops were grown was a sandy loam. It had grown roots the previous year, was fall ploughed, and was well worked in the spring. All grains were treated with formaldehyde before sowing.

SPRING WHEAT

Only two 1/60-acre plots of wheat and one-half acre plot were grown. Marquis outyielded White Russian and Kubanka. The white midge gave signs of activity in the wheat crop.

TEST OF VARIETIES

Name of Variety	Date of Sowing	Date of Ripening	Number of days maturing	Average length of Straw, including Head	Strength of Straw on a Scale of 10 points	Average Length of Head	Actual Yield of Grain per acre
				Inches		Inches	Pounds
White Russian, U.B.C.	May 1	Aug. 14	105	60	10	4	1,667
Marquis, for Dom. Chemist	April 26	Aug. 12	108	50	8	3	2,25
Kubanka (½ acre)	April 26	Aug. 14	110	48	8	3	1,437

OATS

Eleven varieties of oats were tested. Two strains of the old favourite, Banner, were near the bottom in comparative yields, beating only Daubeney, an early oat, and Liberty, a hulless oat. The best yields were produced by Victory and Lincoln respectively.

TEST OF VARIETIES

Name of Variety	Date of Sowing	Date of Ripening	Number of days maturing	Average Length of Straw including Head	Strength of Straw on a scale of 10 points	Average length of Head	Actual Yield of Grain per acre	Weight per measured Bushel after cleaning
				Inches		Inches	Pounds	Pounds
Banner, Ottawa 49	April 26	Aug. 4	100	54	M 8	8	3,082	35·5
Daubeney, Ottawa 47	" 26	July 31	96	54	8	6	2,612	37·3
Gold Rain	" 26	Aug. 5	101	54	7	7	3,400	40·5
Irish Victor	" 26	" 5	101	60	7	8	3,467	39·1
Liberty, Ottawa 480	" 26	" 4	100	48	8	7	2,400	45·0
Ligouro	" 26	" 5	101	60	8	7	3,247	41·1
Lincoln	" 26	" 5	101	60	8	8	3,726	36·4
O.A.C. No. 72	" 26	" 5	101	58	9	8	3,400	39·0
Swedish Select	" 26	" 4	100	60	8	6	3,467	39·6
Victory	" 26	" 5	101	58	7	6	3,979	39·0
Banner Oats, U.B.C.	May 1	" 9	100	54	9	9	3,000	

BARLEY

Twelve varieties of barley were tested. The six rowed varieties made a better showing than usual, when compared with the two-rowed sorts. The heaviest yielders were Manchurian, Gold, and Danish Chevalier. The poorest yielder was Albert.

TEST OF VARIETIES

Name of Variety	Date of Sowing	Date of Ripening	Number of days maturing	Average length of Straw including Head	Strenght of Straw on a scale of 10 points	Average length of Head	Actual yield of Grain per acre	Weight per measured Bushel after cleaning
				Inches		Inches	Pounds	Pounds
Albert, Ottawa.....6 row	April 26	July 22	87	40	8	2·2	2,325	51·0
Danish Chevalier.....2 row	" 26	" 31	96	36	8	3	3,000	53·0
Duckbill, Ottawa 57...2 row	" 26	" 31	96	33	8	2·2	2,560	53·0
Gold.....2 row	" 26	" 30	95	30	8	2·5	3,450	54·4
Guymalaye.....6 row	" 26	" 22	87	30	6	2	3,360	64·5
Manchurian, Ottawa 50.6 row	" 26	" 30	95	42	8	2·2	3,388	50·1
O.A.C. No. 21.....6 row	" 26	" 31	96	46	9	2·6	2,210	52·5
Oderbruch.....6 row	" 26	" 27	92	42	8	2·6	2,600	52·0
Odessa C.....6 row	" 26	" 28	93	42	8	2·5	3,012	51·5
Stella, Ottawa 58.....6 row	" 26	" 28	93	42	7	2	3,150	49·3
Success.....6 row	" 26	" 21	86	44	7	2·2	2,550	47·9
Bark's Excelsior.....6 row	May 1	Aug. 4	95	54	8	2·2	2,667	

PEAS

Only six varieties of peas were tested. Solo heads the list, as it usually does here. The popular variety, Arthur, also yielded well.

Name of Variety	Date of Sowing	Date of Ripening	Number of days maturing	Average Length of Straw	Average length of Pod	Actual Yield of Grain per acre	Weight per measured Bushel after cleaning
				Inches	Inches	Pounds	Pounds
Arthur, Ottawa 18	May 7	Aug. 17	102	62	2·5	2,347	64·9
Picton	" 7	" 20	105	60	2	1,653	64·4
Prussian Blue	" 7	" 18	103	60	2·5	1,486	65·2
Solo	" 7	" 20	105	58	2·5	2,729	64·2
19 B 1	" 7	" 16	101	48	2	2,057	64·8
32 D	" 7	" 16	101	54	2	2,571	64·0

BEANS

Four varieties of beans were tested; i.e., Beauty, Large White, Navy A and Norwegian. These beans were sown in drills twenty-eight inches apart, on May 17. They did well till the September rains started, and then all were spoiled in the field.

MIXED GRAINS

A mixture of Arthur peas and Banner oats gave a greater yield than Solo peas and Banner oats. This is an unusual result, and has been reversed in most of the previous trials. The plots were one-sixtieth-acre each.

Name of Variety	Date of Sowing	Date of Ripening	Number of days maturing	Yield of Grain per acre
				lbs.
Arthur Peas and Banner Oats	April 26	Aug. 7	103	3,420
Solo Peas and Banner Oats	" 26	" 7	103	2,820

OATS FOR HAY

Four varieties of oats were tested for hay purposes. They were sown May 18, harvested July 24, and weighed green. There was a large amount of weeds harvested and weighed with them, so that their yields are somewhat misleading.

OATS FOR HAY

	Gross weight per acre lb.
Banner, Ottawa 49	19,080
Daubeney, Ottawa 47	17,400
Ligowo	18,300
Swedish Select	21,000

FORAGE CROPS

SEASON

The spring was very wet, April having a precipitation of 9·95 inches. This made the ground excessively wet, which, combined with the cool temperature, resulted in a late spring. The mangel varieties were not sown till May 14, with carrots and sugar beets following on the 18th, and corn on the 29th. During June the wet weather continued, so that hoeing was impossible at that time, and on account of the thinning and weeding not being done at the opportune time the yields obtained were not as great as they should have been. A dry spell occurred during July and August, but from then to the end of the growing season the weather was very wet, especially at the time of harvesting the roots and corn.

SOIL AND MANURING

The soil upon which the roots were grown had been in pasture the preceding year, and was manured in the fall at the rate of twenty tons of barnyard manure per acre. It was ploughed in the fall, and again in the spring. It was then well worked and set up in drills. An application of 150 pounds nitrate of soda and 350 pounds of superphosphate of lime was applied per acre at the time the drills were being set up. A light dressing of fertilizer was applied to some of the corn.

CORN FOR ENSILAGE

Thirteen plots of corn were grown, three of these being Longfellow, with seed from different sources. The seeding was done on May 20 and the harvesting on October 9. The corn did not get a good start, but hot, dry weather during July and August was of much benefit. Such late varieties as Leaming, Bailey and Wisconsin No. 7 yielded best, although Longfellow compared well with them; the seed from Duke gave the best results. Size of plots one-hundredth acre.

INDIAN CORN FOR ENSILAGE—TEST OF VARIETIES

No.	Variety	Average Height	Stage of Maturity	Yield per acre	
		inches		tons	lbs.
1	Longfellow, Duke	96	Late milk	18	1,960
2	Bailey	92	Soft cobs	18	1,595
3	Longfellow, American	96	Late milk	18	500
4	Wisconsin, No. 7	104	Cobs just formed	16	1,945
5	Leaming	100	Cobs forming	16	1,215
6	Compton's Early	92	Early milk	16	266
7	North Dakota	94	Late milk	15	1,755
8	Longfellow, Summerland	94	Commencing to glaze	15	295
9	Golden Glow	108	Tasselled	14	1,200
10	Yellow Flint (Maine)	84	Early Milk	13	1,010
11	Northwestern Dent	86	Commencing to glaze	11	265
12	White Cap Yellow Dent	86	Small, watery cobs	10	1,621
13	Yellow Flint (Maine Twitchell's Pride)	62	Ripe	7	600

MANGELS

Thirty-nine one-hundredth acre plots were grown, of different varieties, secured from various sources, in order to determine not only the varieties giving heavy tonnage, but also to what extent the different varieties were uniform to their general type. Yields in table 1 show varieties in order of yield; and in table 2, the average yields of types.

TEST OF VARIETIES

Number	Variety	Plot Yield Per Acre				Remarks
		tons	lbs.	tons	lbs.	
1	Giant White Sugar Mangel (Steele Briggs)	23	500	930		Uniform type, free from prongness, good solid roots
2	Giant Yellow Globe (McKenzie)	22	500	890		A few off type in shape, good crop of uniform roots
3	Danish Sludstrup (Summerland)	21	1,500	870		Uniform in size and shape
4	Jumbo White Sugar Beet (Rennie)	21	1,000	860		Good type, free from prongіness
5	Rose Feeding Sugar Beet (Weibull's Sweden)	21	500	850		Uniform in type and colour, good size
6	Danish Sludstrup (Steeve's)	21	500	850		Well sized roots of good quality
7	Yellow Globe (Sutton's, Eng.)	21		840		Several small roots, a few cracked
8	Half Sugar White (Charlottetown)	20	1,500	830		Very uniform in shape, good quality, free from prongіness
9	Peerless (McKenzie)	20	1,000	820		Very good sized roots of uniform and even quality
10	Mammoth Long Red (Sutton's, Eng.)	20	500	810		Tops heavy, prongy, not uniform
11	Yellow Globe (Steele Briggs)	19	1,700	794		Good type of uniform roots, well shaped and free from prongіness
12	Danish Sludstrup, Kentville	19	1,500	790		Uniform in size and shape
13	Red Intermediate (Sutton's, Eng.)	19	1,000	780		Very uniform in shape, colour and size
14	Giant Yellow Globe (Rennie)	19	400	768		Not quite uniform in shape
15	Improved Giant (Rennie)	19		760		Pretty evenly sized roots of good quality
16	Sarimmer (Weibull's, Sweden)	19		760		Type uniform, quality good

TEST OF VARIETIES—*Con.*

Number	Variety	Plot Yield Per Acre				Remarks
		tons	lbs.	tons	lbs.	
17	Royal Giant sugar beet (Steele Briggs)	18	1,500	750		Neither uniform in type nor colour
18	Giant White Feeding sugar beet (Rennie)	18	1,000	740		Inclined to be prongy, too spindly
19	Improved Tankard Cream sugar beet (Rennie)	18	1,000	740		Fairly uniform, some rather small, few off in colour
20	Sugar Mangel (Sutton, Eng.).....	18	500	730		Good quality of roots, free from pronginess
21	Giant Yellow Intermediate (Steele Briggs)	18		720		Not very uniform in size or shape, inclined to be prongy and long
22	Golden Fleshed Tankard (Steele Briggs)	17	1,500	710		Rather small, not uniform in shape, some globe-shaped and some long
23	Prize Winner Yellow Globe	17	1,000	700		Several roots on small side
24	Yellow Leviathan (Agassiz).....	17	500	690		Very prongy, not uniform in shape
25	Eckendorffer Red (Weibull's, Sweden)	17	500	690		Very uniform in shape and colour, nice type of root
26	Selected Golden Tankard (McKenzie)	17		680		Rather prongy, not at all uniform, several globe-shaped
27	Devon Yellow Globe (Sutton, Eng.)	17		680		Very nice, evenly shaped roots
28	Yellow Intermediate (Sutton, Eng.)	17		680		Fairly uniform in type, shape and colour
29	Golden Tankard (Sutton, Eng.)	16	1,000	660		Very small, off in type, prongy
30	Selected Yellow Intermediate (Charlottetown)	16	500	650		Prongy, varied in shape, uniform in colour
31	Giant Long Red (McKenzie).....	15	1,500	630		Tops too heavy and roots prongy
32	Manitoba Giant Yellow (McKenzie)	15	1,000	620		Rather small but uniform in size and colour, free from pronginess
33	Yellow Intermediate Gate Post (McKenzie)	14	1,500	590		Too varied in type and shape
34	Yellow Intermediate (Charlottetown)	14	1,500	590		Rather prongy, several red rather than yellow
35	Perfection Mammoth Long Red (Rennie)	14	1,500	590		Too heavy top, too prongy, not desirable type
36	Devon Yellow Interm. (Sutton, Eng.)	14	500	570		Not uniform in shape, some globe-shaped
37	Yellow Leviathan (Rennie).....	14	500	570		Narrow, spindly and prongy
38	Yellow Intermediate (Ottawa)...	14		560		Good sample of Intermediate, uniform in colour and shape
39	Golden Globe (Sutton, Eng.).....	13		520		Uniform in type, well coloured

YIELD OF TYPES

Number in test	Variety Type	Average Yield Per Acre			
		tons	lbs.	bush.	lbs.
3	Danish Sludstrup	20	1,834	836	34
7	Half Sugar White	19	1,929	798	29
3	Half Sugar Rose	19	1,334	786	34
1	Red Intermediate	19	1,000	780	
6	Yellow Globe	19	934	778	34
1	Red Tankard	17	500	690	
3	Golden Tankard	17	166	683	16
3	Long Red	16	1,834	676	34
3	Giant Yellow Intermediate	16	1,000	660	
8	Yellow Intermediate	15	1,750	635	
1	Golden Globe	13		520	

TEST OF VARIETIES

No.	Variety	Plot Yield per Acre			Remarks
		Tons	Lbs.	Bush.	
1	Giant White Sugar Mangel (Steel Briggs).	23	500	930	Uniform in type, free from pronginess, good solid roots.
2	Giant Yellow Globe, McKenzie..	22	500	890	A few off type in shape, good crop of uniform roots.
4	Danish Sludstrup, Summerland....	21	1,500	870	Uniform in size and shape.
5	Jumbo White Sugar Beet, Rennie's	21	1,000	860	Good type, free from pronginess
6	Rose Feeding Sugar Beet (Weibull's, Sweden).	21	500	850	Uniform in type and colour, good size.
7	Danish Sludstrup, Steeve's.....	21	500	850	Well sized roots of good quality.
8	Yellow Globe (Sutton's, Eng.).....	21		840	Several small roots, a few cracked.
9	Half Sugar White, Charlottetown.	20	1,500	830	Very uniform in shape, good quality, free from pronginess.
10	Peerless, McKenzie.....	20	1,000	820	Very good sized roots of uniform and even quality.
11	Mammoth Long Red, Sutton's, Eng.	20	500	810	Tops heavy, prongy, not uniform.
12	Yellow Globe, Steele Briggs.....	19	1,700	794	Good type of uniform roots, well shaped and free from pronginess.
13	Danish Sludstrup, Kentville.....	19	1,500	790	Uniform in size and shape.
14	Red Intermediate, Sutton's, Eng..	19	1,000	780	Very uniform in shape, colour and size.
15	Giant Yellow Globe, Rennie's....	19	400	768	Not uniform in shape.
16	Improved Giant, Rennie's.....	19		760	Pretty evenly sized roots of good quality.
	Saummer, Weibull's, Sweden.....	19		760	Type uniform, quality good.
17	Royal Giant, Sugar Beet, Steele Briggs.	18	1,500	750	Neither uniform in type nor colour.
18	Giant White Feeding Sugar Beet, Rennie's.	18	1,000	740	Inclined to be prongy, too spindly
19	Improved Tankard Cream Sugar Beet, Rennie's.	18	1,000	740	Fairly uniform, some rather small, few off in colour.
20	Sugar Mangel, Sutton's.....	18	500	730	Good quality of roots, free from prongniess.
21	Giant Yellow Intermediate, Steele Briggs.	18		720	Not very uniform in size or shape, inclined to be prongy and long.
22	Golden Fleshed Tankard, Steele Briggs.	17	1,500	710	Rather small, not uniform in shape, some globe shaped and some long.
23	Prize Winner Yellow Globe, Sutton's.	17	1,000	700	Several roots on small side.
24	Yellow Leviathan, Agassiz.....	17	500	690	Very prongy, not uniform in shape.
25	Eckendorfer Red, Weibull's, Sweden.	17	500	690	Very uniform in shape and colour, nice type of root.
26	Selected Golden Tankard, McKenzie.	17		680	Rather prongy, not at all uniform several globe shaped,.
27	Devon Yellow Globe, Sutton's, Eng.	17		680	Very nice, evenly shaped roots.
28	Yellow Intermediate, Sutton's....	17		680	Fairly uniform in type, shape and colour.
29	Golden Tankard, Sutton's.....	16	1,000	660	Very small, off in type, prongy.
30	Selected Yellow Intermediate, Charlottetown.	16	500	650	Prongy, varied in shape, uniform in colour.
31	Giant Long Red, McKenzie.....	15	1,500	630	Tops too heavy, roots prongy.
33	Manitoba Giant Yellow, McKenzie.	15	1,000	620	Rather small by uniform in size and colour, free from prongyness.
34	Yellow Intermediate Gate Post, McKenzie.	14	1,500	590	Too varied in type and shape.
35	Yellow Intermediate, Charlottetown.	14	1,500	590	Rather prongy, several red rather than yellow.
36	Perfection Mammoth Long Red, Rennie's.	14	1,500	590	Too heavy tops, too prongy, not desirable type.
37	Devon Yellow Intermed., Sutton's	14	500	570	Not uniform in shape, some globe shaped.
38	Yellow Leviathan, Rennie's.....	14	500	570	Narrow, spindly and prongy.
39	Yellow Intermediate, Ottawa....	14		560	Good sample of Intermediates, uniform in colour and shape.
40	Golden Globe, Sutton's.....	13		520	Uniform in type, well coloured.
1	B. C. Grown.....	12	500	490	Fair sample of uniform roots, hard to pull.
2	Chatham.....	10	1,000	420	Very prongy, rather small, hard to pull.
3	Kitchener.....	9	500	370	Prongy, small, hard to pull.

ANNUAL HAY CROPS

The following annual hay crops were sown in one-fortieth-acre plots: Banner Oats with Hairy vetch, Common vetch and peas, Spring rye and Common vetch, Hungarian, Siberian, Common and Golden millets, Sudan grass, Beardless barley, Soja beans, Sweet clover and Crimson clover. (The spring was so cool and wet, and was followed by such a wet June, that the weeds destroyed the crops to such an extent that the results were most misleading).

RAPE SEED

A plot of rape seed was grown from plants left in the ground over winter. The seed was of good quality and yielded at the rate of 1,630 pounds per acre.

CHEMISTRY

EXPERIMENTAL WORK WITH MIXED FERTILIZERS

EXPERIMENT "E"

This experiment was planned with the object of determining the most profitable combination and quality of a fertilizer mixture, as measured by its influence in relation to cost, throughout a 3-year crop rotation. This rotation commenced in 1918 and, consequently, completed in 1920, consisted of mangels, oats, and hay.

Procedure.—The scheme is a comprehensive one, representing actually several groups of experiments which, while intimately correlated as a whole, may be studied individually. The plan comprises sixty-five (65) plots each one-fortieth of an acre in area. Of these 60 are fertilized, the remainder being check plots. The plots are generally in series of three (1A, 1B, 1C, etc.), the B and C plots of the same series receiving, respectively, three-fourths and one-half the quantity of the mixture applied to the A plot. In this way the quantities are varied. Variation of the proportions of the plant food substances furnished in the fertilizers, is accomplished by the adoption of two "basic" rates of application for each of the three "standard" fertilizers used; thus: Nitrate of Soda: 533 and 266 pounds; Super-phosphate: 1,000 and 500 pounds; Muriate of Potash: 320 and 160 pounds per acre. Commencing with the three maxima (plot 1A), and using every possible combination, the three minima quantities are reached in Plot 8A.

Series 9 is a repetition of series 6, but with a heavier dressing of manure. Plot 10 receives phosphoric acid and potash, but no nitrogen in the fertilizer.

The next group (series 11 to 15), is a repetition in part of the first eight series, except that potash is omitted from all the mixtures.

In the third group (series 16 and 17), basic slag, as a source of phosphoric acid, partially (16) and wholly (17) replaces superphosphate.

In the fourth group (series 18 to 20) organic sources (abattoir by-products), of nitrogen and phosphoric acid are tested.

In series 18 one-half, and, in series 19, the whole of the phosphoric acid—besides a proportion of the nitrogen—is furnished by tankage.

In series 20—abattoir by-products—dried blood, tankage and bone meal are employed exclusively to furnish both the nitrogen and phosphoric acid.

Since the experimental area has not been manured for several years, it was treated, in the fall of 1917, to a uniform application of barnyard manure at the rate of 10 tons per acre; fertilizer series 8, 9, 14, and 15 received 15 tons, and plots 21A and 21B (manure alone), 20 and 15 tons respectively. All checks, except the Permanent check plot, were treated to the general application of manure—10 tons per acre.

The soil is a sandy loam overlying a gravelly subsoil.

RESULTS

Influence of Manure.—One of the salient features of the mangel crop of the first year was the low yields from the check plots. The Permanent check plot produced nothing, while the others, which had received 10 tons of manure per acre, yielded on an average only 22·4 bushels per acre—a result in harmony with that from a previous mangel experiment at Agassiz. Plots 21A and 21B, receiving the larger applications of manure—20 and 15 tons—produced, respectively, only 91·2 and 44 bushels of mangels per acre. Of significance is the fact that when 15 tons of manure were used in conjunction with a "complete" fertilizer, the additional increase of crop was insufficient to cover the cost of the extra 5 tons of manure whereas when potash was omitted from the fertilizer the additional quantity of manure proved decidedly effective and profitable—a result doubtless attributable to the potash furnished in the manure.

INFLUENCE OF FERTILIZERS ON THE MANGEL YIELD

The highest yield of mangels (916·8 bushels) was produced on plot 3A, which received 533 pounds nitrate of soda, 500 pounds of superphosphate and 320 pounds muriate of potash per acre; the second highest (859·2 bushels) on plot 16B, which received 400 pounds nitrate of soda, 375 pounds each of basic slag and superphosphate, but no potash; and the third highest (828 bushels) by plot 3B, which received 400 pounds nitrate of soda, 375 pounds of superphosphate and 240 pounds muriate of potash per acre.

Superphosphate versus Basic Slag as Source of Phosphoric Acid

Comparing plots 11B, 16B and 17B, which received, respectively, 750 pounds superphosphate, 375 pounds of superphosphate and 375 pounds of basic slag, and 750 pounds of basic slag, each in conjunction with 400 pounds nitrate of soda, the records show that whereas superphosphate (11B) and basic slag (17B) produced similar yields of mangels in the first year, the mixture of the two (16B) proved greatly superior to either alone. In the oat crop of the second year, however, the influence of basic slag is more pronounced, plot 17B having the largest and plot 11B (superphosphate) the smallest yield of the three plots.

Seasonal Conditions affecting Results

Owing to unfavourable weather conditions having necessitated the weighing of the hay crop (in the third year of the rotation) in its green state, and the disproportionate quantities of grass and clover on the plots rendering such weights unreliable for use in strict comparisons, discussion of the results is restricted to data furnished by the returns from the mangel and oat crops only. In the year 1919 seasonal conditions—a wet, cold spring followed by a dry, warm summer—were responsible for the very low yields obtained from nearly all cereal crops. The degree of consistency noticeable in the yields of mangels in the first year was lacking in the oat crop yields of the second year.

Mineral versus Organic Fertilizer Materials

In order to illustrate some of the more important features, a few of the data may be presented in tabular form. The results *following the change from a "mineral" to an "organic" fertilizer are interesting.* Though the sources of each are varied, the amounts of nitrogen and phosphoric acid furnished were the same—60 and 120 pounds per acre, respectively—on each plot.

Plot	Treatment	Yields per Acre			Values of Increase (both crops)
		Mangels 1918	Oats (1919) Grain	Oats (1919) Straw	
		Bush.	Bush.	Lbs.	$
11B	All mineral fertilizer (nitrate and superphos.).	668·0	12·9	1,840	91·60
18B	Half phosphate acid from tankage, half from superphosphate.	452·8	28·2	1,440	73·60
19B	All phosphate acid and most of nitrogen from tankage.	304·0	20·0	1,480	43·20
20B	All organic materials (blood, tankage, bone meal).	152·0	18·8	1,600	19·50
Checks	(Average of 4 plots. No fertilizers).....	22·4	18·4	1,745	

The distinct decline in the yield of mangels, as the mineral fertilizers are replaced gradually by organic materials (abattoir by-products), is very striking. In the second year, the low yield of grain (considerably less than that from the checks on Plot 11B) might be attributed, in some measure, to seasonal conditions and premature ripening; this plot, it will be noted, produced the largest yield of straw. Of course, any appreciable residual influence of the nitrate of soda was not to be expected in the second season. A comparison of the grain yields from the other plots (18B, 19B, 20B) shows the same gradual decline noticeable in the former year.

Influence of Potash

In earlier fertilizer experiments at Agassiz, crops have invariably responded in a marked degree to potash in the fertilizer. The following tabulated statement will serve to illustrate this feature, as confirmed by Experiment "E":—

Plot	Fertilizer Treatment (in lbs. per acre)			Yields per acre		
	Nitrate of Soda	Superphosphate	Muriate of Potash	Mangels (1918)	Oats (1919) Grain	Straw
				Bush.	Bush.	Lbs.
2A.....	266	1,000	320	804·0	22·4	1,720
6A.....	266	1,000	160	664·8	20·0	1,800
12A.....	266	1,000	0	558·4	11·2	820
3A.....	533	500	320	916·8	25·3	1,540
7A.....	533	500	160	728·8	20·0	1,600
13A.....	533	500	0	620·0	15·3	1,240

In both groups shown muriate of potash was applied to the first two plots at the respective rates of 320 and 160 pounds per acre, while the third plot received no potash.

Diminishing yields of both mangels and oats followed consistently the reduction of potash in the fertilizers.

As compared with the first, the second group of plots received double the quantity of nitrate of soda and half the quantity of superphosphate, and the results would indicate that the latter combination approximates more closely the formula desired. As a matter of fact, the data furnished by the experiment as a whole indicate that 400 pounds of nitrate of soda and 500 pounds of superphosphate per acre represent the highest limit of profitable application, in any single year, under the particular conditions which obtained.

Influence of Phosphoric Acid

That the influence of phosphoric acid was less than that of potash will be shown by the data presented in the table which follows:—

Plot	Fertilizer Treatment (in lbs. per acre)			Yields per Acre		
	Nitrate of soda	Super-phosphate	Muriate of potash	Mangels (1918)	Oats (1919) Grain	Straw
				Bush.	Bush.	Lbs.
2A	266	1,000	320	804·0	22·4	1,720
4A	266	500	320	794·4	25·9	1,760
5A	533	1,000	160	744·8	17·6	1,440
7A	533	500	160	728·8	20·0	1,600
2C	133	500	160	648·8	22·4	1,320
4C	133	250	160	578·4	16·5	1,360

Three pairs of plots are seen in the table, and the first of each pair has received double the quantity of superphosphate applied to the second plot of the same pair. The double quantity of superphosphate caused, in the first two instances, only slight increases in the yields of mangels—9·6 and 16 bushels per acre—and even this small advantage disappears in the oat crop of the second year, when a decreased yield of grain is noticed on both the leading plots. But the results from 2C and 4C—where 500 and 250 pounds of superphosphates are compared—indicate that the smaller quantity was inadequate, the returns showing increases of 70·4 bushels of mangels and 6 bushels of oats per acre from the heavier application (500 pounds) of superphosphate.

Influence of Nitrogen furnished by Nitrate of Soda

The most prominent feature of Experiment "E" at Agassiz has been the remarkable influence of nitrate of soda, as a source of nitrogen, particularly on the oat crop of the second year.

In the first year the value of nitrate of soda for mangels—a value recognized generally—is clearly shown. A few comparisons of results will suffice to illustrate the point.

Varying the Quantity of Nitrate of Soda in the Fertilizer

Plot	Fertilizer Treatment (in lbs. per Acre)			Yield of Mangels per acre	Increase per Acre due to doubling the quantity of Nitrate
	Nitrate of Soda	Super-phosphate	Muriate of Potash		
				Bush.	Bush.
3A	533	500	320	916·8	122·4
4A	266	500	320	794·4	
3B	400	375	240	828·0	172·0
4B	200	375	240	656·0	
2C	133	500	160	648·8	239·2
10	0	500	160	409·6	
3C	266	250	160	755·2	176·8
4C	133	250	160	578·4	

Profitable increases in yields were produced by doubling (in the first plot of each pair) the quantity of nitrate of soda in the fertilizer, as will be evident on comparing the results given in the table. Though plot 3A gave the highest yield, plot 3B (owing to the lower cost of the fertilizer used) produced the more profitable increase. As previously stated, the results in general indicate 400 pounds of nitrate of soda to be the high limit for profitable application, in any one year, under the circumstances.

Plot 10, which received no nitrate in the fertilizer, gave a yield very much lower than that from any other fertilized plot. The addition of 133 pounds nitrate of soda increased the yield by nearly 240 bushels per acre.

Influence of Nitrate of Soda on the Oat Crop of 1919

Procedure.—By reason of the leaching of soluble nitrogen (nitrates) from the soil during the period—chiefly in the fall—when it is unoccupied by a growing crop, the influence of nitrate of soda applied in the first year could not be expected to extend, in any appreciable degree, to the grain crop of the second year. Recognition of this fact led to the provision in the scheme for repeating the application of nitrate of soda on portions of certain plots at the time of seeding the oats, in the spring of 1919.

The plots in series 2, 4, 6 and 12, which had received (in 1918) nitrate of soda at the rates of 266 (A), 200 (B) and 135 (C) pounds per acre, were divided, and one-half each plot was treated (in 1919) to the same per acre quantity of nitrate as it had received in the former year. To distinguish them from the corresponding half-plots, those on which the nitrate application was repeated in 1919 were designated: 2AA, 2BB, 2CC, and so on throughout the four series, representing twenty-four plots in all.

Influence of Nitrate in Relation to Seasonal Conditions

Nitrification, or formation of nitrates in the soil, is carried on by certain bacteria which attack, break down, and change the organic matter present. These bacterial functions commence and proceed only after a favourable degree of warmth in the soil has been reached. In the early spring, before the temperature of the soil has been raised to the degree necessary for nitrification little or no nitrates are present, so that nitrate of soda—furnishing nitrogen in a readily available form—proves often invaluable by promoting the early, vigorous growth of the young plants.

Conditions at Agassiz in the spring of 1919 were evidently ideal for demonstrating this influence of nitrate of soda. The spring was wet and cold, and the succeeding summer dry and hot. Consequently all plots, except those on which nitrate was applied, produced abnormally low yields both of grain and of straw. The oats were seeded on April 30th—the nitrate being applied to the twelve plots the same day—and harvested on July 5th: a very short season of growth. The table which follows shows the yields of grain and straw produced on each plot receiving nitrate, and on each corresponding plot receiving no nitrate in 1919, but fertilized similarly in 1918. The quantity and cost of the nitrate used is stated, and (in the last column) the profits remaining after duducting the cost of the nitrate are shown. The lower section of the table contains the averages of the four series. In the fourth series it will be observed that the plots number from 12B to 13AA, instead of from 12A to 12B. This is due to an error which occurred in the field at the time the nitrate was applied, plot 12B being mistaken for plot 12A. The results, however, are unaffected thereby.

The prices used in the computations were: Nitrate of soda: $115 per ton; grain $1 per bushel; straw $5 per ton.

RESULTS FROM THE USE OF NITRATE OF SODA ON THE OAT CROP OF 1919

Plot	Nitrate of Soda applied April 30, 1919	Cost of Nitrate of Soda per acre	Yields per Acre		Increase per Acre		Value of increase due to Nitrate	Profit after deducting cost of Nitrate
			Grain	Straw	Grain	Straw		
	Lbs.	$ cts.	Bush.	Lbs.	Bush.	Lbs.	$ cts.	$ cts.
2A	None	.....	22·4	1,720				
2AA	266	15 30	51·8	4,000	29·4	2,280	35 10	19 80
2B	None	.....	28·2	1,360				
2BB	200	11 50	56·5	3,760	28·3	2,400	34 40	22 80
2C	None	.....	22·4	1,320				
2CC	133	7 65	41·2	3,400	18·8	2,080	24 00	16 35
4A	None	.....	25·9	1,760				
4AA	266	15 30	64·7	4,360	38·8	2,600	45 30	30 00
4B	None	.....	23·5	1,360				
4BB	200	11 50	56·5	3,600	33·0	2,240	38 60	27 10
4C	None	.....	16·5	1,360				
4CC	133	7·65	33·0	3,040	16·5	1,680	20·70	13 05
6A	None	.....	20·0	1,800				
6AA	266	15 30	72·9	4,240	52·9	2,440	59 00	43 70
6B	None	.....	20·0	1,560				
6BB	200	11 50	54·1	4,480	34·1	2,920	41 40	29 90
6C	None	.....	23·5	1,680				
6CC	133	7 65	36·5	3,880	13·0	2,200	18 50	10 85
12B	None	.....	10·6	1,320				
12BB	266	15 30	40·0	4,480	29·4	3,160	37 30	22 00
12C	None	.....	12 9	1,640				
12CC	200	11 50	40·0	4,080	27·1	2,440	33 20	21 70
13A	None	.....	15·3	1,240				
13AA	133	7 65	41·8	3,520	26·5	2,280	32 20	24 55
AVERAGES								
4 plots	None	.....	19·7	1,650				
4 plots	266	15 30	57·3	4,270	37·6	2,620	44 15	28 85
4 plots	None	.....	21·1	1,480				
4 plots	200	11 50	51·8	3,980	30·7	2,500	36 75	25 25
4 plots	None	.....	19·4	1,400				
4 plots	133	7 65	38·1	3,460	18·7	2,060	23 85	16 20

These figures speak for themselves in no uncertain manner, and indicate clearly that a lack of available nitrogen (nitrates) was responsible for the small yields on the plots which received no nitrate of soda in 1919. In nearly every instance the yields have been doubled and in three more than trebled, by the nitrate. A point of further significance is noted in the fact that, without a single exception, 266 pounds of nitrate produced the greatest, 200 pounds somewhat less, and 133 pounds the least increase, in each series.

Disregarding plots 13A and 13AA, which received the maximum nitrate application in 1918, the same order (except in series 2) is noticeable in the profits per acre.

The lower yields generally in the fourth series may be attributed to the omission of potash from the fertilizer (in 1918) of these plots.

One may assert with confidence that, from investigational work of this nature, results more consistent and conclusive than these from Agassiz have never been published.

In these experiments nitrate of soda stimulated crop production in a degree which is undoubtedly exceptional. Under more favourable seasonal and soil conditions probably from 100 to 150 pounds of nitrate of soda per acre would have represented the maximum quantity which might have been applied profitably for a grain crop.

FARM IMPROVEMENTS AND BUILDINGS

No fencing, except of a temporary nature, was erected. No land clearing was attempted, other than what was accomplished in connection with getting out the season's fuel and keeping down undergrowth on already brushed land. A new modern poultry house was erected, 140 feet long by 16 feet deep, and is well serving the purpose for which it was intended. That portion of the main barn formerly known as the horse-stable was remodelled and equipped with modern steel fittings. It now makes a convenient addition to the calf pens and test-cow stalls. A litter carrier was also installed in the cow barn. This is a great labour-saving device. A complete electric lighting system was installed, which lights the farm buildings and main drives. The power is obtained from a plant in the town.

MEETINGS

The superintendent attended the following fairs and meetings:—

Consignment Sale of Holstein Cattle, St. Paul, Minnesota; Vancouver, New Westminster, Chilliwack, Victoria and Duncan Exhibitions; Coqualeetza Institute Sardis; Dairymen's Annual Convention, Victoria; Live Stock Breeders' Annual Convention, Victoria; Western International Live Stock Show, Portland; Meeting of the British Columbia Branch of Canadian Society of Technical Agriculturists.

The superintendent did active work in assisting to form the Chilliwack-Agassiz Horse Breeders' Club.

The assistant, besides attending some of the above fairs and meetings, did considerable travelling in connection with the inspection work of poultry for the egg laying contest. The poultryman also did some of this work.

VISITORS

A noticeable increase in the number of visitors to the Farm was in evidence. The egg laying contest attracted many visitors from distant as well as local points. Many new settlers in the district frequently call for information. Some members of the Mount Lehman Branch of the United Farmers of British Columbia motored to the Farm for a picnic on August 21. A party of Murrayville farmers, with their families, motored to the Farm on Labour Day.

It is estimated that at least 4,000 people visited the Agassiz Farm during the year.

EXHIBITION WORK

A travelling Agricultural Exhibit was staged at the Annual Flower Show at Haney, and also at Vancouver and New Westminster Exhibitions. The Flower Show at Haney was managed by the Women's Institute. It was held on July 14, fine weather being the order of the day. Much interest was evidenced in the exhibit, and a large quantity of circulars were distributed, particularly on gardening and poultry subjects. Some names were added to the mailing list.

During the Vancouver Exhibition, held September 11 to 18, and New Westminster, held September 27 to October 2, the weather was very wet. Considerable

interest was shown in the exhibit at both these Shows, but only 226 names were added to the mailing list.

Exhibition work with live stock assumed larger proportions than in former years. At fairs within the province the stock competed for ribbons only. In the horse section of this report the results of the horse exhibits are detailed. With Yorkshire swine at Vancouver the most important prizes won were: First on aged boar, aged sow, aged pen, sow under six months, young pen, three bacon hogs, champion boar and champion sow. At Victoria and New Westminster practically the same placings were obtained, except that a young pen was not shown, and at the latter fair the bacon hogs were too heavy, so were defeated.

In Dorset Horned sheep at these same fairs all prizes of importance were won, except at Victoria, where the ewe championship was lost, as well as one of the first prizes. There was the best exhibit of Dorset Horned sheep on the circuit this year that was ever seen in the province. The Farm's Dorset sheep were put to a good test in the way of competing for cash prizes at the Western International Live Stock Show held at Portland, U.S.A., in November. The flock did exceptionally well, winning the following: Aged ram, first and champion; shearling ram, first; lamb ram, first; aged ewe, third; shearling ewe, first, second and champion; lamb ewe, first, second, third and fourth; aged pen, first; lamb pen, first; get of sire, first.