DOMINION OF CANADA
DEPARTMENT OF AGRICULTURE
DOMINION EXPERIMENTAL FARMS

EXPERIMENTAL FARM
AGASSIZ, B.C.

REPORT OF THE SUPERINTENDENT

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

FOR THE YEAR 1929

Doune Lodge Bell Heather, 43611, and four of her offspring.

Printed by authority of the Hon. W. R. Motherwell, Minister of Agriculture, Ottawa, 1930

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DOMINION EXPERIMENTAL FARM, AGASSIZ, B.C.

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

SEASONAL NOTES

The year 1929 was distinctive from a climatic viewpoint. The total precipitation of 30·49 inches was the lowest ever recorded at Agassiz, and is less than half the average precipitation of the preceding ten years. The greatest deficiency occurred in the first two and the last four months of the year and thus crop growth was not seriously affected. For the six months, April to September, the total precipitation recorded was 12·37 inches, which was slightly more for this period than during the previous year. Other distinguishing features regarding the 1929 climate were:—

January had the lowest mean temperature since 1916.
January was the driest since 1910.
April was the driest since 1918.
June was the wettest since 1921.
September was the brightest since 1918.
November was the brightest ever recorded.
December was the driest since 1914.

The spring season was backward and cool, April especially erring in this respect. When seed was finally sown, however, there was plenty of moisture to push growth. With the heavy June precipitation, weed control was difficult, but everything grew well, and for the balance of the year conditions were good. Haying, harvesting, and threshing were carried on under ideal conditions and the grain and hay was of excellent colour with good yields. Roots and corn were average crops. No frost was recorded between April 9 and November 4.

METEOROLOGICAL RECORDS AGASSIZ, B.C., 1929

	Temperature				Precipitation				Sunshine	
	Maximum	Minimum	Mean	Mean 10 years average 1919-1928	Rain	Snow	Total	10 years average 1919-1928	Hours	10 years average 1919-1928
	°F	°F	°F	°F	in.	in.	in.	in.	hours	hours
January	47	5	29·44	36·18	1·02	0·65	1·67	9·27	64·3	45·9
February	48	15	33·11	39·05	1·31	0·15	1·46	6·14	95·5	76·6
March	63	31	43·67	43·58	4·15	0·10	4·25	5·05	78·5	103·6
April	73	28	46·58	49·54	2·07	0·05	2·12	4·65	123·7	121·6
May	80	39	56·29	55·77	4·29	.....	4·29	4·12	193·7	171·0
June	82	45	60·27	60·72	3·03	.....	3·03	2·69	119·5	157·0
July	89	44	64·14	65·26	0·51	.....	0·51	1·18	229·2	220·8
August	90	45	63·88	64·53	0·95	.....	0·95	1·86	205·9	183·9
September	92	41	62·23	58·27	1·47	.....	1·47	5·34	180·6	136·2
October	74	34	54·03	50·57	4·03	.....	4·03	8·16	98·3	94·9
November	59	26	42·53	42·60	2·35	.....	2·35	7·38	93·7	58·0
December	55	14	35·56	35·85	3·06	1·30	4·36	9·00	29·4	46·8
Totals	.....	.....	49·32	50·16	28·24	2·25	30·49	64·84	1,512·3	1,416·3

ANIMAL HUSBANDRY

DAIRY CATTLE

On December 31, 1929, the dairy herd numbered sixty-two head of pure-bred Holstein-Friesian cattle composed as follows: one mature Bull, one yearling bull, three bull calves, twenty mature cows, three three-year-olds, eleven two-year-olds, thirteen yearlings and ten heifer calves. Twenty-two of the younger females are sired by Sir Bess Ormsby Fobes 40th and to date those which have freshened are proving very satisfactory producers. During the year thirty-one cows freshened, three giving birth to twins, making a total of thirty-four calves born, fourteen of which were heifers and twenty bulls. Ten of the fourteen heifers were reared and six of the bulls. Thirteen bulls and three twin heifers were vealed. Six bulls and one female were sold for breeding purposes, while thirteen other females were culled due to old age, sterility or inferiority of type.

Feed was high in price throughout the year 1929. This was particularly true of all concentrates, which goes to emphasize the importance and value of homegrown feeds. Pasture is a very important crop in the economical production of dairy products in the Fraser Valley and plans are being made to start some intensive pasture experiments next year. Plans are also under way to grow some cereal grain mixtures whereby more protein may be grown at home and thus eliminate the necessity of purchasing expensive protein feeds.

ACCREDITED HERD

In June the entire herd again successfully passed the test for tuberculosis and continued in full accreditation.

HERD RECORDS

(Projects A. 36 and A. 56)

The following list shows the performance of all cows finishing a lactation period during the year 1929. In this table feeds are charged at market value. Butter-fat is computed at 50 cents per pound and skim-milk at 25 cents per one hundred pounds. The average milk production of the twenty-four cows that finished a lactation period during the year was 12,083 pounds and the average fat production was 427·74. From the figures in the table it is found that the average feed cost to produce one hundred pounds of milk was $1.24 and to produce a pound of butter-fat 35 cents.

MILKING RECORDS—COWS WHICH HAVE COMPLETED LACTATION PERIOD DURING 1929

Cow No.	Number of period	Number of days in lactation period	Total quantity of milk produced	Percentage of fat in milk	Total quantity of fat in milk	Quantity of butter (85%) produced	Quantity of meal consumed	Quantity of roots and silage consumed	Quantity of hay consumed	Quantity of beet pulp consumed	Pasture at $2.00 per month	Total cost of feed	Total value of product	Profit over feed
			lb.		lb.	lb.	lb.	lb.	lb.	lb.	$	$	$	$
143	7	365	20,060·0	3·69	740·00	870·59	5·365	22,545	2,148	1,686	.....	221 40	415 14	193 74
153	6	366	16,385·0	3·58	586·58	690·09	3,435	21,275	1,008	138	6 00	145 05	330 16	185 11
178	4	353	19,156·0	3·71	710·00	835·29	4,840	20,870	1,895	1,539	1 00	213 25	398 10	184 85
195	3	365	18,655·0	3·66	682·00	802·35	5,534	18,997	1,997	2,040	.....	232 61	382 97	150 36
207	2	305	15,670·0	4·32	677·00	796·47	5,059	19,205	2,118	2,031	.....	228 67	373 76	145 09
190	3	373	10,186·7	4·10	417·65	491·35	3,026	16,900	905	.....	8 50	115 28	231 75	116 47
238	1	365	15,367·0	3·81	586·00	689·41	4,990	17,048	1,830	1,844	1 00	211 51	327 58	116 07
93	10	594	14,792·8	3·50	517·75	609·12	4,494	27,085	1,135	.....	17 00	180 08	292 16	112 08
229	1	439	12,927·2	3·56	460·21	541·42	3,747	20,925	1,175	364	11 00	154 82	259 19	104 37
173	5	516	13,980·2	3·14	438·98	516·45	3,634	22,615	1,130	.....	18 90	155 69	250 95	95 26
81	10	374	10,772·3	3·26	351·18	413·15	2,963	16,845	905	.....	8 50	112 68	199 83	87 15
245	1	305	11,828·0	3·64	430·00	505·88	3,576	12,965	1,525	1,317	.....	158 03	241 61	83 58
239	1	429	11,265·0	3·46	389·77	458·55	3,721	18,410	905	148	11 95	142 47	220 23	77 76
169	5	384	10,355·9	3·28	339·67	399·61	2,985	16,920	905	.....	12 25	118 20	193 14	74 94
157	4	397	10,535·6	3·31	348·73	410·27	3,370	16,935	905	.....	13 65	123 68	198 07	74 39
237	1	370	8,761·9	3·51	307·54	361·81	2,580	16,340	905	.....	7 00	103 42	173 48	70 06
202	3	455	11,896·4	3·11	369·98	435·27	3,502	24,747	1,275	.....	8 50	148 63	211 76	63 13
95	8	439	11,609·8	3·00	348·29	409·75	3,476	18,355	905	.....	17 75	137 82	200 27	62 45
206	3	346	7,378·7	3·86	284·82	335·08	2,383	16,285	905	.....	11 00	101 80	159 01	57 21
230	2	348	11,047·8	3·39	374·52	440·61	4,238	18,245	1,482	654	5 50	163 31	212 12	48 81
227	2	358	6,246·4	3·85	240·49	282·93	2,213	16,580	940	35	7 95	99 22	134 30	35 08
46	12	326	8,602·9	2·76	237·44	279·34	2,955	16,600	905	.....	6 50	109 84	138 07	28 23
147	7	372	7,005·6	3·43	240·29	282·69	2,542	17,020	980	.....	11 00	108 97	135 91	26 94
176	4	349	5,508·5	3·44	189·49	222·93	2,320	17,720	905	253	6 75	106 34	107 14	0 80
Totals.....	.....	.....	289,994·7	.....	10,268·38	12,080·41	86,948	451,432	29,688	12,049	191 70	3,592 77	5,786 70	2,193 93
Averages.....	4·4	387	12,083·1	3·54	427·85	503·35	3,623	18,810	1,237	502	7 99	149 70	241 11	91 41

LIST OF RECORDS COMPLETED BY COWS IN RECORD OF MERIT DURING THE YEAR 1929

(Project A 57)

Name	Duration of test	Age of cow	Milk	Fat	Butter 80%
	days	y. m. d.	lb.	lb.	lb.
Agassiz Old Pietje Re-Echo	7	3 0 17	420·0	16·34	20·43
Agassiz Sylvia DeKol	7	7 5 3	459·5	15·24	19·05
Agassiz Lina Lulu Fobes	7	2 1 27	375·1	14·78	18·48
Agassiz Lina DeKol Pietje	7	4 3 29	383·6	14·03	17·55
Agassiz Lina Faforit	7	2 3 10	362·4	13·76	17·20
Agassiz Lina DeKol Fobes	7	2 3 14	327·7	12·9	16·13
Agassiz Mercena Rajah	7	2 3 15	341·4	12·82	16·03
Agassiz Lulu Fobes	7	2 3 26	350·2	12·45	15·57
Agassiz Lulu Canary Fobes	7	2 2 3	312·6	12·15	15·19
Agassiz Queen Fobes	7	2 2 14	296·7	10·96	13·70
Agassiz Walula Rajah	7	2 6 23	324·3	10·78	13·4
Agassiz Faforit Pietje Rajah	7	2 3 16	304·8	9·9	12·38
Agassiz Walula Fobes	7	2 6 26	335·7	9·68	12·11
Agassiz Lina Fobes	7	2 4 19	292·9	9·42	11·78

LIST OF RECORDS COMPLETED BY COWS IN CANADIAN RECORD OF PERFORMANCE DURING THE YEAR 1929

(Project A 57)

Name	Age at start of test	Month starting test	Duration of test	Number of times milked daily	Amount of milk	Amount of fat	Percentage of fat
	years days		days		lb.	lb.	%
Agassiz Mechthilde Sylvia.	9 ..	Feb. 1928	365	4 times 309 days. 3 times 56 days.	20,060	740	3·69
Agassiz Sylvia DeKol.	7 ..	Jan. 1929	353	4 times 320 days. 2 times 33 days.	19,156	710	3·71
Agassiz Mercena DeKol.	5 ..	Feb. 1928	365	4 times 309 days. 3 times 56 days.	18,655	682	3·66
Agassiz Walula DeKol.	4 161	Jan. 1928	305	4 times	15,670	677	4·32
Agassiz Lina Faforit.	2 104	June 1928	365	4 times 309 days. 3 times 56 days.	15,367	586	3·81
Agassiz Queen Fobes.	2 77	Feb. 1929	305	4 times	11,828	430	3·64

COMPARISON OF LINSEED MEAL VERSUS EDIBLE FISH MEAL

(Project A. 648)

Considerable quantities of edible fish meal are being fed in the Fraser Valley, not only to poultry and hogs, but also to dairy cattle. Due to this fact, it was decided to commence feeding it at this station, and when possible make some comparisons with other protein feeds. The following rations were fed to nine cows over a period of six weeks:—

Corn silage, 50 pounds per cow per day.
Pulped mangels, 40 pounds per cow per day.
Mixed clover hay, 5 pounds per cow per day.
Meal mixture, 12 pounds per cow per day.

The meal mixture used was made up of:—

300 pounds of bran at $36.50 per ton.
300 pounds of ground oats at $40 per ton.
100 pounds of corn meal at $53 per ton.

During the first and third two-week periods of the trial, fifty pounds of fish meal, costing $81 per ton, were added to this grain ration, and during the second period, for comparison, one hundred pounds of oil meal at $65 per ton were substituted.

No analysis of the oil meal or fish meal was made, but the guaranteed analysis as shown on the tags was as follows:—

—		Oil cake meal	Fish meal
Protein	%	35	70
Fat	%	7	8
Fibre	%	Max. 8	None

All milk produced by the cows was weighed and sampled for butter-fat test. The second week in each period only was used for computation of data, the first week being allowed for transition from one ration to another.

The following are the data obtained:—

FISH MEAL VERSUS LINSEED MEAL

Experimental ration		1 Fish meal	2 Linseed meal	3 Fish meal	Average of 1 and 3 Fish meal
Number of cows in experiment		9	9	9	9
Duration of test	days	7	7	7	7
Milk produced in 7 days	lb.	2,252·6	2,244·1	2,231·9	2·242·25
Average per cent of fat	%	3·52	3·51	3·42	3·47
Fat produced in 7 days	lb.	79·3172	78·7320	76·4398	77·8785
Hay consumed at $12 per ton	"	315	315	315	315
Silage consumed at $5 per ton	"	3,150	3,150	3,150	3,150
Mangels consumed at $5 per ton	"	2,520	2,520	2,520	2,520
Meal consumed at 2·0107 cents per pound	"	706	668	706	706
Linseed meal consumed at 3·25 cents per pound	"	.....	88	.....	.....
Fish meal consumed at 4·05 cents per pound	"	50	.....	50	50
Total cost of feed	$	32 2855	32 3565	32 2855	32 2855
Feed cost to produce 100 pounds milk	$	1 433½	1 4418	1 4465	1 43989
Feed cost to produce 100 pounds fat	$	40 7042	41 09701	42 2365	41 4703
Profit over feed with fat at 50 cents per pound	$	7 3731	7 0095	5 9344	6 6537

From the foregoing data, it will be observed that the results were about equal. The nine cows in seven days produced less than two pounds more milk when being fed the linseed meal ration. The test showed slightly higher at this time. When weather conditions are considered along with the very close margin of difference in results, it is safe to assume that, with rations compounded as above, one pound of fish meal could replace two pounds of linseed meal in a dairy cattle ration without seriously interfering with the milk flow.

A COMPARISON OF THE FEEDING VALUE OF CORN, CLOVER, PEAS AND OATS, AND SUNFLOWER SILAGES

Since 1915, feeding experiments have been conducted on the Agassiz Farm with Holstein cattle for the purpose of determining the feeding value of different silages produced. Corn has always been the popular silage crop to grow in the Lower Fraser Valley, but of recent years labour costs have been high and clover or peas and oats have been substituted for corn with good results.

In all seventeen experiments conducted, comparing the different silages, the three period plan was used. A group of cattle was fed one kind of silage for two weeks to complete the first period, they would then be fed the other kind for two weeks to complete the second period, and then they would be given the first kind again during the final two weeks, or the third period. During the second week of each period only, were data used to make comparisons, the first week being allowed for transition from one ration to another. The results of the first and third period were averaged and compared with the second period to get the direct comparison. Each experiment thus took forty-two days to complete, and the number of cows varied from four to twenty-four head. In all instances, a constant grain ration was fed to each cow throughout that particular trial. During some of the tests, hay or roots or both were also fed, but not in all experiments. Grains and hay were charged at market value, roots at $5 per ton and all ensilages at $5 per ton. The cost of milk and butter-fat in all trials was figured solely on a feed cost basis.

Several samples of the different silages were analyzed by the Dominion Chemist. The following are the results of the analysis of the dry matter from silages grown on the Agassiz Farm:—

COMPOSITION OF DRY MATTER

Variety of silage	Crude protein	Crude fat	Carbo-hydrates	Fibre	Ash
Corn	8·30	2·49	59·81	24·80	4·60
Clover	14·41	2·41	40·36	36·39	6·43
Pea and oat	7·94	2·30	46·81	36·30	6·35
Sunflower	12·09	4·29	44·60	26·92	12·10

Corn	silage yielded		24·04	per cent	dry matter
Clover	"	"	25·11	"	"
Pea and oat	"	"	27·67	"	"
Sunflower	"	"	29·35	"	"

Judging from the standpoint of protein content, the clover silage easily ranked first and sunflower second. The results obtained from these analyses were not duplicated in the practical feeding tests carried on.

COMPARISON OF FEED COST OF PRODUCT FROM CORN SILAGE AND CLOVER SILAGE

Number of experiment	Number of cows in experiment	Feed cost of			
		100 pounds milk		1 pound butterfat	
		Corn	Clover	Corn	Clover
		cts.	cts.	cts.	cts.
1	16	112	114	33·5	33·6
2	14	88·61	87·74	29·6	30·24
3	18	111·0	118·0	35·1	37·75
10	10	157·5	165·0	51·65	51·31
Average 4 experiments	14·5	117·28	121·19	37·46	38·23

Taking the average results from the four experiments, corn produced butter-fat 0·76 of a cent per pound and milk 3·9 cents per hundred-weight less than clover

COMPARISON OF FEED COST OF PRODUCT FROM CORN SILAGE AND PEA AND OAT SILAGE

Number of experiment	Number of cows in experiment	Feed cost of			
		100 pounds milk		1 pound butterfat	
		Pea and oat	Corn	Corn	Pea and oat
		cts.	cts.	cts.	cts.
4	18	110	111	34·02	31·7
5	24	96·27	99·03	29·25	29·44
7	10	85·42	81·72	25·65	22·63
11	10	151·5	158·0	47·76	50·46
Average for 4 experiments	15·5	110·80	112·44	34·17	33·56

The average results of the four trials show that pea and oat silage produced butter-fat 0·61 of a cent per pound cheaper than corn, while milk was produced 1·64 cents per hundred pounds cheaper when corn was fed.

COMPARISON OF FEED COST OF PRODUCT FROM CORN SILAGE AND SUNFLOWER SILAGE

Number of experiment	Number of cows in experiment	Feed cost of			
		100 pounds milk		1 pound butterfat	
		Corn	Sunflowers	Corn	Sunflowers
		cts.	cts.	cts.	cts.
13	9	201·0	209·9	64·11	64·72
14	10	175·21	187·05	54·98	56·02
16	9	137·43	140·60	43·10	45·78
Average of 3 experiments	9·3	171·21	179·18	54·06	55·51

In all three experiments corn gave the best results, producing on the average milk 7·97 cents per hundred pounds cheaper and fat 1·45 cents per pound cheaper than when sunflower ensilage was fed.

COMPARISON OF FEED COST OF PRODUCT FROM PEA AND OAT SILAGE AND CLOVER SILAGE

Number of experiment	Number of cows in experiment	Feed cost of			
		100 pounds milk		1 pound butter-fat	
		Pea and oat	Clover	Pea and oat	Clover
		cts.	cts.	cts.	cts.
6	18	123·0	120·0	38·04	37·63
8	10	103·51	102·84	33·17	33·16
9	10	99·68	100·30	31·56	30·68
12	10	162·70	168·50	49·45	51·87
17	6	151·0	145·0	45·01	44·10
Average of experiments	10·8	127·98	127·33	39·45	39·49

The results of these five tests are conflicting. In some instances the pea and oat silage gives the best results, while in others the clover is superior. The average of the five trials shows clover producing milk cheaper and pea and oat silage producing butter-fat slightly cheaper.

DEDUCTIONS FROM EXPERIMENTS

Corn silage gave decidedly the best results, especially when compared with sunflowers or clover. Its superiority was not so marked when compared with pea and oat silage. Although it analyzed lower in protein, the quality and digestibility of the corn silage protein would appear to be higher. From observations made in the barn, corn silage appears to be the most palatable and is always the silage used, when procurable, for feeding cows on test or other special stock.

The results secured when comparing pea and oat silage with clover are conflicting. In some instances one shows an advantage and at other times the reverse is the result. This would indicate that these silages are about equal in feeding value.

Sunflowers gave such decidedly poor results when compared with corn that it is considered the least desirable for this district, although in one separate test conducted in 1922, it gave better results than clover.

Quality in silage is a very important factor, and may be even more significant than variety. A good quality silage of poor variety will give better results than a low-quality silage made from corn. Work here would indicate that good quality silage is made more readily and with less care from corn than any of the other crops.

These results are all based on all silages in the silo being valued at $5 per ton. Costs of producing these crops or of ensiling them, are not considered. This is a phase of the work which has not been thoroughly explored, on this farm, but plans are being made at the present time to collect accurate cost data on growing and placing in the silo, corn, pea and oat, and clover silage crops.

CONTAGIOUS ABORTION

(Project A. 94)

Further satisfactory improvement has taken place in the herd as far as abortions are concerned. Not one cow aborted during the year and this is the first time for twelve years that this statement could be made. Thirty-one cows freshened, giving birth to thirty-four calves, three of them having twins. Only two calves were lost, one from a cow that had to be destroyed after freshening due to internal wire injury, and the other calf was from a cow with a serious infection in the brisket which apparently went through her system and affected the calf. There appears to be little change in the herd as far as sterility is concerned. Two two-year-olds, two three-year-olds and one old cow were butchered due to this trouble. On the other hand four cows and eight heifers bred between December 19, 1928, and January 18, 1929, all freshened in fine condition in October and are milking well. Ten of these females were only bred once, while the other two held with the second service.

BLOOD TEST FOR ABORTION

(Project A. 660)

Dr. E. A. Bruce, Pathologist, Agassiz and Dr. T. H. Jagger, of Vancouver, have continued in co-operation with the application of the serilogical or blood test on the herd during the year. Tests were made on all negative animals in the herd in March, June, September, and December, with the results unchanged from last year. All animals in the herd, with one exception born since March, 1921, continue to give negative reactions.

Close study is being made of the results of the test as related to the actual breeding history of each individual in the herd. It is considered inadvisable to make any further comments on this phase of the work until more data are available.

PROGRESS IN BREEDING HOLSTEIN CATTLE (Project A. 502)

At the annual meeting of the Holstein-Friesian Association of Canada held early in 1929 a decision was made to confer the title of "Master Breeder" upon an individual, firm or institution meeting certain requirements in connection with breeding Holstein-Friesian cattle.

Awarded by the Holstein-Freisian Association of Canada to the Superintendent of the Agassiz Experimental Farm.

In order to qualify for the title of "Master Breeder" it is necessary to have bred:—

—	XX Bulls	Gold Medal Cows	Excellent Cows
In herds of under 40 head	6	6	6
In herds of 40 to 80 head	12	12	12
In herds of over 80 head	18	18	18

As the Agassiz Experimental Farm herd is of the intermediate class, it is necessary to breed twelve each of XX bulls, Gold Medal cows, and Excellent cows. This has now been accomplished and the herd is eligible to be classed as a Master Herder's herd at the first annual meeting of the Holstein-Friesian Association where this honour is conferred.

The following is a list of the animals bred:—

"XX" Bulls

Advanced Registration No.	Name	Registration No.
70	Agassiz Champion Re-Echo	54809
68	Agassiz Korndyke DeKol	63491
94	Agassiz Priscilla DeKol	49081
71	Agassiz Sir Canary Faforit	58369
5	Agassiz Sir Pietje	51064
155	Agassiz Sir Faforit Pietje	66111
160	Agassiz King Pietje Canary	63093
176	Agassiz Brookside Canary 3	59740
172	Agassiz Walula Rajah	68561
184	Agassiz Faforit Fobes	72347
188	Agassiz Tsussie Rajah	79722
193	Agassiz Sir Faforit Fobes	79723

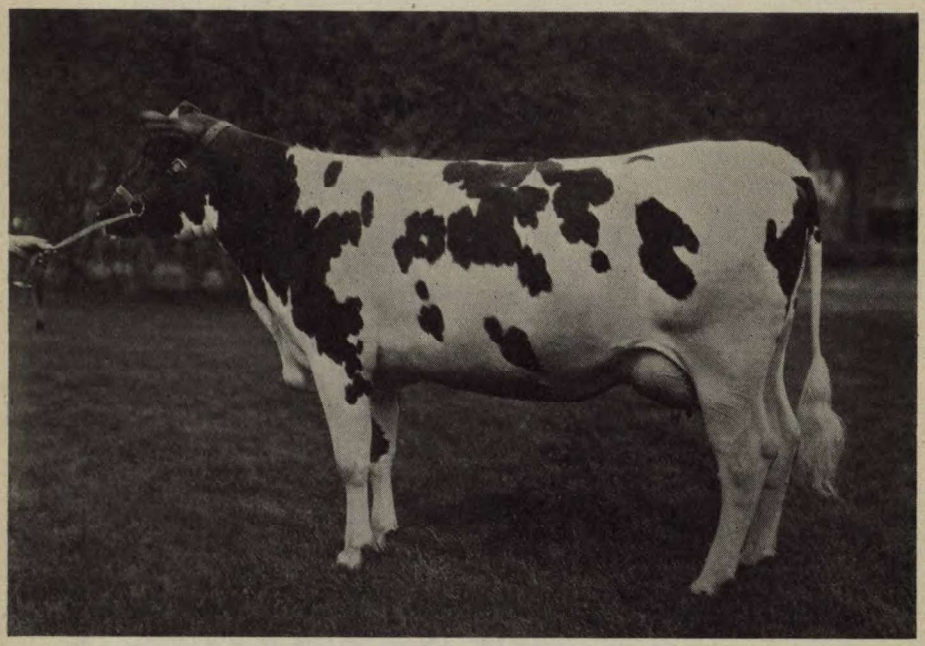
Gold Medal Cows

16	Agassiz Aurora Faforit	77277
17	Agassiz DeKol Faforit	103527
18	Agassiz Priscilla Korndyke	32145
19	Agassiz Priscilla Sylvia	60784
119	Agassiz Walula KeDol	113024
118	Agassiz Queen Re-Echo	141902
123	Agassiz Mercena DeKol	105036
135	Agassiz Lina Faforit	149860
136	Agassiz Mercena Rajah	157645
150	Agassiz Sylvia DeKol	93530
152	Agassiz Lina DeKol Fobes	170023
153	Agassiz Lina Lulu Fobes	170025
154	Agassiz Lulu Fobes	166938

Excellent Cows

35	Agassiz Aurora Sylvia	58519
36	Agassiz Lulu Sylvia	56072
37	Agassiz Mechthilde Sylvia	60783
39	Agassiz Pietje Inka Sylvia	62535
40	Agassiz Walula Canary Inka	103529
41	Agassiz Walula Sylvia	56071
192	Agassiz Pietje Canary Re-Echo	135847
193	Agassiz Inka Pietje Twice	135846
195	Agassiz Inka Lina DeKol	100921
202	Agassiz Old Pietje Re-Echo	141358
211	Agassiz Lulu Canary Fobes	170021

The twelve XX bulls have been well distributed. One went to China, one went down with T.B. in Ontario, and two were butchered in British Columbia because they were difficult to handle. The other eight are alive, two in Saskatchewan, one in Alberta and five in British Columbia. Three of the Gold Medal cows are dead, the remainder are in this herd. Two of the "Excellent" cows are in Ontario, four are dead, one is doing well in a neighbour's herd and the balance are in their home herd.



Agassiz Mercena Rajah, 157645. This Gold Medal heifer was first prize milking two-year-old at the Vancouver Exhibition in 1929.

INFORMATION ON HOLSTEIN BULLS SOLD FOR BREEDING PURPOSES

During the past fifteen years, sixty-three bulls have been sold from this herd for breeding purposes The following information regarding these sires is interesting:—

No information forthcoming	9
Poisoned	1
Disappeared	1
Vealed	1
Went to Alaska	1
Went to United States	1
Went to China	3
Died, natural causes	3
Butchered because cross	3
Butchered, owner could not re-sell for breeding	9
Butchered, T.B. re-actors	6
Living	25
Total	63

DAIRY WORK

Miss R. Keene, who has had charge of the dairy work for a number of years, resigned her position in October. Up to that time the usual weekly shipments of cream cheese were made to Vancouver and a limited quantity of English Stilton and Point l'Eveque cheese were also manufactured and sold.

MILK AND CREAM TESTS

Milk testing of cows in the Experimental Farm herd was continued and numerous samples of milk and cream were sent in by dairymen for testing. Fourteen seven-day Record of Merit tests were supervised.

HORSES

The horses on hand December 31, 1929, totalled eighteen head; all are pure-bred Clydesdales, except one gelding, and all were bred on the farm except the four foundation mares. The pony died of old age in July, and one filly was sold in October. Five foals were born in the spring but only two were raised. One died shortly after birth, one had indigestion and after a long illness died, and the third died from an acute attack of inflamation of the bowels. Three mares were bred to Music Hall but only one is in foal. The average feed cost for the year of the six horses doing most of the work was $114.09 for an average of 2,427 hours work accomplished, or 4·7 cents per hour. The average feed cost of maintaining three two-year-old fillies and one yearling gelding was $61.47.

HORSE-RECORDS OF FEED AND LABOUR FROM JANUARY 1, 1929 TO DECEMBER 31, 1929

Name	Date of birth	Oats consumed	Bran consumed	Hay consumed	Roots consumed	Pasture at $2.00 per month	Total cost of feed	Hours of labour	Weight Dec. 31, 1928	Weight Dec. 31, 1929
		lb.	lb.	lb.	lb.	$	$		lb.	lb.
Mike	April, 1922	3,666	530	5,936	180	.....	110 66	2,521	1,675	1,790
Bob	May, 1923	3,945	530	5,936	180	.....	116 72	2,497	1,770	1,880
Glen	April, 1924	3,880	550	5,936	180	.....	115 51	2,413	1,760	1,870
Harry	May, 1925	3,696	530	5,936	180	.....	111 16	2,400	1,700	1,830
Diana	May, 1918	3,838	535	5,936	180	.....	114 90	2,390	1,790	1,800
Buck	June, 1921	3,887	530	5,936	180	.....	115 60	2,341	1,575	1,695
Madge	June, 1915	2,533	580	4,788	180	14 00	99 24	912	1,750	1,700
Mac	April, 1924	2,799	550	5,768	180	14 00	107 81	782	1,900	2,000
Bute	April, 1924	2,699	512	4,256	180	8 00	91 81	737	1,725	1,800
Heather Bell	Feb., 1926	2,454	497	4,690	160	14 00	92 71	727	1,660	1,810
Bell	June, 1916	2,375	515	4,241	180	14 00	86 85	370	1,900	1,760
Heather	June, 1918	2,224	515	4,175	180	14 00	82 32	.....	1,875	1,750
Carillon Chimes	April, 1927	1,967	363	1,596	70	14 00	65 25	.....	1,320	1,660
Belle of Music Hall	Feb., 1927	1,967	363	1,652	70	14 00	65 58	.....	1,425	1,800
Rosegay	May, 1927	1,967	363	1,652	70	14 00	65 58	.....	1,380	1,720
Billy	Feb., 1928	1,381	324	910	66	14 00	49 47	.....	1,000	1,500

EXHIBITION WORK

Five horses were shown at the Vancouver Exhibition in August. Madge of Bellfield won second in the brood mare class and her filly foal won first. Rosegay, Bell of Music Hall and Carillon Chimes won first, second and third respectively in the two-year-old class. First was won for Get-of-Sire and also for Progeny of Dam. At New Westminster the five-year-old gelding Mac was declared Champion gelding of the show. Doune Lodge Bell Heather won second in the brood mare class and her foal by Music Hall was Reserve Grand Champion female. Madge of Bellfield was well down in the brood mare class but her foal was second to her stable mate, the Reserve Champion. Heather Bell was second in the three-year-old class and Rosegay was first two-year-old. In the Progeny and Get-of-Sire class the same places were secured as at Vancouver. The special prize by the Clydesdale Horse Association for the best filly under three years of age was won by Heather's foal with Rosegay, and Bell's foals in second and third places. The seven horses at New Westminster thus won, one Championship, one Reserve Champion, seven firsts, four seconds, and one third. The five horses at Vancouver won four firsts, three seconds and one third.

SHEEP

The sheep on hand December 31, 1929, totalled seventy-eight head consisting of one mature imported ram, one shearling ram, fifty-three ewes and twenty-three shearlings. Of the forty-eight ewes on hand at the close of the year 1928, two were sold in March; the remaining forty-six produced eighty-one lambs and raised sixty-three to maturity or lambed 176 per cent and reared 137 per cent.

The heavy mortality in the lambs was due to tapeworm infection. Eight lambs averaging seventy-five days old died from this cause in April and May. This is the first recorded appearance of the tapeworm in this district. The entire flock was treated with powdered kamala and copper sulphate with fair results.

The usual keen demand for stock was experienced. Sixty-eight head were sold during the year, and the lambs brought thirteen cents per pound live weight locally as they grew to the proper weight. Only two ewes lambed sufficiently early to produce lambs for the Easter market.

BREEDING EWE LAMBS VERSUS BREEDING AS SHEARLINGS

(Project A. 328)

The twenty shearling ewes on hand at the close of 1928 had been divided into two groups, ten of which had been bred for lambing in late April and May, while the remaining ten were unbred. These shearlings were all born in February, 1928, and were a very uniform lot.

BREEDING EWE LAMBS VERSUS BREEDING AS SHEARLINGS

No. of lamb	Weight Nov. 1		Yield of wool, 1929	Number of lambs born 1929	Number of lambs raised 1929	Value of lambs
	1928	1929				
	lb.	lb.				$
Ewe lambs bred autumn 1928						
697	124	162	11 (low ¼ staple off type)	2	2	31 96
700	111	163	7 (¼ staple good)	1	1	10 53
705	108	141	8 (¼ staple good)	1	1	25 00
714	115	157	9 (¼ staple good)	2	0	00 00
726	114	165	10 (¼ staple good)	1	1	20 00
738	119	165	8 (¼ staple good)	2	2	33 00
742	135	180	10 (¼ staple good)	2	1	20 00
749	104	150	8 (¼ staple good)	2	2	21 06
752	105	144	10 (¼ staple good)	1	1	25 00
769	107	151	9 (¼ staple good)	1	0	00 00
Average	114·2	157·8	9	1·5	1·1	18 655
Ewe lambs not bred in 1928						
699	115	167	9 (¼ staple good)			
703	110	160	10 (¼ staple good)			
708	121	194	10 (¼ staple good)			
713	122	155	9 (¼ staple good)			
716	120	182	9 (¼ staple good)			
719	108	185	9 (¼ staple good)			
724	110	167	9 (¼ staple good)			
737	114	183	7 (¼ staple good)			
744	114	169	8 (low ¼ staple off type)			
747	117	178	10 (¼ staple good)			
Average	115·1	174	9			

These results show close uniformity in the quantity and quality of the wool produced. The ewes which raised lambs were an average of 16·2 pounds lighter on November 1, but, to offset this possible advantage they gave birth to fifteen lambs and reared eleven of them valued at $186.55. Ewe No. 714 lost her lambs from tapeworms. It will be of interest to note the breeding results and size of all these ewes at the end of another year. From these results and those obtained previously, it would appear that early ewe lambs, well grown and well cared for can profitably be bred to lamb as shearlings. This is not true, however, of late undernourished stock.

VALUE OF SILAGE FOR PREGNANT EWES

Project A. 559

Due to the fact that the first snow of winter occurred on January 21, 1929, the ewes were pastured up to that time and received only light feeds of grain and hay. With the arrival of the snow ensilage feeding was started. The mature ewes all lambed between February 7 and March 3 so that they were not on a prolonged ration of ensilage. The ten shearling ewes, however, did not lamb till late April and were fed silage till they went to grass in March; commencing with four pounds per ewe and increasing up to eight pounds. All the lambing results were satisfactory so that it is safe to conclude that ensilage is a safe feed for pregnant ewes. Previous results point to the same conclusion. After lambs are born more care must be exercised, as heavy feeding then to ewes and lambs has a tendency to scour the latter.

CO-OPERATIVE WOOL SELLING

Project A. 342

The final returns for the 1929 wool clip have not been received at the close of the year, so that wool receipts cannot be given. The clip consisting of 68 fleeces totalling 507 pounds averaged 7·456 pounds per fleece. This is the lowest average yield for some years and is directly traceable to the shearling ewes which group averaged only nine pounds per fleece, whereas they usually yield eleven pounds. All fleeces were graded individually and with few exceptions graded up to standard for the breed, i.e., ¼ staple.

SWINE

The swine on hand December 31, 1929, totalled sixty-four head of pure-bred Yorkshires, and consisted of two three-year-old boars, twelve brood sows, forty-five experimental feeders and five on Advanced Registry test. The health of the herd was good throughout the year, except that a number of young pigs in the spring litters were lost with pyaemic arthritis. One hundred and thirty-nine pigs were sold during the year, of which seventy-two were finished market hogs, fifty-eight weaners, one old cull sow, and three young boars and five young sows for breeding purposes.

SKIM-MILK VERSUS FISH MEAL FOR MARKET HOGS

Continuing some experimental work conducted during the last three years, another comparison was made between edible fish meal and skim-milk as a supplement to the grain ration for fattening hogs. The test was carried on in duplicate with four hogs in each pen. All groups were fed a ration consisting of one part bran, one part corn meal, two parts shorts and two parts ground oats. This ration cost 1·8833 cents per pound. Seven per cent fish meal was

added to this ration for lots 1 and 2 at a cost of $78 per ton. Substituting for this in lots 3 and 4, the hogs were given four pounds of skim-milk per pig per day, the milk being charged at 25 cents per 100 pounds. The meal was fed as a slop, and the hogs were given all they would consume.

SKIM-MILK VERSUS FISH MEAL
Project A. 571

		Fish meal groups		Skim-milk groups	
		Lot 1	Lot 2	Lot 3	Lot 4
Number of pigs	No.	4	4	4	4
Initial weight, June 8	lb.	164	174	176	159
Final weight, Oct. 3	"	725	749	700	729
Gain in weight in 118 days	"	561	575	524	570
Average daily gain per pig	"	1·18856	1·21822	1·11017	1·20763
Total value of gain at 12 cents	$	67·32	69·00	62·88	68·40
Amount of meal consumed	lb.	2,390	2,390	2,290	2,290
Value of meal at 1·8833 cents per lb.	$	45·02	45·02	43·13	43·13
Amount of fish meal consumed	lb.	167	167	.....	.....
Value of fish meal at 3·9 cents per pound	$	6·51	6·51	.....	.....
Amount of skim-milk consumed	lb.	.....	.....	1,888	1,888
Value of skim-milk at 25 cents per cwt.	$	.....	.....	4·72	4·72
Total cost of feed	$	51·53	51·53	47·85	47·85
Difference in value of gain and feed	$	15·79	17·47	15·03	20·55
Cost of feed per 100 pound gain	$	9·19	8·96	9·13	8·39

The total cost of the feed consumed by the two fish meal fed groups was $7.34 greater than the milk fed hogs. The former however, gained a total of twenty-two pounds more than the latter, so that the actual profit over feed cost on both pens was only $2.30 greater for the milk fed hogs. This completes the fourth test of this series, in every one of which skim-milk at 25 cents per 100 pounds made cheaper gains than fish meal at from $70 to $80 per ton. In greater gains, however, the honours have been divided fifty fifty.

In connection with the quality of the carcasses from these groups, the following criticism from the manager of the packing plant where they were slaughtered is of interest:—

> " The eight which were fed on fish meal were extremely soft and sloppy and more or less on the unfinished order; the eight which were fed on skim-milk were very soft, also unfinished."

Further work on feeding fish meal is planned and at the present time, nine pens of five pigs each are being fed for this purpose. All are being fed a basic grain ration composed of 200 pounds barley, 200 pounds shorts, 100 pounds middlings and 100 pounds ground oats. To this mixture, forty-two pounds of fish meal is added and fed to pens 1 and 2; sixty-five pounds of tankage is added to the meal and fed to pens 3 and 4, and ninety pounds of oilmeal is added and fed to pens 5 and 6. Pens 7 and 8 are fed six pounds of skim-milk per pig per day along with the meal mixture, while lot 9 gets double this quantity of milk with the meal. A complete summary of this trial will be made in next year's report.

ADVANCED REGISTRY OF SWINE

With the object in view of further improving the commercial bacon hogs in Canada, the Advanced Registered policy for swine, evolved last year, has been continued. Realizing that commercial hog improvement must of necessity come through the pure-bred herds, the policy aims to gain information on the breeding ability of pure-bred individuals in connection with type, prolificacy and rapidity in development, and the proper finished carcass of the offspring. Due to the fact that there is as yet no fixed standard and also that it is a co-operative project with the Dominion Live Stock Branch, only a report of the feeds consumed and gains made by litters set aside for this work, are given here.

Representatives from the litters of six sows were chosen for this work during 1929. Five pigs from each of these litters were selected at weaning time to be fed through to market weight, four of these to go through the slaughter test.

The following data show the number of pigs raised per litter and the average feed cost of producing them to weaning age, including the feed cost of the sows and litters farrowing to weaning:—

FARROWING RESULTS OF ADVANCED REGISTRY SOWS

Sow number		23G	43B	51C	86B	1	2
Date farrowed		Mar. 10	Mar. 1	Mar. 7	Mar. 18	June 6	June 28
Number of pigs farrowed		12	8	11	6	11	8
Average weight at birth	lb.	2·25	1·88	2·91	2·5	1·91	2·25
Number of pigs weaned		7	5	6	6	11	8
Date of weaning		April 30	April 30	April 30	April 30	July 30	Aug. 30
Age at weaning	days	51	60	54	43	54	63
Average weight at weaning	lb.	17·29	21·4	21·0	18·83	20·9	26·37
Meal consumed by sow and litter farrowing to weaning	"	384	403	382	275	470	557
Skim-milk consumed by sow and litter farrowing to weaning	"	656	836	719	444	673	505
Roots consumed by sow and litter farrowing to weaning	"	20	50	35	.....	.....	.....
Total value of feed consumed by sow and litter farrowing to weaning	$	8·1382	8·9854	8·3026	5·73	9·5785	10·6201
Average feed cost per pig farrowing to weaning	$	1·1626	1·7971	1·3838	0·955	0·8708	1·3275

The lowest average cost per pig to weaning time is found, as would be expected, in the largest litter, where eleven pigs were farrowed and all reared. These pigs compared favourably in weight with those of other litters. The cost of the pigs from sow No. 2 was high as they were the oldest when weaned, and were of course the largest pigs. The death rate in the litters from 23G, 51C and 43B was high, with the latter being the oldest at weaning time and hence the most costly.

RESULTS OF FEEDING PIGS FOR SLAUGHTER TEST FROM WEANING TO MARKET WEIGHT

Sow number		23G	43B	51C	86B	1	2
Litter number		ZA19	ZB19	ZD19	ZH19	ZF19	ZJ19
Weaning weight of feeder pigs	lb.	78	107	110	96	101	142
Number of pigs in each lot		4	5	5	5	4	5
Weight 90 days after weaning	lb.	527	728	734	626	586	909
Number of pigs marketed 94 days after weaning		.....	.....	.....	.....	.....	3
Number of pigs marketed 119 days after weaning		.....	.....	.....	.....	.....	2
Number of pigs marketed 120 days after weaning		1	5	4	2	.....	.....
Number of pigs marketed 125 days after weaning		.....	.....	.....	.....	4	.....
Number of pigs marketed 156 days after weaning		3	.....	1	3	.....	.....
Total weight of pigs marketed	lb.	862	1020	1042	1064	808	994
Average weight of pigs marketed	"	215·5	204·0	208·4	212·8	202·0	198·8
Total gain in weight	"	784	913	932	968	707	852
Average daily gain per pig	"	1·333	1·5217	1·4654	1·3672	1·414	1·6385
Amount of meal consumed 1st 60 days after weaning	"	599	911	885	732	606	728
Amount of skim-milk consumed 1st 60 days after weaning	"	624	780	780	780	728	2467
Amount of green clover consumed 1st 60 days after weaning	"	20	24	24	24	.....	.....
Amount of meal consumed 60 to 90 days after weaning	"	501	878	860	698	624	834
Amount of skim-milk consumed 60 to 90 days after weaning	"	270	388	388	388	1410	1635
Amount of meal consumed 90 days to finish	"	1627	1163	1374	1696	898	328
Amount of skim-milk consumed 90 days to finish	"	132	163	163	163	1735	900
Total value of feed consumed, weaning to finish	$	60·07	65·51	69·04	69·22	54·47	52·22
Cost to produce 100 pounds gain	$	7·662	7·175	7·407	7·151	7·704	6·129

The following rations were used during the feeding period:—

FIRST SIXTY DAYS

Middlings	200 pound
Ground oats	100 "
Ground barley	50 "
Shorts	50 "
Bran	25 "
Linseed oil meal	14 "
Tankage, 45 per cent protein	14 "
Bone char	4½ "
Salt	2¼ "
Buttermilk	hand fed

SIXTY TO NINETY DAYS

Middlings	100 pound
Ground oats	150 "
Ground barley	100 "
Shorts	50 "
Bran	25 "
Linseed oil meal	14 "
Tankage, 45 per cent protein	14 "
Bone char	4½ "
Salt	2¼ "
Buttermilk	hand fed

NINETY DAYS TO FINISH

Ground oats	150 pound
Ground barley	200 "
Shorts	100 "
Linseed oil meal	14 "
Tankage, 50 per cent protein	14 "
Bone char	4½ "
Salt	2¼ "
Buttermilk	hand fed

The cost of these feeds was as follows:—

Middlings	$ 42 00	per ton
Barley	46 00	"
Oats	36 00	"
Bran	32 00	"
Shorts	32 00	"
Oil cake	62 00	"
Tankage	66 00	"
Bone char	40 00	"
Salt	30 00	"
Green clover	5 00	"
Skim-milk	5 00	"

It will be noted that the two litters from sows No. 1 and No. 2 received larger quantities of milk than the others. The latter pigs particularly made rapid gains and averaged just short of 200 pounds in a little over one hundred days, and made much the cheaper gains. The pigs from Sow No. 1 were very uniform, all marketed the same day, and although the total cost of feed was low, the cost of 100 pounds gain was the highest. Sow No. 43B produced a very uniform lot that were all marketed in 120 days, averaging 204 pounds and costing $7.17\frac{1}{2}$ per 100 pounds gain. The litter from 23G made the poorest showing. Only one was market weight in 120 days, the remaining three feeding for 156 days and hence costing the most per one hundred pounds gain.

The twenty-eight hogs were weighed at the farm in the afternoon, given a good evening meal, shipped the following morning by truck without breakfast, over a three-hour journey, and had an average shrinkage of $5\frac{1}{4}$ per cent.

FIELD HUSBANDRY

The rotation carried on at this Farm is a four-year one and consists of: first year, hoed crop; second year, grain seeded down; third year, hay: fourth year, pasture. (Project F. 20.)

HOED CROPS

The crops grown in this section were corn and mangels. The area for mangels had been fall-ploughed and again ploughed in the spring. That for corn had been ploughed in the spring only. Barnyard manure at the rate of 12 tons per acre had been applied broadcast on the ploughed ground in the spring and cultivated in. The portion reserved for mangels also received, at the time of seeding, an application of commercial fertilizer, in the proportion of one part nitrate of soda, two parts superphosphate of lime and one part muriate of potash, at the rate of 500 pounds per acre.

The mangel seed was sown at the rate of 10 pounds per acre in drills set up 28 inches apart with a double mould-board plough, the varieties grown being Danish Sludstrup and Half Sugar White. The total mangel crop amounted to 163 tons from 6 acres; i.e., 27 tons per acre.

The corn was sown in drills three feet apart the varieties grown being Minnesota 13, Longfellow . nd Northwestern Dent. The total yield amounted to 210 tons from 16 acres; i.e., 13 tons to the acre.

GRAIN

The grain (oats) was grown on land that had been in hoed crop the previous year and ploughed in the spring just prior to seeding. The grain was seeded down with a grass and clover mixture of 9 pounds red clover, 3 pounds alsike clover, 2 pounds White Dutch clover, 2 pounds Italian rye grass and 2 pounds orchard grass per acre. The total crop of oats harvested amounted to 44 tons from 36 acres; i.e., $1\frac{1}{4}$ tons per acre.

HAY

From 36 acres, 277 tons 1,600 pounds of clover silage and 42 tons first cutting hay were harvested. The second cutting yielded 56 tons 1,200 pounds hay. The average yield per acre estimated in hay approximated 4½ tons.

A good finish by a champion ploughman on the Agassiz Experimental Farm.

PASTURE

The past season was satisfactory for pasture. The stock were turned out early, the pasture carrying a maximum number throughout the year.

SUMMARY OF YIELDS, VALUE AND PROFIT AND LOSS (PER ACRE)

Rotation year	Crop	Yield per acre 1929	Value of crop 1929	Cost of production 1929	Profit or loss per acre 1929
			$	$	$
1	Mangels	27 tons	90 45	100 27	−9 82
	Corn	13 tons	86 45	72 98	13 47
2	Grain (oats)	66 bush.	48 00	43 60	4 40
3	Hay	4½ tons	90 00	33 81	56 19
4	Pasture	.....	8 40	16 70	−8 30

COST OF PRODUCTION

The following table shows the cost prices and return values in determining the cost of producing the various crops of the four-year rotation:—

Cost Prices

Rent including taxes	$ 13 00 per acre
Manure:—	1 50 per ton
The cost of the manure is distributed as follows:—40 per cent to the first crop of the rotation, 30 per cent to the second, 20 per cent to the third and 10 per cent to the fourth.	
Commercial Fertilizers:—	50 00 per ton
The cost is distributed as follows:—55 per cent to the first crop of the rotation, 30 per cent to the second, 10 per cent to the third and 5 per cent to the fourth.	
Manual labour	0 27½ per hour
Teamster labour	0 30 per hour
Horse labour	0 15 per hour
Machinery	2 85 per acre
Twine	0 20 per pound
Threshing	0 04¼ per bush.
Oats	0 85 per bushel
Corn	0 08 per pound
Mangel seed	0 50 per pound
Red clover	0 25 per pound
Alsike clover	0 29 per pound
White Dutch clover	0 44 per pound
Italian rye grass	0 13 per pound
Orchard grass	0 26 per pound

Return Values

Oats	$ 0 50 per bushel
Hay	20 00 per ton
Oat straw	10 00 per ton
Corn silage	6 65 per ton
Roots	3 35 per ton

Cost Per Acre of Producing Mangels

Item	1929	Average 1924-29
Rents and taxes	$ 13 00	$ 21 00
Manure	14 07	16 13
Seed	5 00	5 00
Machinery	2 85	2 93
Manual labour	54 55	55 85
Horse labour	10 80	10 20
Total cost per acre	100 27	111 11
Yield per acre, tons	27·00	21·00
Value per acre, $	90 45	65 11
Loss per acre, $	9 82	46 00

Cost per Acre of Producing Ensilage Corn

Item	1929	Average 1924-29
Rent and taxes	$ 13 00	$ 21 00
Manure	7 20	8 80
Seed	1 20	1 47
Machinery	2 85	2 93
Manual labour	36 38	32 00
Horse labour	11 55	10 30
Twine	0 80	0 80
Total cost per acre	72 98	77 30
Yield per acre, tons	13	13
Value per acre, $	86 45	89 30
Profit per acre, $	13 47	12 00

COST PER ACRE OF PRODUCING OATS

Item		1929	Average 1924-29
		$	$
Rent and taxes		13 00	21 00
Manure		9 15	10 60
Seed		2 55	2 60
Machinery		2 85	2 93
Twine		0 60	0 60
Manual labour		7 25	7 07
Horse labour		5 40	6 35
Threshing		2 80	2 51
Total cost per acre		43 60	53 66
Yield per acre, grain	bush.	66	56
Yield per acre, straw	ton	1½	1½
Value per acre, grain	$	33 00	33 66
Value per acre, straw	$	15 00	8 00
Total value	$	48 00	41 66
Profit or loss per acre	$	4 40	−12 00
Cost per bushel	$	0 45	0 66

COST PER ACRE OF PRODUCING HAY

Item		1929	Average 1924-29
		$	$
Rent and taxes		13 00	21 00
Manure		4 85	5 74
Seed		3 51	3 00
Machinery		2 85	2 93
Manual labour		6 90	6 80
Horse labour		2 70	2 25
Total cost per acre		33 81	41 72
Yield per acre	tons	4½	3¾
Value per acre	$	90 00	74 72
Profit per acre	$	56 19	33 00

HORTICULTURE

From a meteorological point of view the year 1929 was particularly outstanding for light precipitation. The rainfall for the year totalled 30·49 inches as compared with the previous ten year average of 64·84 inches. The greatest deficiency of rain occurred in the first two and the last four months of the year and crops were consequently not subjected to any greater degree of drought than usual. The months of April and June were cooler and less bright than average and with a higher rainfall in June than usual the season during the early stages of growth was backward.

Tree fruits yielded a light crop while cane fruits were normal. Much of the variety testing of vegetables as carried on in previous years was suspended with the result that labour could be more effectively devoted to other phases of work. The major projects carried out were an extensive trial in the use of paper mulch, the production of foundation stock seed, and the care of the ornamental section of the farm, which required approximately one half of the labour devoted to horticultural work.

VEGETABLES

BEANS

Seven varieties of bush beans were tested. The highest yielding green variety was Masterpiece, a variety which has proved itself to be the most satisfactory of this type. The highest yielding wax variety was Jones White, a production of the Manitoba Agricultural College, which can be recommended along with Davis White Wax and Hodson Long Pod. (Project H.61.)

A beautiful group of shrubs and trees screening the barnyard on the Agassiz Farm.

CHINESE CABBAGE

A test of varieties of Chinese Cabbage was commenced this year to determine the suitability of this vegetable to local conditions. Different cultural methods were followed. Seed was sown in hotbeds and cold frames on March 21 and transplanted to open conditions on April 30 and May 15 respectively. Seed of the different varieties was sown in the open on April 30. There were no satisfactory results from any of the above seedings. The plants were all subjected to heavy infestations of flea beetles and cabbage root maggots. The plants were either destroyed by these insects or ran to seed before forming heads. A late seeding was made on July 19. The first heads were ready from the Wong Bok variety on November 16. Plants continued to develop until December 4 when they were partially frozen by eight degrees of frost. The quality of heads both as a potherb and a salad crop was very good. Results from this year's work would indicate that the most suitable planting time would be between May 1 and July 15. This will be determined in subsequent years. Varieties tested were: Wong Bok, Pe Tsai, Chi Li, New Joy and Chinese Chili. (Project H.670).

CORN

Eight varieties of corn were tested, one of these a new introduction called Golden Nugget. This is an early variety of about the same season as Pickaninny and has golden coloured ears. It produced a very light crop and could only be recommended for its earliness. The plants are small and can, therefore, be

planted closer than standard varieties. Three varieties tested here during recent years offer considerable promise. Groff Golden of about the same season as Golden Bantam but higher yielding, Sixty Day Golden and Early Dighton yielding approximately the same as Golden Bantam but several days earlier. (Project H.102).

PEAS

Eighteen varieties of garden peas were grown, ranging from the early dwarf kinds to the taller later maturing and heavier yielding varieties. Of the tall varieties Kootenay, Golden and Duke of Albany produced heavy crops of approximately the same weight. Of the medium tall varieties No. 42, tested for the first time, Director, and Bruce are satisfactory; the latter is the latest variety of the three. Alaska and Little Marvel are the earliest and highest yielding of the dwarf varieties tested, the latter excels in quality. The variety, Supreme, for a late dwarf variety has proved during the past two years to be a better variety than Stratagem. (Project H. 153).

POTATOES

Six varieties of early potatoes were sprouted and planted on March 19 and dug on June 25. From an area of 2,775 square feet the acre yield was 6 tons 1,727 pounds. The wholesale price at time of digging was four cents a pound. Of the white varieties tested, Early Saint George gave the highest yield and of the pink varieties Bliss Triumph was highest. These are both consistently high-yielding varieties.

Main crop varieties are divided into numerous groups, the three most important in British Columbia being the Burbank, Green Mountain and Up-to-Date. During the past four years, of thirty-five varieties tested, the Burbank has ranked fourth in yield. This is the only variety of this group which has done well. In the Green Mountain Group, Wee McGregor and Gold Coin are leaders having ranked first and second amongst the thirty-five tested kinds. In the Up-to-Date group, Table Talk and Dalmeny Beauty have been leaders ranking sixth and seventh of the varieties tested. Other high-yielding kinds of the same or different groups are Rawlings Kidney ranking third, Dreer Standard ranking fifth, Empire State eighth, Ormandy ninth and U.B.C. tenth of the thirty-five varieties tested.

In each year from which these results are taken, potatoes have been planted in triplicate rows thirty feet long and yields have been corrected for misses.

CULTURAL EXPERIMENTS

Fall versus Spring Planting.—This project, commenced in 1925, is being run to determine at what time of year different kinds of vegetables can be planted to obtain early yet satisfactory spring crops. Under Agassiz conditions, when low winter temperatures will record in most years twenty-five or more degrees of frost accompanied by high winds, most seedling plants that are exposed will be winter-killed. These conditions require that most seed be sown not earlier than November. Climatic and soil conditions influence to a marked degree the success of crops resulting from sowings from November until the end of March. The soil should be one that offers good drainage and remains friable. Weather conditions in February are at times more favourable for germination than are those experienced at times during March. Few of the crops seeded before March 15 have given satisfactory results, and results as to the first date of maturity and total yield have been variable.

LETTUCE.—Seedings of lettuce prior to March 15 have in general not proved satisfactory, though some early plants have been obtained. Seedlings transplanted from hotbeds have given earlier crops and more uniform stands. Results were obtained with Grand Rapids and Big Boston. Further work on dates of sowing is to be done.

BEET.—No satisfactory crop obtained with early seedings up to March 19.

ONIONS.—No satisfactory crop obtained with early seedings up to March 19.

TURNIPS.—No satisfactory crop obtained from earliest plantings. Roots produce seed before attaining edible size. This crop is difficult to manage, due to flea beetles and maggots. These insects have to some extent been a factor in poor yields from the later sowings.

RADISH.—This vegetable has responded better than any other to early planting. Germination has with the exception of one year been good. The earliest that roots have been obtained is March 29. The early plantings have yielded better crops than the later ones due largely to the fact that roots were an edible size before injury from maggots had taken place.

CARROTS.—Early seedings of carrots from November to March have given satisfactory results. There is evidence to show that early winter planting in December will produce earlier crops than February or March planting. Roots from early plantings have a tendency to run to seed, the resultant crop will not be as large as is obtained from April plantings but roots reach an edible size from one to three weeks earlier. Germination of seed has varied from forty to ninety per cent. Further work on dates of sowing with this vegetable will be done.

CABBAGE.—Satisfactory results have been obtained with early winter planting of cabbage from November to March. There is evidence to show that November and December plantings will produce earlier crops than seed sown at later dates. Germination of seed has varied from fifteen to ninety per cent. Further work on dates of sowing will be done.

Some work has been done on the early planting of spinach, Brussels sprouts and cauliflower. Sufficient data are not on hand up to the present time to report on results obtained. (Project H. 640.)

Three identical projects are being conducted with cabbage, cauliflower and Brussels sprouts by planting seeds in hotbeds and sowing seed in the open on the same date, transplanting the seedlings when ready to determine the comparative yields and the dates when ready for use. This year the seedlings were set out on new soil which baked badly with the result that no satisfactory crops were harvested; there are consequently no results to report from this year's work. Similar conditions prevailed in the project different dates of sowing cabbage for storage.

CORN

SUCKERING VERSUS NOT SUCKERING.—This project is being run to determine what value, if any, is obtained in removing suckers or side shoots from sweet corn. Two varieties, Early Malcolm and Golden Bantam have been used. The following table shows the annual yields and the total yields to date, with respective dates of maturity approximately the same and yields in favour of unsuckered rows:—

CORN SUCKERING EXPERIMENT

Variety	Year	Date ready for use	Yield suckered	Yield not suckered
			lb.	lb.
Early Malcolm, suckered	1926	Aug. 5	17½	
" not suckered		" 9		17½
Golden Bantam, suckered	1926	" 9	29	
" not suckered		" 13		27½
Early Malcolm, suckered	1927	" 16	18¾	
" not suckered		" 16		23¾
Golden Bantam, suckered	1927	" 21	22½	
" not suckered		" 23		22½
Early Malcolm, suckered	1928	" 27	57½	
" not suckered		" 27		59
Golden Bantam, suckered	1928	" 27	42½	
" not suckered		" 27		48¼
Early Malcolm, suckered	1929	Sept. 14	104½	
" not suckered		" 14		107
Golden Bantam, suckered	1929	" 10	42	
" not suckered		" 10		54¾
Total yield			334¼	360¼

In 1926 and 1927 there were single rows of each variety suckered and unsuckered adjacent to one another, and in 1928 and 1929 plots were in triplicate, the rows alternating with one another. The length of rows was thirty feet. (Project H. 101.)

LETTUCE

SEED SOWN IN HOTBEDS VERSUS SEED SOWN IN OPEN.—During the past two years, the varieties Grand Rapids and Big Boston in 1928 and Grand Rapids and New York in 1929, have been sown in hotbeds and in the open on February 27 and March 16 in the respective years. The hotbed sown seed has matured from ten to fourteen days earlier than the check rows. Yields and quality of the different seedings have been very comparable. (Project H. 113.)

ONIONS

SEEDED IN HOTBEDS AND TRANSPLANTED VERSUS SEEDED IN OPEN.—This experiment has been run for a number of years but only since 1927 have uniform conditions been established. In order for the hotbed transplanted crop to succeed it should be ready to plant out at the time that seeding can be done out of doors. In some of the early years of the experiment this fact was not closely observed with the result that plants from late seedings in the hotbeds did not yield as well as rows seeded in the open. The results from year to year were variable depending largely on the dates of seeding and soils lacking uniformity. The following table gives results obtained during the past three years:—

ONIONS TRANSPLANTED FROM HOTBED VERSUS SEEDED IN OPEN

Variety	Year	Date seeded in hotbed	Date trans-planted	Date seeded in open	Yield trans-planted rows	Yield rows seeded in open
					lb.	lb.
Ailsa Craig	1927	Feb. 28	April 16	April 12	51¾	25
Southport Yellow Globe	1927	" 28	" 16	" 12	36¾	30
Southport Red Globe	1927	" 28	" 16	" 12	23½	24¾
Ailsa Craig	1928	" 27	" 21	" 21	31½	23
Giant Yellow Prizetaker	1928	" 27	" 21	" 21	45	21
Large Red Wethersfield	1928	" 27	" 21	" 21	40½	19
Ailsa Craig	1929	Mar. 16	May 2	May 2	104¼	49¼
Giant Yellow Prizetaker	1929	" 16	" 2	" 2	107¾	51¾
Large Red Wethersfield	1929	" 16	" 2	" 2	60½	39¼
Total yield					501¼	283

In 1927 there were three seeded rows one of each variety followed by three transplanted rows.

In 1928 there were two rows of each variety one seeded and one transplanted alternating with each other.

In 1929 there were six rows of each variety three seeded rows followed by three transplanted rows.

In years when onion maggots are prevalent they will cause considerable losses in transplanted rows which will necessitate replacing misses. Thick seeding will to a considerable extent overcome this source of loss. Transplanted onions, due largely to their extensive top growth which results in very large bulbs show a tendency towards thick necks; they are nevertheless of good keeping quality. (Project H. 137.)

POTATOES, EARLY

DIFFERENT SIZES OF WHOLE SETS FOR EARLY POTATOES.—An experiment was commenced this year to determine the comparative value of whole two ounce, four ounce and six ounce sprouted sets for the production of early potatoes. Each plot consisted of a single thirty-foot row of each size of set, with plots replicated three times. The two-ounce sets averaged 2·4 ounces, four-ounce sets averaged 4·2 ounces and six-ounce sets averaged 5·9 ounces. Seed was planted on March 19 and dug on June 25. The wholesale price of early potatoes at the time of digging was four cents a pound. The following figures give the tabulated results:—

EARLY POTATOES—SIZE OF WHOLE SETS

Size of sets	Seed per acre	Yield market-able potatoes three 30-foot rows	Yield per acre	Cost of seed per acre at 2 cents per pound	Value of crop per acre at 4 cents per pound	Differ-ence in cost of seed and value of crop
	lb.	lb.	tons lb.	$	$	$
Two-ounce sets	2,226	76	7 714	44 52	588 56	544 04
Four-ounce sets	3,969	101¼	9 1,650	79 38	786 00	706 62
Six-ounce sets	5,614	106¾	10 667	112 28	826 68	714 40

The seed required per acre is based on the amount of seed used to plant the different plots.

The yield per acre is based on the yield of three thirty-foot rows and as such is correct and comparisons, therefore, are exact. Due to the small size of plots the acre yield cannot be accepted as being a true indication of yields obtainable from that area of land. The crop this year, however, was a particularly good one.

The cost of seed at two cents is based on what can be considered a fair average price. (Project H. 675.)

POTATOES, MAIN CROP

COATED VERSUS UNCOATED SEED.—This experiment was commenced this year to determine the difference in yield, if any, of cut seed coated with land plaster and cut seed which was not coated. Seed was treated in the following manner:—

1. The seed was cut and planted at once.
2. The seed was cut and planted ten days later.
3. The seed was cut and coated and planted at once.
4. The seed was cut and coated and planted ten days later.

These four seed treatment methods permitted of the following comparisons, all of which were replicated three times in thirty-foot rows, rows in each group being adjacent to one another.

1. Seed coated and planted at once, versus seed uncoated and planted at once.
2. Seed uncoated and planted at once, versus coated and planted ten days later.
3. Coated and planted at once, versus coated and planted ten days later.
4. Uncoated and planted at once, versus uncoated and planted ten days later.

The first method gives a direct comparison between seed freshly cut and coated and planted and that freshly cut, uncoated and planted which is the normal way of treating sets.

The second method aims to determine whether seed which has been cut and coated ten days before planting is as good as seed which is freshly cut and planted.

The third method is a direct comparison between seed coated and planted at once and seed coated and then planted ten days later.

The fourth method is a direct comparison between uncoated seed freshly cut and planted and uncoated seed planted ten days after cutting.

The results obtained are those of one year's work and can be accepted only as a preliminary report. The seed which might ordinarily be expected to give the lowest yield averaged highest per row. Due to the method of group planting there were not the same number of rows of each type of seed. The yield from group planting, three rows of each different type of seed treatment and the yield from the total number of rows of each type of seed were as follows:—

POTATOES—COATED VERSUS UNCOATED SEED

—	Yield from group planting, three rows	Average yield from total number of rows	Number of rows
	lb.	lb.	
ted and planted at once	138¾	43¼	6
Uncoated and planted at once	135¾	44¾	9
Uncoated and planted at once	134¾		
Coated and planted 10 days later	143¼		
Coated and planted at once	120¾		
Coated and planted 10 days later	149¾	48¾	6
Uncoated and planted at once	132¼		
Uncoated and planted 10 days later	150	50	3

A fertilizer experiment was commenced this year with main crop potatoes, consisting of a comparison between 4-10-10 and 4-10-6 mixtures applied at the rate of 750 and 1,500 pounds per acre. The heavier applications with both mixtures gave the higher yield and the fertilizer with the higher potash content yielded slightly more than the comparative mixture. There were three thirty-foot rows for each method of application. Results will be reported in more detail when they can be compared over a longer period of experimentation.

TOMATOES

METHOD OF PRUNING.—This experiment is under way to determine if the ripening of tomatoes can be hastened by different methods of pruning. The procedure followed at present is not the same as when the project was first outlined. The system of pruning then followed was (1) to train plants to one stem by cutting out all side shoots; (2) to allow three trusses to form and then head back; (3) to allow two trusses to form; (4) to allow only one truss to form. The last method was discontinued when it was found that the total yield from such plants was very small and the majority of fruit badly sun-scalded. Training to two stems was substituted for this method. In 1929 a new method of pruning was introduced. The plants were allowed to grow naturally. At the time the earliest fruit on the lower trusses was well sized and turning from a vivid green to a pale green, indicating signs of ripening, the plants were headed back on the different arms to the higher trusses on which the fruit had developed to approximately one inch in size. The following table gives the result of the total crop during the last three years. It will be noticed that the yields are divided into five periods with the total marketable yield for the season making a sixth period. The total yield for the first period covers the marketable yield obtained during the first picking week (approximately) of the three seasons, the second period covers the total weight of marketable fruit harvested during the first two picking weeks (approximately) of three seasons and so forth:—

TOMATOES—METHODS OF PRUNING FOR EARLINESS

Method of pruning	Total yield first week	Total yield second week	Total yield third week	Total yield fourth week	Total yield fifth week	Total yield for season	Total yield green fruit	Total yield unmarketable
	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.
Pruned to 2 stems	26 3	58 6	132 12	244 6	344 8	476 14	53 8	88 12
Pruned to 1 stem	35 4	77 13	142 15	194 3	263 2	376 2	42 0	65 11
Pruned to 3 trusses	32 11	80 12	128 4	178 12	212 2	217 8	1 4	24 13
Pruned to 2 trusses	32 6	77 2	96 7	105 12	108 9	109 1	0 0	10 7
Headed back late	21 6	53 12	96 14	117 8	121 4	121 4	0 0	8 3

The yields for the first four methods of pruning are totals of the three years 1927, 1928, and 1929. The totals for the fifth method are for only one year, 1929. In 1927 and 1928 there were single thirty-foot rows of each system of pruning and in 1929 there were three thirty-foot rows of each system of pruning, one row arranged in each of three plots. The result of the last mentioned type of pruning, if averaged out for three years, would be increased by two-fifths. The system of heading back to two and three trusses will permit of closer planting than where one or two stems are allowed to develop, by closer planting it is likely that a larger yield for a given length of row would be obtainable. (Project H. 207.)

PAPER MULCH

Extensive tests were made with paper mulch to determine its value in producing earlier crops, larger yields and any other conditions which it might bring about.

The plots in this experiment were in two ranges each with thirty-foot rows. In each range a mulched and an unmulched row were adjacent to one another. The paper extended at least two feet on either side of the row and no unmulched row was closer than twenty-one inches to an edge of paper.

With cabbage, cauliflower, celery, peppers, beet, lettuce, onions, spinach, and carrots the order of planting was reversed in the second range so that the kind of vegetable in range one on the west side was on the east side in range two.

With beans, cucumbers, muskmelon and eggplant the rows were end to end with a three-foot path between. In range one the westerly row had paper mulch and in range two the easterly row had paper mulch. With tomatoes, in both ranges the easterly row had paper mulch. With early potatoes there were two adjacent rows without paper, then a guard row followed by two adjacent rows with paper. With corn, paper mulched and unmulched rows alternated with one another.

The spring of the year produced most unfavourable weather for the germination of small seed such as lettuce, beet, onions, etc. The day on which the majority of such seed was planted was followed in the evening by a heavy hail and rain storm and with variable weather following, the surface soil formed a hard crust through which many of the young seedlings could not force their way. The surface soil between strips of paper did not become as hard and impervious as that in the open. Owing to the very poor seed germination, with one exception, no two rows were of a sufficiently uniform stand to allow for accurate comparisons and dependable results. With transplanted crops such as cabbage, cauliflower and tomatoes there was a uniform stand in all rows, comparisons could, therefore be made between similar conditions. Round Pod Kidney Wax beans germinated poorly, Giant Stringless Green Pod germinated well, but crows pulled out many seedlings of both varieties which resulted in an un-uniform stand.

The following remarks for each kind of vegetable and subsequent remarks are the result of one year's work, they may be indicative of what would happen over a longer period of experimentation but cannot at the present time be taken as conclusive.

Beans, Round Pod Kidney Wax. No significant difference between mulched and unmulched rows. In range one the unmulched row gave the larger crop, in range two the mulched row gave the larger crop.

Beans, Giant Stringless Green Pod. No significant difference. In both ranges the mulched gave slightly the larger yield.

Cabbage, Golden Acre. Significant difference in favour of paper mulch. Golden Acre is an early variety and was grown as such, first heads being ready on July 6.

Cauliflower, Super Snowball. No significant difference. Slightly increased yield in both ranges from paper mulched rows.

Peppers, Harris Earliest. No significant difference. In range one both for green and ripe fruit the unmulched rows gave the larger yield, while in range two the mulched rows gave the larger yield.

Celery, Golden Plume. There was a small difference in both ranges favouring the paper mulch. In range two the unmulched row was so planted that it had a disadvantage as compared to the check which minimizes the effect of the value of the paper mulch.

Beet, Detroit Dark Red. No significant difference. Poor germination which resulted in lack of uniform stands.

Corn, Golden Bantam. Significant difference in both ranges favouring paper mulch.

Cucumber, Perfection. Significant difference in favour of paper mulch. The heavier yields from mulched rows with this vegetable were very marked.

Lettuce, Iceberg. No significant difference. Poor germination, particularly in range one, resulted in an uneven stand.

Muskmelon, Hearts of Gold. Significant difference in favour of paper mulch. The heavier yields and increased vigour of vine growth were very marked.

Onions, Yellow Globe Danvers. No significant difference. There was poor germination which resulted in an uneven stand.

Potatoes, Green Mountain. A significant difference in favour of paper mulch.

Potatoes, Early Ohio. No significant difference. These potatoes were sprouted, planted on March 19 and dug on June 25.

Tomatoes, Bonny Best. No significant difference. Plants were staked and trained to two stems.

Spinach, King of Denmark. No significant difference. Germination was poor, which resulted in an uneven stand.

Eggplant, New York Purple. Significant difference in favour of paper mulch.

Four different methods of laying the paper were adopted:—

1. Seed was sown in the usual manner and the paper laid down immediately after planting.

2. One sheet of paper was laid down, the seed drilled in along one edge covered over and the second sheet of paper laid down.

3. The seed was planted and when it had germinated the paper was placed along the edges of the rows.

4. The paper was put on the ground for transplanted crops such as cabbage and tomatoes; holes were made in the middle of the paper and the plants set in the ground through these. This is a satisfactory method of handling such crops.

The chief difficulty with methods one and two is to have seedlings come up in a sufficiently straight line so that the paper can be placed from one to one and a half inches apart without smothering a considerable number of the young plants. Method two proved unsatisfactory as the edges of the paper next to the row could not be placed closer than two to two and one-half inches owing to the fact that the bottom of the drill in a friable soil cannot be made to come immediately below the edge of the sheet of paper laid down. Spacing the paper two inches or more apart partly defeats the object and permits of a comparatively wide strip of weed growth. The third method proved the most satisfactory. Rows in every case must be as straight as possible.

Three different methods of holding down the paper were tried.

1. Covering the edges of the paper with soil. This was quite satisfactory for outside edges and transplanted crops but not satisfactory for edges adjacent to rows of seed or small seedlings. For such edges it requires careful labour to not cover too deeply the planted seed and at the same time to get a sufficient weight of earth on the edge of the paper to make an efficient anchor.

2. Strips of one by three lumber were laid along the edges of the paper, ends of strips being held down with rocks. This method is extravagant in the use of lumber and requires a lot of handling. Furthermore, where the ground is not level the strips will not lie sufficiently close to the paper.

3. Laths fastened down with long staples made from heavy galvanized wire. This method appeared to be the most satisfactory as well as being the neatest. Strips of wood similar to laths but approximately twice as long would be more satsifactory.

The paper proved satisfactory in keeping down weeds. A few weeds came up through the perforations in the paper and an average number between the edges of the paper along the rows. In a home garden where the grower was likely to be away for a few weeks during the active period of weed growth, paper would help considerably to overcome the weed problem. Along the edges, which were held down with strips of wood, laths or earth, the paper disintegrated to a very considerable extent, in no case however, once the paper was laid and fastened down did it become displaced by wind. The paper is difficult for one man to lay, especially if there is any wind. If putting the paper down is delayed until after seeding or seed germination, a suitable time for this work can be chosen. During the growing season the paper was walked on to a considerable extent for weeding between rows, harvesting crops, spraying and dusting plants. When the paper is dry, the soil beneath level and firm, it will withstand a considerable amount of wear if care is taken in walking.

Soil temperatures were taken with two soil thermometers at a depth of four inches. The thermometers were in both cases set one foot away from tomato plants in adjacent rows. Temperatures were recorded at 7 a.m., 1 p.m., and 6 p.m. for seven days in July, twenty-seven days in August, twenty-one days in September, and twenty-seven days in October. The figures given below indicate the average temperature for the month based on the number of records obtained. They show a very slight average increase in soil temperature under paper mulch and it is to be noted that the 6 p.m. temperature for July and August under paper mulch is slightly less than that recorded under exposed soil conditions, whereas in September and October it is greater. (Project H. 685.)

Soil Temperatures

Month	Average number of days	7 a.m.	1 p.m.	6 p.m.	Soil exposure
		°F.	°F.	°F.	
July	7	62·286	69·000	74·428	Exposed.
July	7	63·000	70·000	73·571	Paper mulched.
August	27	60·44	67·63	71·85	Exposed.
August	27	61·44	67·89	71·19	Paper mulched.
September	21	55·381	61·190	66·238	Exposed.
September	21	56·587	63·429	66·452	Paper mulched.
October	27	48·778	52·148	52·852	Exposed.
October	27	49·889	53·000	53·074	Paper mulched.
Average increase for paper mulch		+1·008	+1·060	−0·542	

FOUNDATION SEED STOCK

The object of this project is seed improvement—to obtain seeds of different kinds and varieties of vegetables which will produce as closely as possible progeny of the accepted standard and type. The ultimate object is to have such proven strains of seed multiplied and made eligible for registration. Work is being done with the following vegetables at this farm:—

Cabbage: Copenhagen Market.
Carrot: Half Long Danvers.
Beet: Early Flat Egyptian.
Radish: China Rose.
Peas: Daisy.
Lettuce: New York.
Beans: Masterpiece.
Vegetable Marrow: Long Trailing Green.
Scarlet Runners.

Originally several commercial strains of each variety were planted and from the resulting progeny the best plants of the most promising strains were selected. In the case of annuals such as peas and lettuce, the seed of such selected plants was planted this spring and a further selection of strains was made during the growing season. From the most promising lots seed was harvested. With biennial crops such as beets and carrots, the selected roots were planted in the spring and seed was harvested from these. There is now on hand sufficient seed from several different plants of each variety of the following kinds of vegetables: cabbage, carrot, beet, peas, lettuce, and beans that in 1930 the different strains can be closely checked for type, date of maturity, yield, and any other desirable factors.

Radish were planted for the first time in 1929.

Selections of vegetable marrow were made in 1928 and two very promising strains were obtained. Unfortunately the bulk of the seed from these strains was destroyed. The progeny from two hand-pollenized fruits did not compare at all satisfactorily with the parent and were not deemed suitable. The progeny from several open-pollenized plants was very largely a conglomeration of types, which represented everything but the desired one. It will be necessary to make further selections from commercial strains.

A considerable amount of selection is still necessary with scarlet runners. In 1929 seed of six different plants representing three different types selected in 1928 was planted. Ripe pods from each strain were harvested in the fall and from each strain seventy-five pods were hand shelled. There was a marked difference between the seeds within a strain. The following number of distinct variations in seed type were found:—

Strain one: eight seed types.
Strain two: seven seed types.
Strain three: six seed types.
Strain four: seven seed types.
Strain five: two seed types.
Strain six: fourteen seed types.

There is reason to believe that bumble bees are responsible for cross pollination.

In order to avoid cross pollination of cabbage, beet, and carrots whole plants of these vegetables were enclosed in cheese cloth and with cabbage parts of other plants were bagged with manila bags or cheese cloth.

No commercial quantities of cabbage seed were obtained from any plants completely covered in or from any part of a plant which was protected in either

of the ways mentioned above. The plants so protected appeared to produce an average number of blossoms of which the majority formed seed pods, practically all of these, however, were either barren or had only one seed, usually in the terminal end of the seed pod. All the pods were undersized. In the case of one plant which was completely surrounded by cheese cloth ,the stigmas on one half of stems were hand-pollenized with pollen from the same plant, the blossoms on the other half of the plant were untouched. There was no apparent difference in the amount of seed from the different halves of the plant. Seed pods of cabbage shatter when ripe.

All carrot plants bagged set a reasonable amount of seed. No weights of seed were kept, growth conditions of unbagged plants were not equal to that of bagged plants, it is presumed that this was due to other causes. Half of the flower heads of one enclosed plant were gone over with a camel hair brush, the other half were left untouched. There was an appreciable increase in the amount of seed which set on those flower heads which had been brushed over.

Two beet plants were enclosed in cheese cloth, a third plant was allowed to grow naturally and did not make as strong a growth as the first two. None of the plants produced a large seed crop, the plants covered in were equally as satisfactory as the third mentioned plant. Beets require a longer season for seed production than cabbage and carrots. (Project H. 652.)

FRUITS

CRANBERRIES

The three varieties of low bush cranberries planted in 1928 have made very little growth during the past two seasons. It is presumed that there are three chief factors which retard the successful development of these plants. First, the type of soil, a muck soil underlaid with clay, second, a shortage of moisture during summer months, third, a soil not sufficiently acid. The latter condition may be partially overcome by applications of sulphate of ammonia, which will be commenced in 1930.

SMALL FRUITS

Very little work has been done with small fruits during the past few seasons, other than variety testing. It has been found difficult to grow strawberries successfully due to severe attacks of weevil. With the use of weevil bait during the past two seasons this pest has in a measure been controlled.

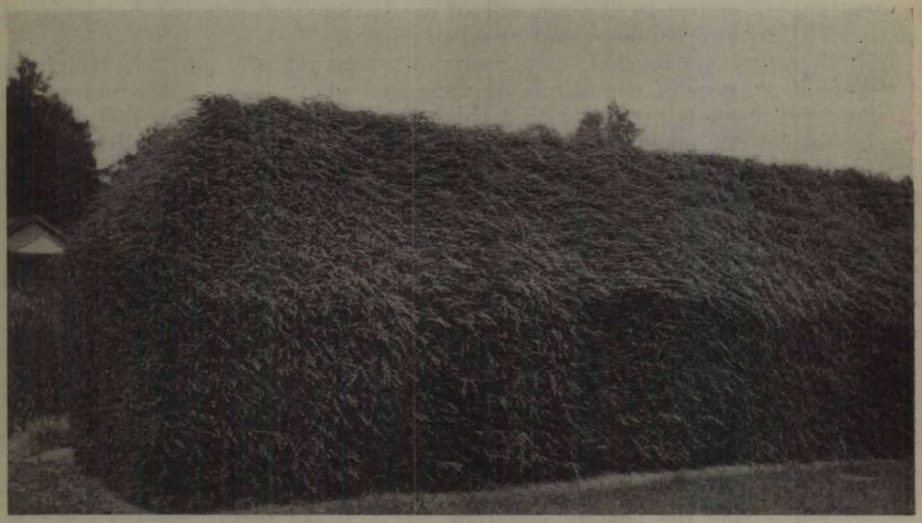
During the past season two new varieties of gooseberries were planted. Four plants of Spinefree and two plants of Thornless. These varieties were originated at the Central Experimental Farm, Ottawa, and as their names indicate are free of spines or thorns.

Three varieties of raspberries, Count, Viking, and Brighton have been compared during recent years to the Cuthbert. None of these varieties has equalled the Cuthbert for yield and quality, the first two named are, however, several days earlier. For quality and yield the Brighton is the most promising of the three. Commencing in 1930 several new projects are contemplated with raspberries.

TREE FRUITS

The yield of all tree fruits during the past season was light. In the late spring the orchard was seeded down to a cover crop of red clover. The following trees were taken out: two trees of Belle Magnifique cherries. These trees were mechanically injured several years ago and failed to recover. Three Easter Beurre pears. These were small trees, approximately fifteen feet high after

sixteen years of growth. Both the fruit and foliage has been very subject to attacks of scab, the crops light and totally unfit for use. One Transcendent crab. This tree over a number of years had shown itself to be a large vigorous grower, resistant to anthracnose but both the fruit and foliage very subject to attacks of scab.



The hemlock hedge is green all year and forms a very compact shelter.

FLOWERS

The varieties of narcissus referred to in the 1928 report, were all good and bloomed satisfactorily, the three best being King Alfred, Duke of Bedford, and Lord Kitchener.

The following bush roses were added to the collection:—F. J. Looymans Angèl Pernet, Earl Haig, Hoosier Beauty, Christine, and Louise Baldwin.

The following varieties of climbing roses were planted along the southern boundary fence of the ornmental section of the grounds:—

Lady Hillingdon.
Perle de Jardins.
Cecille Brunner.
Caroline Testout.
Cants Blush.
Chromatella.
Gruss an Teplitz.
Hoosier Beauty.
Mme. Abel Chatenay.
Heart of Gold.
Mermaid.
Dr. Huey.
American Beauty.
American Pillar.
Lemon Pillar.
Aviateur Bleriot.
Glen Dale.
Mme. Ed. Herriott.
Richmond.
Mary Wallace.
Zepherin Drouhin.
Mme. Jules Gravereaux.
Yvonne.
Leontine Gervais.
Crimson Rambler.
Albertine.
Emily Gray.
Mrs. Aaron Ward.
Christine Wright.
Allen Chandler.
Breeze Hill.
Dr. Van Fleet.
Excelsa.
Beacon.
H. V. Machen.
Gloire de Dijon.
Billard et Barre.
Veilchenblau.
Alberic Barbier.
Paul Scarlet.

It is hoped that these varieties will thrive and be sufficiently hardy to withstand the cold winter winds. They should make a valuable addition to the appearance of the grounds as well as being a collection from which visitors to the farm can choose those varieties which most appeal.

CEREALS

LAND AND TREATMENT

The land on which the cereal plots were located had been in mangels the previous season and was in a good state of tilth as a result of which, coupled with favourable weather conditions, the yields were very satisfactory.

Before sowing, all cereal grains were treated with formalin as a smut preventive. Seeding commenced on April 25 and harvesting of barley on July 24.

OATS—VARIETIES OR STRAINS

Twenty-one varieties of oats were grown in quadruplicate rod-row plots. Each plot consisted of five rows of which the three inside rows were harvested the two outside rows having been discarded. (Project Ce. 5.)

The results shown are the average of the four plots grown this year.

OATS—TEST OF VARIETIES OR STRAINS

Name of variety	Number of days maturing	Average length of straw including head	Strength of straw on scale of 10 points	Yield of grain per acre	Weight per measured bushel after cleaning
		in.		lb.	lb.
Abundance (U.B.C)	109	52	7	2,651	38
Alaska	100	46	8	1,860	39
Banner (Ott. 49)	109	49	9	2,980	41
Columbian (Ott. 78)	109	56	9	3,173	41
Conqueror (U.B.C.)	103	50	9	3,870	42
Crown (U.B.C.)	109	50	9	3,900	40
Gerlach (Sask.)	109	52	9	3,170	39
Gold Rain	109	53	9	3,311	43
Gopher	108	45	8	2,532	42
Irish Victor (Ott. Sel)	109	51	9	2,927	43
Laurel (Ott. 477), hulless	103	44	9	1,420	54
Leader A (Ott. Sel.)	107	49	8	1,960	36
Leader B (Ott. Sel.)	107	49	8	3,075	39
Legacy (Ott. 678)	107	45	8	2,376	39
Liberty (Ott. 480), hulless	106	49	9	1,194	50
Ligowo (U.B.C.)	108	53	9	2,651	37
Lincoln	108	57	9	3,137	40
Longfellow (Ott. 478)	108	52	9	3,134	40
Prolific	110	51	9	2,930	41
Star (Swedish)	108	49	9	3,160	41
Victory	110	48	9	2,780	42

OATS—RESULTS OF TEST OF VARIETIES OR STRAINS, FIVE-YEAR AVERAGE 1925-1929

Name of variety	Number of days maturing	Average length of straw including head	Strength of straw on scale of 10 points	Yield of grain per acre	Weight per measured bushel after cleaning
		in.		lb.	lb.
Alaska	99	44	8	2,489	39
Banner (Ott. 49)	106	44	9	2,844	35
Columbian (Ott. 78)	101	46	9	2,799	35
Gerlach (Sask.)	106	46	8	2,600	35
Gold Rain (Swedish)	106	47	8	2,862	39
Irish Victor P (Ott. Sel.)	106	46	8	2,591	38
Laurel (Ott. 477), hulless	101	42	8	1,397	49
Leader A (Ott. Sel.)	104	41	8	1,786	32
Leader B (Ott. Sel.)	104	43	8	2,316	34
Legacy (Ott. 678)	104	36	8	2,249	35
Liberty (Ott. 480), hulless	103	40	8	1,331	51
Lincoln	106	50	9	2,511	37
Longfellow (Ott. 478)	104	47	9	2,354	36
Prolific	107	48	9	3,077	39
Victory	107	48	9	3,168	39

The results as shown in the foregoing table are to the effect that Victory stands in the lead with Prolific second, then Gold Rain followed by Banner. Victory has for a number of years proved itself an oat of first importance for this section of the country. The other three varieties are also good.

OAT VARIETY—CLASSIFICATION

Apart from the regular test of varieties with oats forty-three varieties were sown in head-row plots for study in oat variety classification under the supervision of the Cereal Division.

BARLEY—VARIETIES OR STRAINS

Seventeen varieties of barley were sown between April 25 and April 27 under the same conditions as the oats (Project Ce. 6.)

BARLEY—RESULTS OF TEST OF VARIETIES OR STRAINS

Name of variety	Number of days maturing	Average length of straw including head	Strength of straw on scale of 10 points	Yield of grain per acre	Weight per measured bushel after cleaning
		in.		lb.	lb.
Albert (Ott. 541) (6)	93	43	5	2,056	48
Barks (Don Barks) (6)	107	38	8	3,028	40
Bearer (Ott. 475)	101	47	7	3,275	46
Charlottetown (Charlottetown) (2)	105	47	7	2,756	51
Chinese (Ott. 60) (6)	98	53	9	2,440	45
Duckbill (Ott. 57) (2)	103	53	8	2,146	52
Early Chevalier (Ott. 51) (2)	98	54	8	2,480	52
Feeder (Ott. 561) (6)	100	50	8	2,143	51
French Chevalier (2)	103	54	8	2,500	52
Gold (Swedish) (2)	103	46	7	2,790	55
Hannchen (Sask. 229) (2)	101	44	6	2,390	55
Himalayan (Ott. 59) (hulless)	98	41	8	2,590	64
O.A.C. 21 (O.A.C.) (6)	102	53	8	2,996	49
Plumage Archer	105	50	7	2,698	51
Star	105	50	7	3,696	47
Success	95	44	7	2,330	45
Trebi	105	48	7	3,592	45

BARLEY—RESULTS OF TEST OF VARIETIES OR STRAINS, FIVE-YEAR AVERAGE 1925-1929

Name of variety	Number of days maturing	Average length of straw including head	Strength of straw on scale of 10 points	Yield of grain per acre	Weight per measured bushel after cleaning
		in.		lb.	lb.
Albert (Ott. 541) (6)	90	40	6	2,293	48
Barks (Don Barks) (6)	101	38	8	2,646	46
Bearer (Ott. 475 (6)	98	49	7	2,872	47
Charlottetown 80 (Charlottetown) (2)	99	46	7	2,700	53
Chinese (Ott. 60) (6)	93	47	8	2,834	47
Duckbill (Ott. 57) (2)	98	48	8	1,948	51
Early Chevalier (Ott. 51) (2)	93	50	8	2,618	52
Feeder (Ott. 561) (6)	93	43	8	1,580	48
French Chevalier (2)	99	51	8	2,451	53
Gold (Swedish) (2)	99	44	8	2,682	54
Hannchen (Sask. 229) (2)	98	43	6	2,254	53
Himalayan (Ott. 59), hulless (6)	93	33	8	2,527	63
O.A.C. 21 (O.A.C.) (6)	96	48	8	2,997	49
Success	92	41	7	2,649	46

From the above table it will be observed that O.A.C. 21 (6) takes first place. O.A.C. 21, Bearer and Chinese generally give a good account of themselves at Agassiz.

SPRING WHEAT—VARIETIES OR STRAINS

Seven varieties of spring wheat were sown on April 25 under the same scheme as the oats and barley. The resulting crop was a failure owing to the ravages of the wheat midge. The yields were so poor as to make the recording of same useless.

SPRING WHEAT—RESULTS OF TEST OF VARIETIES OR STRAINS, FOUR-YEAR AVERAGE 1925-1928

Name of variety	Number of days maturing	Average length of straw including head	Strength of straw on scale of 10 points	Yield of grain per acre	Weight per measured bushel after cleaning
		in.		lb.	lb.
Crown (Ott. 353)	108	36	8	890	60
Early Red Fife (Ott. 16)	108	43	8	1,272	57
Garnet (Ott. 652)	108	34	8	1,257	61
Huron (Ott. 3)	108	39	8	788	57
Marquis (Ott. 15)	108	41	8	460	58
Red Fife (Ott. 17)	109	40	8	604	57
Reward (Ott. 928)	107	34	8	952	62

It would seem that local conditions are altogether unfavourable for the growing of spring wheat.

With a view to obtaining more definite information regarding the wheat midge and its destructive influence on spring wheat in this district the Entomological Branch commenced investigational work in the spring of 1928.

In conjunction with the cereal plots one plot of Marquis wheat was sown for the Chemistry Division. Seed is received annually from that Division and a sample of the resulting crop forwarded after harvest to Ottawa where tests are made to ascertain the influence of seasonal and soil conditions on the yield and composition of wheat (Project C. 11). As usual the yield per acre was extremely low.

PEAS—VARIETIES OR STRAINS

Four varieties of field peas were tested. Yields were an improvement on those of the previous year (Project Ce. 7.)

PEAS—RESULTS OF TEST OF VARIETIES OR STRAINS

Name of variety	Number of days maturing	Average length of plant	Average length of pod	Yield of seed per acre	Weight per measured bushel after cleaning
		in.	in.	lb.	lb.
Arthur	103	57	4	2,050	62
Chancellor	103	62	3	2,277	63
Golden Vine	103	62	3	2,150	62
Solo	103	58	4	1,375	62

PEAS—RESULTS OF TEST OF VARIETIES, OR STRAINS, FIVE-YEAR AVERAGE 1925–1929

Name of variety	Number of days maturing	Average length of plant	Average length of pod	Yield of seed per acre	Weight per measured bushel after cleaning
		in.	in.	lb.	lb.
Arthur	94	50	3	1,419	62
Chancellor	94	48	2	1,881	63
Golden Vine	94	52	2	1,599	62
Solo	94	49	3	1,408	62

BEANS—VARIETIES OR STRAINS

Four varieties of beans were tested. Yields were only fair (Project Ce. 8.)

BEANS—RESULTS OF TEST OF VARIETIES OR STRAINS

Name of variety	Number of days maturing	Average length of plant	Average length of pod	Yield of seed per acre	Weight per measured bushel after cleaning
		in.	in.	lb.	lb.
Beauty	114	26	5	2,400	62
Large White	114	24	5	1,300	62
Navy	114	25	4	1,150	61
Norwegian	114	27	5	2,050	63

BEANS—RESULT OF TEST OF VARIETIES OR STRAINS, FIVE-YEAR AVERAGE 1925–1929

Name of variety	Number of days maturing	Average length of plant	Average length of pod	Yield of seed per acre	Weight per measured bushel after cleaning
		in.	in.	lb.	lb.
Beauty	109	22	5	1,852	62
Large White	109	22	5	1,522	62
Navy	109	21	4	1,449	61
Norwegian	109	23	5	1,863	63

FORAGE CROPS

Conditions during the season were generally speaking favourable for the growth of forage crops. Variety tests were carried on with corn, sunflowers, mangels, carrots, sugar beets, annual hays and tests were made of clovers and grasses alone and in combination. From all plots harvested green weight samples were taken in order to calculate therefrom the yield of dry matter per acre.

SOIL AND TREATMENT

The area reserved for forage crops, exclusive of the section already seeded down to grasses and clover, had been ploughed the previous fall, reploughed in the spring and well worked. Well rotted manure was applied in the spring at the rate of 16 tons per acre to the portion used for root and ensilage crops and turned under with the spring ploughing. Prior to seeding, commercial fertilizer was applied at the rate of 600 pounds per acre to the area for roots.

CORN FOR ENSILAGE

The corn, of which there were eight varieties, was sown three feet apart each way. The following table gives, in order of yield per acre dry matter, the results of corn varieties tested (Project Ag. 1):—

CORN—TESTS OF VARIETIES

Name of variety	Yield per acre green weight		Yield per acre dry matter	
	tons	lb.	tons	lb.
Minnesota 13 (B. & K.)	16	565	3	1,073
Northwestern Dent (B. & K.)	15	60	3	670
Burr Leaming (Carter)	16	1,901	3	356
Longfellow (Popp & Lang)	13	219	2	1,222
Longfellow (Vancouver Milling Co.)	13	1,221	2	913
Golden Glow (Duke)	11	1,046	2	708
Wisconsin No. 7 x Twitchell's Pride	8	533	2	326
Northwestern Dent (McKenzie)	7	1,865	1	1,917

CORN—TEST OF VARIETIES, FIVE-YEAR AVERAGE 1925–1929

Name of variety	Yield per acre green weight		Yield per acre dry matter	
	tons	lb.	tons	lb.
Burr Leaming	19	1,124	3	692
Northwestern Dent	11	541	2	1,435
Golden Glow	12	1,567	2	1,429
Longfellow	13	857	2	935
Wisconsin No. 7	13	1,376	2	764

Although Burr Leaming ranks first according to the foregoing figures, the actual facts are that this variety requires a longer season than exists locally to allow of its being the most suitable. Wisconsin No. 7 does not measure up to a state of maturity, under local conditions of soil and climate, for the making of the best of ensilage. While it might be wished that Golden Glow and Longfellow would come to the most desirable stage of maturity for ensilage sooner than they do, the fact remains that either or both of these along with North-

western Dent form a creditable combination for ensilage in this district. Northwestern Dent matures into a very desirable stage for ensilage under local conditions.

SUNFLOWERS FOR ENSILAGE

Two varieties of sunflowers were grown in hills three feet apart each way, Mammoth Russian as usual coming first (Ag. 76):—

SUNFLOWERS—TEST OF VARIETIES

Name of variety	Yield per acre green weight		Yield per acre dry matter	
	tons	lb.	tons	lb.
Mammoth Russian	19	1,913	3	126
Manchurian	14	1,726	2	738

SUNFLOWERS—TEST OF VARIETIES, FIVE-YEAR AVERAGE 1925–1929

Name of variety	Yield per acre green weight		Yield per acre dry matter	
	tons	lb.	tons	lb.
Mammoth Russian	25	363	3	1,542
Manchurian	17	201	2	684

Mammoth Russian consistently has shown its superiority under conditions here, but it is not likely that this crop will ever become an important ensilage crop in this locality.

Twelve varieties of mangels were sown on May 21 in drills 30 inches apart and harvested on October 23 (Project Ag. 16):—

MANGELS—TEST OF VARIETIES

Name of variety	Yield per acre green weight		Yield per acre dry matter	
	tons	lb.	tons	lb.
Barres Sludstrup (Svalof)	33	120	3	1,002
Yellow Intermediate (C.E.F.)	28	1,300	3	22
Half Sugar White (Steeves)	33	300	2	1,695
Danish Sludstrup (Steeves)	29	1,700	2	1,665
White Red Top ½ Sugar	26	1,520	2	1,394
Giant Yellow Globe (Ewing)	31	1,840	2	660
Giant White Feeding (Steele Briggs)	26	80	2	640
Fjerritslef Barres (Hartmann)	25	640	2	512
Giant Yellow Intermediate (McDonald)	25	640	2	329
Yellow Eckendorfer (Svalof)	30	420	2	271
Giant Yellow Globe (Rennie)	27	720	2	16
Barres Oval (Svalof)	22	520	1	1,930

MANGELS—TEST OF VARIETIES, FIVE-YEAR AVERAGE 1925-1929

Name of variety	Yield per acre green weight		Yield per acre dry matter	
	tons	lb.	tons	lb.
Yellow Intermediate (C.E.F.)	24	1,638	2	1,143
Half-Sugar White (Steeves)	27	935	2	1,050
Danish Sludstrup (Steeves)	25	1,755	2	814
Giant White Feeding (Steele Briggs)	26	707	2	729
White Red Top ½ Sugar (Hartmann)	23	1,081	2	720
Giant Yellow Intermediate (McDonald)	24	586	2	612
Yellow Eckendorfer (Svalof)	26	1,365	2	436
Fjerritslef Barres (Hartmann)	25	64	2	422
Giant Yellow Globe (Ewing)	27	749	2	304
Barres Oval (Gen. Swedish Co.)	22	1,262	1	1,796
Giant Yellow Globe (Rennie)	26	1,775	1	1,779

A glance at the foregoing table indicates the fact that the Yellow Intermediate including the Sludstrup strain can well be recommended.

CARROTS

Three varieties of carrots were sown under the same conditions as were the mangels (Project Ag. 36):—

CARROTS—TEST OF VARIETIES

Name of variety	Yield per acre green weight		Yield per acre dry matter	
	tons	lb.	tons	lb.
Mammoth Short White (Rennie)	25	1,000	2	1,237
Improved Intermediate White (Ewing)	27	600	2	864
New Yellow Intermediate (Ewing)	16	1,600	1	966

CARROTS—TEST OF VARIETIES, FIVE-YEAR AVERAGE 1925-1929

Name of variety	Yield per acre green weight		Yield per acre dry matter	
	tons	lb.	tons.	lb.
Mammoth Short White (Rennie)	27	473	2	539
Improved Intermediate White (Ewing)	26	1,931	2	353
New Yellow Intermediate (Ewing)	23	1,071	1	1,751

Of the carrot varieties tested Mammoth Short White and Improved Intermediate White have always given good results. They are easy to harvest and compare well with other varieties in keeping qualities.

SUGAR BEETS

Four varieties of sugar beets were grown with fair results. Analyses were made by the Chemistry Division (Project Ag. 66):—

SUGAR BEETS—TEST OF VARIETIES

Name of variety	Yield per acre green weight		Yield per acre dry matter	
	tons	lb.	tons	lb.
Rabbethge and Giesecke	18,	1800	3	762
Horning	15	720	3	371
Fredericksen	14	1,100	3	23
Klein Wangleben	13	1,600	2	1,315

RESULTS OF ANALYSIS

The following results were obtained on the examination of samples of sugar beets grown this past season at this Farm.

Lab'y. No.	Variety	Sugar in juice	Coefficient of purity	Average weight of one root	
		p.c.	p.c.	lb.	oz.
100414	Klein Wanzleben	16·43	81·28	3	11
100415	Horning	15·88	82·83	3	11
100416	Fredericksen	16·48	85·84	3	5
100417	Rabbethge and Giesecke	15·25	81·70	3	15

The sugar content of these beets is very similar to that of the preceding year, but decidedly lower than that obtained in the earlier years of this investigation at this Farm. The "purity" is fairly high, which in part compensates from the factory standpoint, for the somewhat low percentage of sugar. The beets were very large, over 3 pounds, and this will, in some measure, account for the percentage of sugar not being higher than here recorded. The yield should be very satisfactory.

HAY MIXTURES

A series of plots in quadruplicate consisting of grasses and clovers alone and in combination for hay was seeded down with a nurse crop of oats in the spring of 1928. A similar group was seeded down last spring. (Project Ag. 264.)

The experiment comprises 4 ranges of 12 plots in a range; i.e., 48 plots in all. The following table gives the results of the first season's crop:—

GRASSES AND CLOVERS: ALONE AND COMBINATION

Rates of seeding	Yield per acre green weight		Yield per acre dry matter		Yield per acre cured hay	
	tons	lb.	tons	lb.	tons	lb.
1. Red clover—12 pounds per acre	23	1,700	5	674	6	557
2. Red top—10 pounds per acre	8	..	2	1,187	3	102
3. Alsike—6 pounds per acre	18	100	3	1,120	4	376
4. Perennial rye grass—14 pounds per acre	4	800	1	405	1	829
5. Italian rye grass—14 pounds per acre	5	200	1	1,030	1	1,563
6. Orchard grass—14 pounds per acre	3	1,500	1	285	1	688
7. Red clover, 9; alsike 2, Italian 3 and orchard 3 pounds per acre	21	1,400	4	1,179	5	798
8. Red clover 6, alsike 2, Italian 3 and orchard 3 pounds per acre	21	1,700	5	172	5	1,966
9. Red clover 8, alsike 2 and red top 6 pounds per acre	25	1,100	5	462	6	307
10. Red clover 9, alsike 2, perennial 3 and Italian 3 pounds per acre	23	1,900	5	195	5	1,993
11. Red clover 9, alsike 2, perennial 3 and orchard 3 pounds per acre	20	300	4	285	4	1,746
12. Red clover 8, alsike 2 and orchard 6 pounds per acre	21	1,600	5	147	5	1,937

In such an early stage of the above experiment, which is to be continued for a number of years, no definite conclusions are made as yet. Apparently, however, it would appear that the single grasses will not be much of a success grown alone. In their second cutting White Dutch clover had obtruded itself to such an extent as to practically crowd such crops out of existence. White Dutch clover had not been sown on this particular area for a considerable number of years. In the combination plots with red clover present the white clover did not show itself.

It is interesting to note that plot 8 gave better results than plot 7. These plots had the same combination of grasses and clovers sown but different amounts of the red clover, 6 pounds per acre in the case of plot 8 as compared to 9 pounds per acre in that of plot 7. It may be that where less red clover was sown the other components of the mixture were given a better chance to develop.

Orchard grass came to a stage ready for harvesting long before other grasses or clovers in the mixture. By the time the red clover, which may be looked upon as a standard in this locality, was ready for cutting the orchard grass was much too far advanced for the making of good hay.

One of the most promising combinations seems to be that of plot 10 where the grasses and clovers came to a similar stage of maturity more in harmony with one another while they also made a nice quality of hay. As far as hay-making in this district is concerned, however, the great need is a mixture that does not come into a stage of maturity desirable for hay-making until the first or second week of July, because weather conditions previous to that make hay-making impossible as a rule.

MISCELLANEOUS

Ten different perennial grasses were sown in replicated rows 30 inches apart in the spring of 1928 nine of which were again sown last spring. (Project Ag. 255.)

The following table gives an indication as to the suitability of these for local conditions:—

MISCELLANEOUS — PERENNIAL GRASSES

Name of variety	Yield per acre green weight		Yield per acre dry matter		Yield per acre cured hay	
	tons	lb.	tons	lb.	tons	lb.
Orchard grass	9	193	2	1,102	3	2
Italian rye grass	5	396	1	1,160	1	1,717
Perennial rye grass	4	1,379	1	604	1	1,063
Timothy (Boon)	2	1,989	0	1,848	1	174
Timothy (commercial)	2	859	0	1,480	0	1,741
Kentucky Blue grass	1	1,390	0	966	0	1,136
Meadow fescue	10	1,922	2	1,784	3	804
Tall oat grass	11	600	3	533	3	1,685
Red top	4	588	1	784	1	1,275

Bulbosa blue grass was a complete failure. Until results are available from the crop of the second year it would not be well to jump to conclusions as yet.

Grasses which are extremely early such as orchard grass offer a peculiar problem in this locality. There is just the possibility that such a grass comes along so early that in a pasture it is ready for pasturing before the condition of the sod is firm enough to allow of stock tramping thereon. As a result by the time live stock are turned on the pasture the orchard grass has reached the rank stage where the cattle leave it for more tender grass.

Of the foregoing grasses it would seem that several may yet find a place of importance in hay or pasture mixtures in the Agassiz district.

MISCELLANEOUS LEGUMES

Eighteen varieties of legumes were sown in replicated rows in the spring of 1928 and again the same were sown last spring. (Project Ag. 256.)

The following table gives an indication as to their possibilities in this district:—

MISCELLANEOUS—LEGUMES

Name of variety	Yield per acre green weight		Yield per acre dry matter		Yield per acre cured hay	
	tons	lb.	tons	lb.	tons	lb.
Red clover (Early Swedish)	9	1,662	1	1,425	2	28
Red clover (Late Swedish)	8	1,289	1	1,578	2	209
Red clover (Alta Swede)	13	1,911	2	1,805	3	829
Red clover (Kenora)	8	46	1	1,494	2	110
Red clover (St. Clet, Que.)	7	577	1	727	1	1,207
Red clover (New Zealand)	9	193	1	685	2	334
Alsike	2	1,085	0	834	0	981
Alfalfa (Grimm, not inoculated)	15	1,075	3	836	4	42
Alfalfa (Grimm)	8	1,289	1	1,837	2	513
Alfalfa (Baltic)	12	305	2	1,597	3	584
Alfalfa (Cossack)	10	114	2	660	2	1,481
Alfalfa New Zealand)	12	1,651	2	1,867	3	901
Alfalfa (Medicago falcata)	10	453	2	284	2	1,039
Alfalfa (Ontario variegated)	8	724	1	1,568	2	197
White sweet clover	11	730	1	1,418	2	21
Sweet clover (Arctic)	8	1,741	1	1,049	1	1,585
Sweet clover (Common Yellow)	11	1,956	2	304	2	1,063
Wild White Dutch (Sutton's)	4	588	0	1,643	0	1,933
Mammoth white clover (Sutton's)	10	618	1	1,583	2	215

It will be observed from the foregoing table that alfalfa gave a fairly good account of itself. As far as this crop is concerned, however, it would be well to give a few years' trial before coming to conclusions. The alternate freezing and thawing so peculiar to this district may have a disastrous effect on the alfalfa.

The fact that the plot (not inoculated) did so well is no argument against inoculation. There never had been alfalfa or sweet clover grown in or near that particular area hitherto so, therefore, it would appear that inoculation may not be necessary here. This particular plot had one great advantage over the other plot of Grimm and that is the fact that on one side of the rows there was a six-foot border which no doubt gave an undue advantage. The un-inoculated plot was sown as an afterthought and there was no other corner available at the time.

The late clovers such as Late Swedish and Alla Swede are of particular interest because what would be of value in this district is a clover that does not attain its best stage of maturity for hay-making until the first or second week of July.

Results with alsike were due to the fact that the weather was so wet at proper time of cutting that it was impossible to have same done satisfactorily so as to get reliable weights of green material for dry-matter analysis. When the alsike was cut it was too ripe for hay. In fact, this same problem happened with several of the clovers because when they were ready for cutting we had the usual broken weather which comes in June, with few exceptions.

Mammoth white clover would seem to offer valuable possibilities. It is questionable if the sweet clovers will ever have much of a place in the Agassiz district where red clover does so well.

ANNUAL HAY CROPS

To determine their relative value as annual hays several varieties of millets and other grasses were sown in quadruplicate $\frac{1}{100}$-acre plots. (Project Ag. 241.)

The results are recorded in the following table:—

ANNUAL HAY CROPS—TEST OF MILLET VARIETIES AND STRAINS

Name of variety	Yield per acre green weight		Yield per acre dry matter		Yield per acre cured hay	
	tons	lb.	tons	lb.	tons	lb.
Siberian millet	7	400	2	824	2	1,675
Kursk millet	6	1,900	2	696	2	1,524
Golden millet	8	1,600	2	331	2	1,096
Hungarian millet	6	1,700	2	160	2	894
Common millet	6	600	1	1,543	2	168
Hog millet	6	1,700	1	1,438	2	44
Japanese millet	9	700	1	1,373	1	1,968
Early Fortune millet	3	800	0	1,712	1	14

As well as the foregoing the following were also sown but they were not a success: Feterita, Kaffir corn, Sudan grass and sugar cane.

All of the eight varieties harvested were made into hay and fed to cows which ate the small quantities of hay with relish.

Previous experience at this Farm suggested that millets be sown later in the season than had been the custom formerly so as to avoid as far as possible the wet weather which usually followed seeding, because the showery weather

tended to encourage the growth of corn spurrey to such an extent as to smother the millets. On that account seeding of millets was delayed during this season so that a further crop of weeds could be destroyed previous to seeding at the same time anticipating that the warm weather would come soon after seeding. Unfortunately, however, showery weather continued in June long enough to delay seeding until the 22nd. Although yields were satisfactory on the whole, yet harvesting operations were thrown too late for climatic conditions locally. It was hoped to have sown the millets from ten days to two weeks sooner had weather conditions allowed.

TOBACCO

Varieties of tobacco have been tested on this Farm during the past five years. The growing of the crop requires very specialized care, particularly in regard to dates of topping, suckering, and harvesting. It has not always been possible to give the crop, during the various years of growth, the detailed attention that is necessary to produce the highest quality product. This has been apparent in the quality tests as determined by the Tobacco Division at the Central Experimental Farm. Nevertheless, there has been sufficient evidence to show that when grown and produced under good conditions, with the necessary careful supervision, a leaf of some merit is obtainable. It is now proposed that these variety tests be discontinued and in their place be substituted some cultural experiments, a policy which will be pursued in 1930.

During the past few years a considerable amount of publicity has been given to the growing of tobacco in British Columbia. It is interesting, therefore, to include here excerpts from the Agassiz Farm reports of 1895 and 1896 as prepared by the late Mr. Thomas A. Sharpe, the then superintendent.

Excerpt 1895 Report:—

"A packet of seed of Havana tobacco was received for test from the Commissioner of Dominion Lands, Winnipeg, Man., April 16. This was sown at once as directed, and transplanted as soon as the plants had grown to sufficient size. They made a vigorous growth and when matured were cut and are being cured in accordance with the instructions accompanying seed."

Excerpt 1896 Report:—

"A package of seed of two varieties of Havana tobacco was received from the Commissioner of Dominion Lands, Winnipeg, Man., late last spring (1896). They were sown in a hot bed and transplanted as soon as ready. The plants made a vigorous growth, but as it was so late before the seed was received, the plants were late. At the close of the season they were cut and the leaf is being cured, but they do not appear to be as well matured as the tobacco grown last year.

"The seed should be sown here in March so that the plants would be well grown and strong by the time the weather was suitable for transplanting. These seeds were supplied by Mr. J. R. Gordon of New York, who is an expert in tobacco, and I append a copy of his opinion of the leaf raised last year which was not received in time to be included in the report for 1895."

"Pier 24, East River, N.Y., Nov. 28, 1895.

"The Agassiz sample was received in fair condition, and after moistening, I was able to examine it very minutely. It is clear to my mind that for this sample the best leaves were picked from several different plants, as they are of excellent quality. Of the leaves enclosed in this Agassiz package four would certainly pass as A1 wrappers, and the remainder would go as wrappers, although not so fine as the others. The beauty of the leaf I find consists in its silky texture, its freedom from blemish, and its very fine veins. The colour is also good, but it would have been better had the plant been allowed to ripen more. Because the leaf is small is no fault. Havana cannot rank with the other varieties for size and weight, and a fine leaf rather than a large one is the point at which Connecticut Valley growers of 30 years' experience are now striving for. It has been proved that the smaller varieties of tobacco are the most profitable, in that they find a quicker market and sell at a price sufficiently higher to offset the greater weight of the coarser varieties which must wait for a market, and then be disposed of at a low figure. To make myself plain, I might put it in

this way: That while from a certain acreage where two tons of the coarser varieties were produced, of the finer varieties the yield might be only one and one half tons, and this one and one half tons of fine tobacco would bring a greater return of money than the two tons of coarse tobacco.

"But to sum up the matter, I do not think the Agassiz people have any reason to be dissatisfied with the experiment, and it is proved to my mind that in certain districts of British Columbia tobacco can be raised to rank with any produced in the States. Of course it must have careful treatment to ensure success."

J. R. GORDON.

FERTILIZERS

An experiment was conducted to compare the fertilizing value of various commercial fertilizers. The experiment was conducted on a crop of mangels according to the following plan. (Project C. 165.)

The entire area received an application of well-rotted barnyard manure at the rate of 16 tons per acre ploughed under in the spring.

RESULTS OF FERTILIZER EXPERIMENT WITH MANGELS

Plot No.	Treatment in pounds per acre	Yield per acre	
		tons	lb.
1	Superphosphate of lime 500, nitrate of soda 200, muriate of potash 100	40	1,768
2	Ephos basic phosphate 292, nitrate of soda 200, muriate of potash 100	31	172
3	Superphosphate of lime 500, sulphate of ammonia 160, muriate of potash 100	29	1,004
4	Dedolph's patent fertilizer—800	28	124
5	Check—no commercial fertilizer	20	645

It was necessary to apply a good coat of barnyard manure to the area available because it lacked humus and required building up. Furthermore, fertilizer experiments in previous years at this farm have demonstrated the fact that roots cannot be grown successfully on plots where no fertilizer of any sort has been applied.

POULTRY

The farm flock, consisting entirely of Barred Plymouth Rocks, totalled on December 31, 1929, five hundred and fifty-five birds including 70 males, 173 hens, and 312 pullets. Fifty cockerels hatched in 1928 were sold for breeding purposes and 80 settings or 1,200 eggs were sold for hatching purposes.

INCUBATION

The following summary shows the 1929 hatching results. These were so satisfactory and the pullets did so well that 188 were available for disposal after the laying houses were filled in the fall:—

Total eggs set	2,872
Number fertile	2,589
Per cent fertile	90·1
Number of chicks	1,588
Per cent total eggs hatched	55·3
Per cent fertile eggs hatched	61·3
Number of chicks alive when wing-banded	1,412
Per cent chicks hatched alive when wing-banded	88·9
Total eggs required for one chick hatched	1·9
Total fertile eggs for one chick hatched	1·6
Total eggs required for one chick when wing-banded	2·0

BREEDING AND PRODUCTION OF AGASSIZ EXPERIMENTAL FARM BARRED ROCK PEN IN VANCOUVER ISLAND CONTEST, 1928-29, EXCLUSIVE OF TWO BIRDS WHICH HAD BEEN SUBSTITUTED

Contest band number	Sire	Eggs of sire's dam	Egg weight of sire's dam	Dam	Dam's eggs	Dam's egg weight	Number of eggs laid	Average egg weight	Qualification for registration
			oz.			oz.		oz.	
F 221	L 1	321	26	F 397	321	26·0	223	23·0	No
F 222	L 1	321	26	F 397	321	26·0	212	21·8	No
F 224	L 10	299	24	K 52	214	23·5	163	25·3	No
F 225	L 10	299	24	J 226	230	24·0	240	24·4	Yes
F 226	L 5	299	24	K 33	260	22·0	246	24·3	Yes
F 227	L 3	300	24	V.I.C. 294	288	25·0	224	24·0	Yes
F 228	L 6	262	22	K 219	251	24·0	232	22·7	No
F 230	L 7	321	26	K 36	234	22·0	175	24·8	No

A study of this chart reveals the fact that when F 397, a 321-egg hen with 26 ounce eggs, was bred to her son, L 1, the results were far from satisfactory. The two pullets in this contest pen from the mating laid 223 and 212 eggs respectively and both were disqualified from registration due to eggs not averaging 24 ounces to the dozen in weight.

BACILLUS PULLORUM

(Project P. 191)

In February, 1929, one hundred and twenty-one hens hatched in 1928 and previously untested for bacillus pullorum were subjected to the blood test and were one hundred per cent free.

FEEDING LAYING PULLETS

A series of feeding experiments was conducted from November 1, 1928, to August 31, 1929. Six pens were included consisting of 100 birds in all. The number of birds in an experiment varied from ten to thirty, final results being worked out on the basis of one bird.

The following outline describes the various experiments and the rations used in each:—

(1) Project P. 82—Beef scrap versus skim-milk.

The mash fed consisted, by weight, of 100 parts bran, 100 shorts, 100 corn meal, 100 crushed oats, 20 alfalfa meal (leaves and blossoms), 10 bonemeal, 10 charcoal, 60 beef scrap; scratch grain (standard) consisting of equal parts wheat, oats and cracked corn was the same in all pens. Skim-milk, green feed and oyster shell were fed in all pens except where mentioned to the contrary there being no skim-milk fed in this pen.

Prices per 100 pounds: grain $2.25; mash $2.40; green feed 25 cents; shell $1.60.

(2) Project P. 82—Skim-milk versus beef scrap.

This experiment was conducted similarly to the previous one except that skim-milk but no beef scrap was fed.

Prices per 100 pounds: grain $2.25; mash $2.18; skim-milk 25 cents; green feed 25 cents; shell $1.60.

(3) Project P. 87—Fish meal versus beef scrap.

The birds in this group were fed similarly to those in experiment No. 1 apart from receiving fish meal instead of beef scrap the proportion of each, viz., 12 per cent being the same in each case.

Prices per 100 pounds: grain $2.25; mash $2.36; green feed 25 cents; shell $1.80.

(4) Project P. 87—Beef scrap plus fish meal versus beef scrap.

This lot was handled similarly to the previous one except that equal parts beef scrap and fish meal were fed, 6 per cent of each, the total combination of these being the same as either the beef scrap or fish meal in Projects 82 and 87, viz., 12 per cent.

Prices per 100 pounds: grain $2.25; mash $2.38; green feed 25 cents; shell $1.60.

(5) Project P. 107—Grain in litter versus grain in hopper.

The grain (standard) was fed in the litter. The mash (standard) was composed by weight of 100 parts bran, 100 shorts, 100 cornmeal, 75 crushed oats, 25 alfalfa meal (leaves and blossoms), 75 beef scrap, 10 bonemeal, 10 charcoal, 5 oilmeal.

Prices per 100 pounds: grain $2.25; mash $2.45; skim-milk 25 cents; green feed, 25 cents; shell $1.60.

Project P. 107A—Grain in hopper versus grain in litter.

The only difference between the care of the birds in this group and that preceding was in the grain being fed in a self-feeding hopper. Prices of feed were the same.

EXPERIMENTS IN FEEDING—RESULTS FROM LAYING PERIOD NOVEMBER 1, 1928 TO AUGUST 31, 1929

Group	Eggs per bird	Value of eggs per bird	Cost of feed per bird	Profit over cost of feed per bird
		$	$	$
1. Basal ration with beef scrap; no skim-milk	180	4 80	2 50	2 30
2. Basal ration without beef scrap; skim-milk fed	190	5 06	2 56	2 50
3. Basal ration using fish meal instead of beef scrap; no skim-milk	160	4 26	2 24	2 02
4. Basal ration with 6 per cent each of beef scrap and fish meal; no skim-milk	183	4 88	2 32	2 56
5. Basal ration—Grain in litter	146	3 89	2 22	1 67
6. Basal ration—Grain in hopper	155	4 13	1 97	2 16

The following summary gives an indication of results in order of profit over cost of feed per bird with reference only to the results of one year.

The beef scrap plus fish meal lot (No. 4) came first in order of profit. This would suggest that where a good brand of fish meal is procurable a combination of beef scrap and fish meal has its place.

The skim-milk group (No. 2) came a close second in order of profit, thus indicating the value of the use of skim-milk where obtainable.

Beef scrap (No. 1) followed in third place.

The lot where grain was fed in hopper (No. 6) gave unexpected results in better returns than the group (No. 5) fed the same grain ration in the litter.

The pen fed fish meal (No. 3) came between the latter two mentioned.

EXPERIMENTS IN FEEDING—SUMMARY OF RESULTS THREE-YEAR AVERAGE 1927-1929

Group	Eggs per bird	Value of eggs per bird	Cost of feed per bird	Profit over cost of feed per bird
		$	$	$
1. Basal ration without beef scrap; skim-milk fed	188	4 91	2 33	2 58
2. Basal ration with beef scrap; no skim-milk	184	4 79	2 45	2 34
3. Grain (standard) in hopper; skim-milk fed	160	4 17	1 92	2 25
4. Basal ration with fish meal; no skim-milk	164	4 25	2 07	2 18
5. Basal ration with 6 per cent each of beef scrap and fish meal; no skim-milk	165	4 29	2 16	2 13
6. Grain (standard) in litter; skim-milk fed	154	3 99	2 16	1 83

Before conclusions can be arrived at several years' tests would have to be carried on.

Results such as the foregoing are in keeping with what might be expected in Nos. 1 and 2. Nos. 4 and 5 might well have changed places. In No. 3 the birds consumed much less mash than did those in No. 6 thus accounting for the lower cost of feed.

EGG-LAYING CONTEST

The ninth British Columbia Egg-Laying Contest ended on October 23, 1929. The contest contained the usual forty-six pens of ten pullets in each, two spare birds being also sent in with each original pen. As each contestant is allowed to keep his pen of ten birds up to full strength throughout the year, spares are kept in reserve to allow of substitution as deaths occur in the pen.

White Wyandotte pen in the British Columbia Egg-laying Contest, 1928-29. These hens layed 2,592 eggs, making the highest score for Wyandottes on this continent. Owned by A. Cant, Appledale, B.C.

In the early part of the year, mortality was very heavy as a result of a severe attack of infectious bronchitis, the disastrous effects of which played havoc with egg-production. As a consequence of this heavy mortality, numerous spares had to be introduced from time to time.

Nothwithstanding the set-back the contest received with sickness, some very creditable records were made, chief of which was that by Mr. Cant's White Wyandottes of Appledale, B.C. This pen was the highest Wyandotte pen on the American Continent in 1929 for egg-production with the excellent score of 2,592 eggs and 2,772·6 points. There was an average production per bird of 203 eggs, the highest pen according to number of eggs made an average of 259 eggs, 16 birds laid over 300 eggs each and 243 birds qualified for registration. Of the birds entered, 143 were daughters of registered hens; *i.e.*, hens measuring up to standard qualifications of the breed and laying 200 eggs or over averaging 24 ounces to the dozen.

In the contest, there were six breeds represented as follows:—

	Pens
SC. White Leghorns	34
Barred Plymouth Rocks	5
Rhode Island Reds	3
White Wyandottes	2
Anconas	1
Black Minorcas	1

BRITISH COLUMBIA EGG-LAYING CONTEST

DOMINION EXPERIMENTAL FARM, AGASSIZ, B.C.—SUMMARY OF FINAL RESULTS, 1928-29

Total number of eggs laid	93,496
Average number of eggs laid per bird	203
Winning pen (by points), Smith Bros., Surrey Centre, (W.L.)	2,893·6
Winning bird (by points), also registered, Brandon Exp. Farm, bird No. 9, (B.R.)	348·3
Highest pen according to egg-production— A. Cant, Appledale, B.C. (W.W.)	2,592 eggs
Highest bird according to egg-production— W. M. Fairweather, bird No. 10 (W.L. not registered)	316 "
2nd highest bird according to egg-production— M. S. Schofield, bird No. 6, (W.L., not registered)	312 "
Highest registered bird according to egg-production— D. Russell, bird No. 2, (R.I.R., 2nd generation)	309 "
2nd highest registered bird according to egg-production— A. Cant, bird No. 2, (W.W.)	306 "
Brandon Experimental Farm, (B.C.)	306 "
Number of birds laying 200 to 224 eggs	109
Number of birds laying 225 to 249 eggs	123
Number of birds laying 250 to 274 eggs	49
Number of birds laying 275 to 299 eggs	12
Number of birds laying 300 and over	16

BEES

During the years 1927 and 1928 the major portion of work done in the apiary consisted of increasing the number of hives by adding package bees, and the division of colonies, and making such observations as the frequent manipulation of colonies would permit. Queening and requeening has to a large extent been done with queens raised in the apiary. In the fall of 1928 there were sixty colonies in all. A considerable portion of these were not in first class condition for wintering, due to poor stores, being rather weak in the total number of bees, or being composed largely of old bees due to the early cessation of brood raising. During the winter five colonies died, two were found to be queenless, and one had been robbed. There were fifty colonies available for experimental work in 1929. In February the apiary was moved to a new location.

The spring was cold and dull though there was a smaller amount of rain than usual. Weather conditions are subject to pronounced changes; it not infrequently happens that February may be a brighter month than March, and April little or no better than March. When there is not a progressive uniformity in the weather brightening, early spring brood production is retarded. This was in evidence this year. On the first examination of the apiary on March 3, there was an appreciable amount of brood in all stages. On the second examination on April 17 only eggs and larvae could be found which indicates a falling off in brood rearing.

The apiary moved to a new site on the Agassiz Farm.

The first nectar was brought in on April 20, which was obtained chiefly from plums, maples, and dandelions. There were few colonies sufficiently strong to take advantage of this early flow. May was a good average month, the greatest amount of nectar brought in on one day was nine pounds on May 7. Brood production was average. June was a cloudy, dull month, wetter than average with comparatively few good flying days. The greatest amount of honey stored on any one day was three pounds. July was bright with good flying weather, there was, however, little nectar available, as the hive on the scales, one of the best in the apiary, only stored thirty-six pounds. In August this same hive stored eight and one-half pounds.

The season from the viewpoint of honey production was poor. Experimental work done with colonies requires that they be handled more often than would otherwise be the case, which interferes with maximum honey production. This is the third year in which there have been very low yields. It is possible that the work of building up the apiary has been responsible, and that there are now too many colonies for the limited district, or that some valuable source of nectar has been destroyed.

EUROPEAN FOUL BROOD

(Project Ap. 18)

The disease was not as prevalent in 1929 as it had been in 1928. During the winter of 1928-29 two colonies, which were known to be affected with this disease died. One of these hives was treated with formalin gas; the other hive was not treated. On May 20 two frames containing healthy bees, brood, larvae, eggs and

honey were placed in the hive that had been treated with formalin gas and no trace of European Foul Brood was discovered during the remainder of the season. The second hive was not treated and had a small amount of capped stores. Two frames, as above noted, were placed in this hive on May 14. On June 6 seventy-five per cent of the larvae was affected by the disease. The colony was destroyed, the hive treated with formalin gas and a swarm put in on July 21. On August 16 there were a few cells of brood showing evidence of disease. This hive had a small quantity of capped stores and it is possible that the formalin gas was not effective in destroying germs that may have been in these cells. Further work along this line will be done.

METHODS OF DETECTING PREPARATIONS FOR SWARMING

(Project Ap. 5)

The principle involved in the project is to use two brood chambers, a deep and a shallow super to determine if possible, whether the position in which the queen cells are found will indicate whether the colony is making preparations for swarming, or queen supersedure. Twenty-four colonies were used during the past season. The following results were obtained:—

Nine colonies made no preparations for swarming, no queen cells being found during the season.

Four colonies superseded their queens.

Six colonies swarmed.

Five colonies built queen cells but neither swarmed nor superseded their queens.

Results will be given in further detail when they can be based on a longer period of experimentation.

PROTECTED VERSUS UNPROTECTED HIVES DURING SUMMER

(Project Ap. 12)

The object of this experiment is to determine the difference between protecting supers with Kootenay case lifts and unprotected supers. The brood chamber in both cases is protected. The hives with unprotected supers gave the better results.

STIMULATIVE FEEDING FOR BROOD PRODUCTION

(Project Ap. 25)

Ten hives were selected for this project, five of which were fed a surplus of sugar syrup to assure that they had at all times a greater amount of stores than was necessary for consumption. The remaining five colonies were only given sufficient sugar syrup to assure that they had an adequate amount of stores to prevent any possibility of starvation. The object of the experiment is to determine to what extent the feeding of a surplus amount of stores will stimulate brood production in order that there may be a maximum force of bees when the main honey flow commences.

The colonies fed a surplus amount of sugar syrup received thirty-two pounds as compared to seventeen pound for the check hives. The average maximum brood production was reached on June 23 as compared to July 9 and they produced a surplus of 117 pounds as compared to 18½ pounds. There was no appreciable difference in the strength of the different colonies taking the whole season into consideration. The chief factor in the difference of surplus yields appears to have been due to the earlier date of the maximum of brood production.

TOP-ENTRANCE HIVES

At the request of and supplied by the provincial apiarist, two types of ten frame Langstroth hives have been tested out, namely a top-entrance hive and a middle-entrance hive When there is only one colony on which comparisons can be made it is not practical to place much emphasis on one or two years' work, as much can happen within the colony which affects its behaviour. The results of the Provincial Apiary Department are based on the total number of experiments of this type carried on in different localities last year and are, therefore, more significant. They show a slight average increase of surplus honey from top-entrance hives. The top-entrance hive was tried for the second time in 1929. Both in 1928 and during the past season the check hive has given a greater surplus of honey. This type of hive appears to be satisfactory for wintering purposes as it lost fewer bees during the winter than any other colony in the apiary and showed no signs of mould on the combs at the first spring examination.

MIDDLE-ENTRANCE HIVES

A middle-entrance hive was tried out for the first time during the past season. The middle-entrance was put on the hive on March 29. On April 3 there was a considerable amount of chilled brood and the bees clustering very closely. On April 24 the bees were still closely clustered. The impression obtained was that a hive with this type of entrance lost a considerable amount of warmth, causing the bees to cluster. This type of entrance will receive further trials.

QUADRUPLE CASES FOR WINTERING

(Project Ap. 8)

The quadruple case for wintering is so constructed that it holds four single-walled hives end to end in pairs and side by side with sufficient space at the ends and sides for insulation. It is so built that the sides are removable and allow for easy manipulation of the colonies. During the past summer the top and sides were removed and the colonies allowed to remain on the bottom board of each case, the hives being moved to its outer edges, this method gives approximately eight inches between each hive and proved quite satisfactory, particularly in saving labour of moving colonies to and from separate stands in the spring and fall. The wintering results to date have been entirely satisfactory. All the colonies handled in this manner have been strong and vigorous on the first spring examinations and there is evidence to show that brood production commences earlier in the spring, assuring a larger force of working bees for both early bloom and the main honey flow. In the fall of 1929, the twelve colonies so wintered were weighed and will be closely compared in the spring to twelve colonies which were weighed and wintered in Kootenay cases.

QUEEN RAISING

During the past two seasons, a considerable number of queens have been raised in the apiary. Several methods of raising queens from the larval stage to the fully developed and mated queen have been followed.

The wooden cup system produced on an average fifty-five per cent of queen cells from young larvae placed within the cups. The larvae are taken from a suitable colony, placed in small wooden cups and then transferred to a colony from which the brood and queen have been removed. Other queen cells were obtained from colonies which were making preparations for swarming. The cells or queens raised in cups or produced naturally by bees were either placed in

queenless colonies, in mating boxes or were put with nuclei over established colonies with a super clearer between or with nuclei as a new colony. From thirty-two queens in mating boxes, five were lost; from fourteen above super clearers, two were lost; from two placed in nuclei, none were lost; from five placed in colonies, three were lost. The loss in the last mentioned case was apparently due to the fact that the young queens were introduced during a spell of dull, cold weather, during which time they did not leave on a mating flight and were killed by the bees. There are now in the apiary forty-two colonies headed by Agassiz-raised queens.

Thirty of these queens produced large, first-class bees, uniform and true to race.

Seven produced smaller bees, uniform and true to race.

Two produced large hybrid bees.

Three were introduced too late for progeny to be classified.

There was this year a much smaller loss of young queens going out on the mating flight than in the previous year, when approximately sixty per cent failed to return to the hive. The hives this year were spaced at a greater distance and the entrance was marked by some distinguishing colour or some conspicuous object.

The past season is the first year that the majority of the experiments referred to above have been conducted on the present basis. The results obtained are, therefore, from a short period of experimentation and must be accepted as a preliminary report.

FIBRE PLANTS

One plot of flax (Project E. 3) and one of hemp (Project E. 4) were grown for fibre. Both plots gave satisfactory yields, the hemp 8,400 pounds of dry straw per acre and the flax 6,220 pounds of dry straw per acre. The flax was shipped to Ottawa for deseeding, retting and scutching and gave a yield of 670 pounds of seeds, 750 pounds of long fibre and 160 pounds of short fibre per acre.

Flax always gives a creditable result at this farm but this has not been true of hemp. The flax grown has invariably contained fibre of excellent quality while yields are always satisfactory. It is evident that local conditions of soil and climate are favourable to the production of this crop.

GENERAL NOTES

In co-operation with the Summerland Station, an interesting agricultural exhibit was staged at the Vancouver and New Westminster Exhibitions. The exhibiting of Holstein cattle and Clydesdale horses at each of these shows attracted attention to the livestock breeding operations here. The winning of grand champion gelding and reserve grand champion Clydesdale female at New Westminster on animals bred here was particularly valuable in securing publicity for this farm. Although production in the egg-laying contest was not as satisfactory as on some previous occasions, 243 birds qualified for registration, and sixteen got in the three-hundred-egg class. The superintendent attended the Class A Exhibitions at which the stock was shown, the Royal at Toronto, the annual meetings of the C.S.T.A. and C.S.G.A. at Winnipeg, and the W.C.L.S.U. at Edmonton. An inspection was made of the Illustration Stations in Central British Columbia during September. Considerable time was given to directorate work of the Provincial Dairymen's, Stock Breeder's, Holstein Breeder's, and Sheep Breeder's Association. Sheep were judged at the Calgary Fall Show. The

superintendent and assistants addressed several farmers' meetings and attended fairs, conventions, poultry and horticultural meetings. Some co-operative cereal test plots of oats were supervised in conjunction with the Provincial Society of Agronomy.

During the year the foreman's house and the assistant's cottage were painted outside, and the boarding house was redecorated inside. Land clearing operations were completed on the eastern portion of the farm and the entire area was cropped for the first time.

Each spring the agricultural students at the University of British Columbia take their final examinations in stock judging at the Agassiz Farm.

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