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 1930

Eight two-year-old heifers, all on the R.O.P., sired by Sir Bess Ormsby Fobes 40th—64569.

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SEASONAL NOTES

Meteorological records show a drastic decrease in precipitation at Agassiz during the last three years. The average precipitation of the ten years preceding 1928 was 69·04 inches, while the average for the last three years is only 36·62 inches. This year, with 38·32 inches, it is greater than last year with 30·49 inches, but less than 1928 with 41·06 inches. For the six months April to September, the total precipitation recorded of 12·95 inches is greater than for this period for either of the two previous years. August recorded the lowest rain since 1901 and December the least since 1914. No frost was registered between March 20 and October 13.

During the last week in March the land dried out well and prospects appeared good for an early spring, but later, rainfall alternating with dry, bright days, made it difficult to get seed properly sown. Crops planted by the middle of May got a good start, but from then to the end of June rain was plentiful, and with cool weather caused rank growth of weeds and retarded the growth of more tender crops. The dry, bright period in July and August afforded excellent conditions for saving an average crop of hay and grain in excellent condition. Roots and pastures suffered somewhat at this time, but made a fine recovery in the autumn.

METEOROLOGICAL RECORDS, AGASSIZ, B.C., 1930

	Temperature				Precipitation				Sunshine	
	Maximum	Minimum	Mean	Mean 16 years average 1914-1929	Rain	Snow	Total	38 years average 1892-1929	Hours	38 years average 1892-1929
	°F	°F	°F	°F	in.	in.	in.	in.	hours	hours
January	45	-8	25·47	35·40	2·61	1·00	3·61	7·44	103·0	47·4
February	53	28	40·35	38·04	5·80	0·10	5·90	5·75	62·1	72·3
March	73	29	45·34	43·34	2·21	0·05	2·26	5·32	98·2	102·5
April	74	35	52·54	49·15	2·26	.....	2·26	4·45	108·2	124·2
May	82	35	54·37	55·21	3·54	.....	3·54	4·61	158·7	156·9
June	87	40	59·88	59·88	2·69	.....	2·69	4·08	130·7	158·0
July	94	44	65·77	64·36	0·12	.....	0·12	1·93	238·6	218·6
August	88	43	65·37	64·37	0·01	.....	0·01	2·39	214·8	195·4
September	84	39	59·86	58·69	4·33	.....	4·33	4·53	127·2	131·1
October	70	29	49·15	50·43	5·80	0·05	5·85	6·60	101·2	96·3
November	64	26	42·81	42·32	3·92	0·90	4·82	8·51	74·7	49·5
December	52	25	39·95	35·83	2·88	0·55	2·93	7·67	33·9	40·8
Totals	.....	.....	50·07	49·75	36·17	2·15	38·32	63·28	1,451·3	1,393·0

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ANIMAL HUSBANDRY

DAIRY CATTLE

On December 31, 1930, the dairy herd numbered sixty-seven head of pure-bred Holstein-Friesian cattle composed as follows: one two-year-old bull, six bull calves, nineteen mature cows, eleven three-year-olds, eleven two-year-olds, seven yearlings and twelve heifer calves. During the year twenty-seven cows gave birth to thirteen heifer and sixteen bull calves. All of the heifers were reared except a twin which was vealed. Nine bull calves were sold for veal and three for breeding purposes, while one mature bull and five females were culled. A well-bred yearling heifer was exported to Japan at a good figure and two good heifer calves were sold to a breeder in Alberta.

ACCREDITED HERD

The herd has continued fully accredited having successfully filled all requirements.

HERD RECORDS

(Projects A. 36 and A. 56)

The following data show the performance of all cows finishing a lactation period during the year 1930. In this table feeds are charged at market value. Butter-fat is computed at 42 cents per pound and skim-milk at 25 cents per one hundred pounds. The average milk production of the twenty-seven cows that finished a lactation period during the year was 11,703 pounds and the average fat production was 418·85 pounds. This is considered satisfactory production considering the fact that over one-third of the herd were heifers. From the figures in the table it is found that the average feed cost to produce one hundred pounds of milk was $1.19, and to produce a pound of butter-fat 34 cents.

MILKING RECORDS—COWS WHICH HAVE COMPLETED LACTATION PERIOD DUPING 1930

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	Butter (85%) produced	Meal consumed at $40	Roots and silage consumed at $5	Hay consumed at $12	Beet pulp consumed at $50	Pasture at $2 per month	Total cost of feed	Cost to produce 100 pounds of milk	Total value of product	Profit over feed
			lb.		lb.	lb.	lb.	lb.	lb.	lb.	$	$	$	$	$
145	7	365	17,861·0	3·76	672·00	790·59	4,076	17,230	1,282	1,504	5 50	175 39	0·982	322 43	147 04
135	7	365	20,718·6	3·35	694·07	816·55	4,830	22,415	1,472	982	7 50	193 52	0·934	338 13	144 61
246	1	365	15,917·0	3·89	619·00	728·24	4,772	17,233	1,876	1,752	.....	193 58	1·216	295 79	102 21
250	1	365	12,345·0	3·51	433·00	509·41	2,639	15,265	855	144	14 55	114 22	0·925	209 64	95 42
259	1	305	13,250·0	3·92	520·00	611·76	3,985	14,937	1,135	1,465	0 20	160 68	1·213	248 21	87 53
169	6	375	13,388·7	3·28	439·15	516·65	2,841	19,217	980	.....	17 40	128 07	0·957	214 57	86 50
257	1	305	13,299·0	4·03	536·00	630·59	4,086	16,042	1,205	1,560	1 00	169 06	1·271	255 04	85 98
81	11	471	14,840·5	3·22	477·86	562·19	3,569	24,472	1,265	.....	15 30	155 45	1·047	234 09	78 64
154	8	418	13,608·0	3·44	468·12	550·73	3,273	21,552	1,150	264	16 95	149 79	1·100	227 23	77 44
190	4	389	11,490·6	3·79	435·49	512·34	3,350	17,512	790	.....	16 90	132 42	1.152	208 76	76 34
261	1	365	15,819·0	3·58	567·00	667·06	5,005	17,997	1,545	1,793	0 90	200 09	1·265	273 73	73 64
255	1	365	14,681·0	3·59	527·00	620·00	4,511	15,894	1,450	1,750	0 20	182 61	1·244	254 37	71 76
153	7	345	11,523·8	3·52	405·64	477·22	3,118	18,665	957	75	8 00	124 64	1·082	196 30	71 66
227	3	305	12,444·0	3·99	497·00	584·70	4,135	15,544	1,405	1,143	9 10	167 67	1·347	236 74	69 07
230	3	262	7,813·9	3·63	283·64	333·69	1,493	10,900	480	176	11 00	75 39	0·965	136 71	61 32
245	2	330	10,265·9	3·27	335·69	394·93	2,362	15,540	878	.....	12 15	103 51	1·001	164 09	60 58
249	1	365	10,537·0	3·82	403·00	474·12	3,094	16,995	935	290	19 55	136 78	1·298	192 97	56 19
207	3	340	10,321·9	3·90	402·55	473·59	3,538	19,867	1,242	254	11 00	145 23	1·407	192 30	47 07
195	4	348	9,666·2	3·53	341·22	401·44	2,429	20,005	1,050	372	10 50	124 69	1·290	165 06	40 37
252	1	365	9,689·0	3·55	344·00	404·71	3,170	17,437	890	223	12 55	130 46	1·346	166 28	35 82
253	1	329	8,731·1	3·20	279·40	328·71	2,343	14,500	1,720	.....	12 15	102 58	1·175	136 99	34 41
157	5	355	8,043·3	3·82	307·25	361·47	2,449	17,222	830	.....	17 40	114 42	1·422	147 14	32 72
256	1	365	9,115·0	3·47	316·00	371·76	3,184	17,047	950	281	11 50	130 53	1·432	153 23	22 70
46	13	451	11,013·9	3·05	335·92	395·20	3,336	23,462	1,250	109	18 40	151 50	1·375	165 87	14 37
206	4	389	6,596·2	3·91	257·91	303·42	2,075	18,637	790	.....	16 75	109 58	1·661	123 16	13 58
237	2	360	7,049·3	3·32	234·04	275·34	1,983	16,255	790	.....	15 65	100 69	1·428	114 17	13 48
202	4	345	5,960·1	2·97	177·01	208·25	1,841	16,040	790	.....	15 15	96 81	1·624	87 75	−9 06
Totals.....	.....	.....	315,989·0	.....	11,308·96	13,304·66	87,487	477,882	29,962	14,137	297 25	3,769 36	.....	5,460 75	1,700 45
Averages..	3·8	360	11,703·3	3·58	418·85	492·76	3,240	17,699	1,110	524	11 01	139 61	1·192	202 25	62 98

Butter fat is computed at 42 cents per pound and skim-milk at 25 cents per one hundred pounds.

LIST OF RECORDS COMPLETED BY COWS IN CANADIAN RECORD OF PERFORMANCE DURING THE YEAR 1930

(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
	yrs. days		days		lb.	lb.	lb.
Agassiz Pietje Inka Sylvia.	10 ..	Feb. 1929	365	4 times 277 days..	17,861	672	3·76
Agassiz Mercena Rajah.	2 114	Mar. 1929	365	4 times 365 days..	15,917	619	3·89
Agassiz Lina Lulu Fobes.	2 50	Oct. 1929	365	4 times 365 days..	15,819	567	3·58
Agassiz Lina DeKol Fobes.	2 108	Oct. 1929	305	4 times 305 days..	13,299	536	4·03
Agassiz Lulu Fobes..	2 120	Oct. 1929	365	4 times 365 days..	14,681	527	3·59
Agassiz Lulu Canary Fobes.	2 66	Oct. 1929	305	4 times 305 days..	13,250	520	3·92
Agassiz Lina DeKol Pietje.	4 123	Oct. 1929	305	3 times 178 days..	12,444	497	3·99
Agassiz Walula Fobes	2 211	Nov. 1929	365	4 times 13 days..	12,345	433	3·51
Agassiz Walula Rajah	2 249	Oct. 1929	365	4 times 31 days..	10,537	403	3·82
Agassiz Lina Fobes..	2 143	Oct. 1929	365	4 times 27 days..	9,689	344	3·55

EXHIBITION WORK

To assist in making an exhibit of Holsteins from British Columbia at the Portland International Exposition in October, seven head from the Agassiz herd were selected. Considering the competition met with at a show of this calibre, the cattle did well, winning eight ribbons, the most important ones being: first for four cows with records sired by one sire; second for senior yearling heifer; third for two-year-old bull and fourth for dairy herd. At the Vancouver Winter Fair in December, five head of young stock won: first for two-year-old bull; second each for three-year-old cow and junior heifer calf, and third each for senior and junior yearling heifers.

CONTAGIOUS ABORTION

(Project A. 94)

Further satisfactory progress has taken place in the herd as far as abortions are concerned. This year and last year are the only years since 1916 with no abortions recorded. Twenty-seven cows freshened, giving birth to twenty-nine calves, two of them having twins and all healthy except one. There appears to be little change in the herd as far as sterility is concerned. There were the usual number returned for service, and apparently some of the cows on hand at the close of the year will have to be sold as non-breeders.

BLOOD TEST FOR ABORTION

(Project A. 660)

Blood tests for abortion were made on all negative cows in the herd in March, June, October and December, with the same results as the previous year. None of the cows changed their reactions and all born since 1921 continue negative. Close study is being made of the results of the test as related to the actual breeding history of each individual. Dr. T. H. Jagger of Vancouver made periodic examinations of the herd for pregnancies and breeding troubles.

CLOSE GRAZING OF PASTURES

In keeping with the popularity which intensive pasture is receiving at the present time, some work of this nature was started this year. Early in March, a six-acre permanent pasture field was given a dressing of superphosphate of lime and muriate of potash at the rate of 300 pounds and 50 pounds per acre respectively. The field was then divided into six one-acre plots by constructing cross fences, with a lane arrangement along one side. Water was piped to each plot and on April 21 pasturing started. Six good milking cows were pastured for five days in plot 1. They were then moved to plot 2 and the same number of dry cows were put in plot 1 to finish off the grazing. Every five days the front line cows were moved to the next field and the followers occupied the plot vacated by the good milkers. Whenever the followers were moved from a field, any tufts of long or coarse grass were scythed off, and the plot thoroughly harrowed. The first time the followers vacated each plot, an application of 100 pounds per acre of nitrate of soda was applied, but no later dressings were made. This rotation scheme was continued to August 12, when drought showed its effect and herbage stopped growing.

The first year results were not particularly encouraging, due to the unsatisfactory condition of the field and the unusually dry summer season. Apparently, however, the grass is in better condition for next year, as it has thickened out and made more dense growth. The first month the cows were pastured they were fed a little grain and ensilage. When the grass was at its best the supplementary feeds were discontinued, but it was soon found that the cows required from two to four pounds of grain per day to retain condition and keep up the milk flow. This system requires a greater outlay for fences, water equipment and fertilizers. There is some additional labour required for applying fertilizers, cutting rank grass and properly distributing the droppings. To offset this, there is little doubt but that the stock-carrying capacity of the pasture is largely increased. One year's work is not sufficient to draw definite conclusions from, so plans have been completed to continue and enlarge this important phase of live stock feeding for another year.

PROGRESS IN BREEDING HOLSTEIN CATTLE

(Project A 502)

Due to further R.O.P. records completed by members of the herd, two bulls previously used as herd sires were awarded R.O.P. standing. These bulls, Tsussie Rajah —28017—and Sir Bess Ormsby Fobes 40th —64569—, are now both dead.

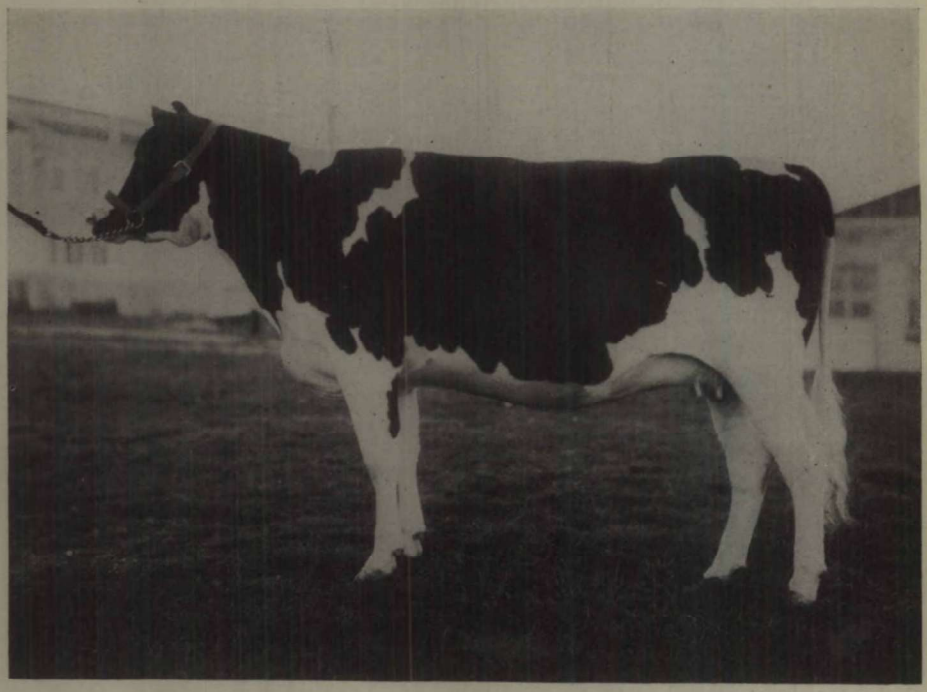
No inspections were made of the herd for Advanced Registry, but due to production requirements being removed from the two top classes by the Holstein Association, automatically five more Gold Medal and three Excellent cows received certificates. This raises the number to eighteen Gold Medal and fourteen Excellent cows bred in this herd. One more bull of our breeding, Agassiz Sir Bess Fobes —80199—, owned by F. O. Langstaff, Rhein, Saskatchewan, won his "XX" grading.

The oldest cow in the herd, Agassiz Lina Korndyke, born April 10, 1913, is still in excellent condition. Her udder is perfectly sound and she is due to give birth to her fourteenth calf two days after she is eighteen years old. She

has an R.O.P. record of 19,060 pounds of milk and 584 pounds of fat made when six years old. The following are her calving dates:—

February 10, 1915.	August 25, 1923.
November 5, 1916.	September 18, 1924.
December 16, 1917.	January 10, 1926.
December 26, 1918.	May 28, 1927.
January 3, 1920.	August 28, 1928.
February 17, 1921.	October 4, 1929.
January 20, 1922.	Due April 15, 1931.

The calves born in 1921 and 1922 were aborted, all the rest have been healthy. This cow was blood tested for abortion once in 1920, once in 1924, five times in 1927, five times in 1928, and once in December, 1930. All tests gave positive reactions.



Agassiz Sylvia De Kol Fobes—202364. This heifer was second to the junior champion at the Portland International Live Stock Exposition, November, 1930.

The age, condition, and breeding history of this cow is an excellent example of the durability and lasting qualities of the Holstein cow.

The following data show a comparison between the production of the first six daughters to freshen of Sir Bess Ormsby Fobes 40th and their dams:—

COMPARISON OF DAUGHTERS' RECORDS WITH DAMS' RECORDS

Daughters' records							Dams' records							Difference	
No.	Age	Number days milked	Number times milked	Yield			No.	Age	Number days milked	Number times milked	Yield			Milk	Fat
				Milk	Fat	Test					Milk	Fat	Test		
	yrs.			lb.	lb.	%		yrs.			lb.	lb.	%	lb.	%
245	2	305	4	11,828	430	3·64	154	7	305	4	14,275	513	3·59	−2,447	− 83
250	2	365	2	12,345	433	3·51	126	2	365	4	16,577	536	3·23	−4,232	−103
255	2	365	4	14,681	527	3·59	81	2	365	4	9,923	363	3·65	4,758	164
257	2	305	4	13,299	536	4·03	227	2	305	4	10,240	396	3·87	3,059	140
259	2	305	4	13,250	520	3·92	215	2	344	2	9,408	299	3·17	3,842	221
261	2	365	4	15,819	567	3·58	173	3	365	4	14,684	537	3·66	1,135	30
Total														6,115	369
Average														1,019	61·5

The results show marked improvement in the production of the daughters not only in milk but test as well. The length of lactation periods balance up quite evenly and also the number of times milked daily. The age factor is in favour of the dams with one mature cow, one three-year-old and four two-year-olds compared to six daughters all two-year-olds. The average increased production is 1,019 pounds of milk and 61·5 pounds of fat.

Not only is there an improvement in production but there is also improved type in the daughters. Under Advanced Registry inspection, four of the daughters graded Gold Medal and two Excellent. As compared to this, the dams graded two Gold Medal, one Excellent, two Good and one not classified, although she would not have done better than Good.

HORSES

The horses on hand December 31, 1930, totalled eighteen head; all are pure-bred Clydesdales and all were bred on the farm except the four foundation mares. One gelding was sold to a dairy company in Vancouver at a satisfactory price. Only one mare foaled and produced a fine filly foal in March. Three mares are due to foal early in 1931 to the service of Westerton Favorite —25344—.

The average feed cost for the year of the seven horses doing most of the work was $98.15 for an average of 2,287 hours work accomplished, or 4·3 cents per hour. The average feed cost of maintaining two yearling fillies and one two-year-old gelding was $38.78.

Group of pure-bred mares which won first prize at the Vancouver Winter Fair for five draft horses of any breed, age or sex.

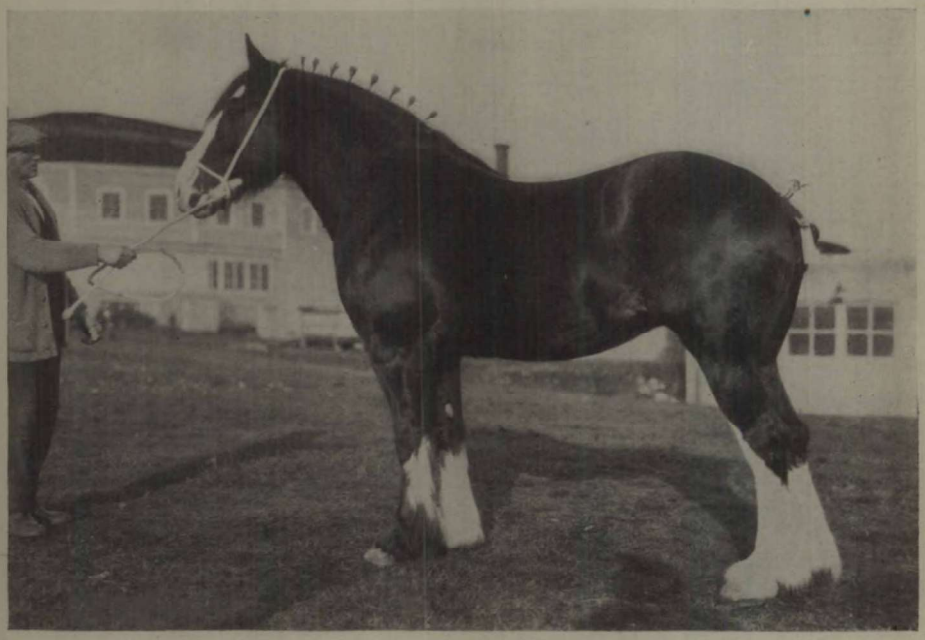
HORSE-RECORDS OF FEED AND LABOUR FROM JANUARY 1, 1930 TO DECEMBER 31, 1930

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, 1929	Weight Dec. 31, 1930
		lb.	lb.	lb.	lb.	$	$		lb.	lb.
Madge	June, 1915	3,241	530	5,936	266	.....	95 18	2,193	1,700	1,620
Bell	June, 1916	3,241	530	5,936	266	.....	95 18	2,232	1,760	1,720
Diana	May, 1918	3,808	530	5,936	266	.....	104 74	2,561	1,800	1,620
Bob	May, 1923	3,363	530	5,936	266	.....	96 26	2,345	1,880	1,750
Harry	May, 1925	3,527	530	5,936	266	.....	100 14	2,299	1,830	1,760
Glen	April, 1924	3,402	480	5,376	266	.....	93 01	2,015	1,870	1,760
Buck	June, 1921	3,674	530	5,936	266	.....	102 56	2,367	1,695	1,600
Mac	April, 1924	2,961	530	5,936	266	8 00	99 67	1,401	2,000	1,910
Heather Bell	Feb., 1926	2,335	500	5,096	266	8 00	83 28	1,027	1,810	1,720
Heather	June, 1918	2,261	500	4,704	266	14 00	86 66	638	1,750	1,770
Belle of Music Hall	Feb., 1927	2,551	374	4,781	172	14 00	87 53	965	1,800	1,650
Rosegay	May, 1927	2,310	374	4,591	168	14 00	83 55	695	1,720	1,890
Carillon Chimes	April, 1927	1,911	362	3,675	168	14 00	75 86	205	1,660	1,800
Bute	April, 1924	1,848	500	3,668	266	14 00	72 92	.....	1,800	1,810
Billy	Feb., 1928	903	301	1,512	126	14 00	42 94	.....	1,500	1,780
Bonnie Jean	Feb., 1929	700	268	1,036	107	14 00	36 70	.....	1,050	1,400
Thelma	April, 1929	700	268	1,036	107	14 00	36 70	.....	1,050	1,550

FEED AND MAINTENANCE COST OF SEVEN WORK HORSES

Total feed	$ 687 07
Labour (stable attendance)	465 00
Depreciation at 6 per cent	84 00
Shelter estimated at $25 each	175 00
Harness and repairs, $14 per head	98 00
Shoeing, $40 per head	280 00
Total yearly cost	$1,789 07
Yearly cost per head	255 58
Number of hours worked	16,012.00
Cost of horse labour per hour	0.111

From the above data it is seen that the cost of horse labour on this farm for the seven horses doing the most work amounted to over eleven cents per hour. These are high-class draft horses, always well conditioned and making a good appearance. The shoeing charge is high due to the fact that all the roads on this farm are gravelled and these seven horses do the heavy teaming on the roads, thus wearing out shoes quickly.



Heather Bell—52420. Grand champion Clydesdale mare at the Vancouver Winter Fair.

EXHIBITION WORK

Seven Clydesdale females were shown at the Vancouver Exhibition in August. First prizes were won in Get-of-Sire, Mare-with-Progeny and three-year-old classes. Second prizes were won with the brood mare, yeld mare, yearling and foal. The yeld mare, Doune Lodge Bell Heather, was also Reserve Grand Champion. Eight horses were shown at the Vancouver Winter Fair in December. The mature heavy draft gelding was not placed, but the two-year-old gelding won his class. The four-year-old yeld mare, Heather Bell, won her class and the Grand Championship. She and her sister won second to their stable mates, Rosegay and Topline Bute, in the Progeny class; Rosegay having won the three-year-old and Bute getting second in the brood mare class. Second

and sixth placings were secured in the $500 Sweepstake. One of the most coveted classes at the Fair is the Grand Display of five draft animals any age, sex or breed, owned by exhibitor, which was won with a group of mares.

SHEEP

The sheep on hand December 31, 1930, totalled ninety-eight head consisting of one mature imported ram, one shearling ram, sixty-five ewes, twenty-two shearling ewes and nine young lambs born in December. Of the fifty-three ewes on hand at the close of the year 1929, one failed to breed and one aborted, the remaining fifty-one gave birth to eighty-three lambs and raised seventy, or lambed 161 per cent and reared 137 per cent. In addition to the ewes, ten lambs were bred late in 1929. The six that lambed gave birth to seven lambs, three of which died, two were killed by dogs in July and two raised.

This is the first time for a number of years that sheep were destroyed by dogs, eight being lost from this cause. The health of the sheep was excellent with no repetitions of tape worm infection.

EASTER LAMB PRODUCTION

(Project A. 408)

Thirteen lambs born between January 6 and 21 were slaughtered and sold for the Easter trade. These lambs averaged 38 pounds dressed weight and netted $14.25 each.

CO-OPERATIVE WOOL SELLING

(Project A. 324)

Returns from the 1929 wool clip were not received in time to include in last year's report. The sixty-eight fleeces with a net weight of 495 pounds returned $59.66 or just under 88 cents per fleece, after selling charges were deducted.

The 1930 wool clip consisted of 71 fleeces, 675 pounds making an average of 9·5 pounds per fleece. The grading was similar to the previous year and the wool sold for 12 cents per pound. It cost $30.40 for selling, freight and membership, leaving $50.60 for 675 pounds of wool or just under 7½ cents per pound, or just over 71 cents per sheep.

VALUE OF SILAGE FOR PREGNANT EWES

(Project A. 559)

With the first snowfall of the season on December 9, 1929, ensilage feeding of ewes commenced. From then till April ensilage was fed to pregnant and lambed ewes. The lambing season extended from January 6 to April 21 and there was apparently no ill effects from silage feeding. Previous results bear out this same conclusion.

BREEDING EWE LAMBS VERSUS BREEDING AS SHEARLINGS

(Project A. 328)

The flock of ewe lambs born in 1928 retained for breeding purposes were divided into two groups, one of which was bred as lambs in the autumn of 1928 and the other group held over and bred as shearlings the following year. The data as given below show the former practice as being the most profitable as, with very little loss in weight of the ewes or their wool yields, an extra lamb

crop was produced with no decrease in the succeeding lamb crop as compared with that of the other group. These ewes were well grown and well cared for, thus being able to stand the production of an extra lamb crop better than late-born or poorly grown lambs. Further work is planned on this project.

EWE LAMBS BRED AUTUMN 1928 AND 1929

No. of ewe	Weight of ewe Nov. 1			Yield of wool		1929			1930		
	1928	1929	1930	1929	1930	Number of lambs born	Number of lambs raised	Value of lambs	Number of lambs born	Number of lambs raised	Value of lambs
	lb.	lb.	lb.	lb.	lb.			$			$
697	124	162	174	11	11·5	2	2	31 96	2	2	22 44
700	111	163	173	7	9·0	1	1	10 53	2	0	.....
705	108	141	150	8	10·6	1	1	25 00	1	1	15 00
714	115	157	174	9	10·5	2	0	.....	3	2	23 00
726	114	165	186	10	10·0	1	1	20 00	1	1	10 92
738	119	165	194	8	10·0	2	2	33 00	1	1	12 05
742	135	180	193	10	10·4	2	1	20 00	2	2	28 65
749	104	150	151	8	9·0	2	2	21 06	1 Killed	by dogs	.....
752	105	144	155	10	13·2	1	1	25 00	1	1	8 00
9	1,035	1,427	1,550	81	94·2	14	11	186 55	14	10	120 06

EWE LAMBS NOT BRED AUTUMN OF 1928 BUT BRED IN 1929

703	110	160	159	10	10·5	.....	.....	.....	1	0	.....
708	121	194	189	10	12·0	.....	.....	.....	2	0	.....
713	122	155	176	9	9·0	.....	.....	.....	1	1	25 00
737	114	183	191	7	12·0	.....	.....	.....	2	2	36 75
719	108	185	217	9	11·5	.....	.....	.....	1	1	15 20
724	110	167	168	9	12·0	.....	.....	.....	1	1	15 00
744	114	169	202	8	10·0	.....	.....	.....	.....	.....	.....
747	117	178	170	10	11·5	.....	.....	.....	2	1	15 00
716	120	182	185	9	11·5	.....	.....	.....	3	3	35 84
9	1,036	1,573	1,657	81	100·0	.....	.....	.....	13	9	142 79

SWINE

The swine on hand December 31, 1930, totalled fifty-nine head of pure-bred Yorkshires, and consisted of two mature boars, fourteen brood sows, twenty-four experimental feeders and nineteen young pigs. The health of the herd was excellent throughout the year. This was particularly true of the young pigs which were reared on a new rough pasture area. One hundred and sixty-two pigs were sold during the year, of which one hundred and nine were finished market hogs, thirty-two weaners, two old cull sows, and nine young boars and ten young sows for breeding purposes. More hogs were finished for market this year than for some time. Sixteen of the young feeder pigs were sold to members of the Agassiz pig club, which club though small, stood fourth in the provincial competition with twenty-two entries.

SKIM-MILK VERSUS FISH MEAL VERSUS TANKAGE VERSUS LINSEED OIL MEAL

(Project A. 571)

As mentioned in the 1929 report of this Farm, nine pens of five pigs each were being fed with the object in view of making a comparison of the above feeds for fattening hogs. All were being fed a basic grain ration composed of 200 pounds ground barley, 200 pounds shorts, 100 pounds middlings and 100 pounds ground oats. To this mixture forty-two pounds of fish meal was added and fed to pens 1 and 2; sixty-five pounds of tankage was added to the meal and fed to pens 3 and 4, and ninety pounds of oilmeal was added and fed to

pens 5 and 6. Pens 7 and 8 were fed six pounds of skim-milk per pig per day along with the meal mixture, while lot 9 got double this quantity of milk with the meal.

These feeds were charged at the following prices:—

	Per ton
Barley	$45 00
Shorts	36 00
Middlings	42 00
Oats	40 00
Fish meal	81 00
Tankage	80 00
Linseed oil meal	63 00
Skim-milk	5 00

Early in January the pigs in pen 6 went off feed and so it was necessary to feed them skim-milk for a week to get them back in condition. The milk was charged to them the same as the other pens.

	Fish meal		Tankage		Linseed meal		Skim-milk		
	Lot 1	Lot 2	Lot 3	Lot 4	Lot 5	Lot 6	Lot 7	Lot 8	Lot 9
Number of pigs in each group.....No.	5	5	5	5	5	5	5	5	5
Initial weight Dec. 7, 1929..... lb.	352	350	349	349	355	359	350	350	342
Weight Dec. 21..... "	448	438	442	434	441	444	474	466	480
Weight Jan. 11, 1930... "	584	584	577	569	549	562	632	628	666
Weight Jan. 25..... "	712	716	715	704	625	663	725	724	780
Final weight Feb. 5... "	811	833	794	786	694	735	838	837	891
Total gain in 60 days.. "	459	483	445	437	339	376	488	487	549
Average daily gain per pig..... "	1·53	1·61	1·463	1·356	1·13	1·253	1·626	1·623	1·83
Total value of gain at 12 cents..... $	55 08	57 96	53 40	52 44	40 68	45 12	58 56	58 44	65 88
Amount of meal consumed..... lb.	1,477	1,477	1,426	1,426	1,217	1,217	1,447	1,447	1,460
Value of meal at 2·033 cents..... $	30 03	30 03	28 99	28 99	24 74	24 74	29 42	29 42	29 68
Amount of fish meal consumed..... lb.	101	101	.....	.....	.....	.....	.....	.....	.....
Value of fish meal at 4·05 cents..... $	4 09	4 09	.....	.....	.....	.....	.....	.....	.....
Amount of tankage consumed..... lb.	.....	.....	152	152	.....	.....	.....	.....	.....
Value of tankage at 4 cents..... $	.....	.....	6 08	6 08	.....	.....	.....	.....	.....
Amount of linseed oil meal consumed..... lb.	.....	.....	.....	.....	183	183	.....	.....	.....
Value of linseed oil meal at 3·15 cents.. $	.....	.....	.....	.....	5 76	5 76	.....	.....	.....
Amount of skim-milk consumed..... lb.	.....	.....	.....	.....	.....	210	1800	1800	3600
Value of skim-milk at 25 cents per cwt..... $	.....	.....	.....	.....	.....	0 52½	4 50	4 50	9 00
Total cost of feed..... $	34 12	34 12	35 07	35 07	30 50	31 03	33 92	33 92	38 68
Difference in value of gain and feed cost..$	20 96	23 84	18 33	17 37	10 18	14 09	24 64	24 52	27 20
Feed cost per 100 pounds gain..... $	7 434	7 064	7 881	8 025	8 997	8 253	6 951	6 965	7 046

Consistent results were secured with these combinations of feeds in this test; skim-milk, fish meal, tankage and linseed meal giving the best results in the order named, not only for total gains but for cost of gains as well. Skim-milk once again gave excellent results, twelve pounds per pig per day as fed to Lot 9 producing greater gains than half the amount, but the cost of production was higher than with Lots 7 and 8. Fish meal proved the best substitute for the milk with linseed meal giving the poorest results. This is one more test where skim-milk has produced cheaper gains than fish meal, but it has not always produced greater gains.

ADVANCED REGISTRY OF SWINE

Further work was carried on in 1930 under the Advanced Registry Policy supervised by the Dominion Live Stock Branch. Seven sows were entered in this scheme last year and to date all have qualified under the tentative standard established. These standards come under three heads:—production, maturity and slaughter test. The sow to qualify in production must wean at least eight pigs in a litter. The four pigs nominated at weaning time for the slaughter test along with one spare, must show an average gain of 200 pounds in 200 days or the equivalent thereof before the sow can qualify for maturity. The qualifications for the slaughter test are more complicated, but the four pigs from the litter, nominated for this purpose, when dressed must show a certain weight, length, thickness, evenness, finish, balance and quality. Five of the sows to qualify to date did so with their 1929 litters; the other two sows, however, did not succeed in production until they had farrowed their 1930 spring litters, from which eight pigs were weaned.

The seven sows handled under this scheme this year each contributed five pigs at weaning time to be fed for maturity and the slaughter test. Through a misunderstanding, five of the groups were not put through the slaughter test, but sows ZD and ZJ each had slaughter tests made on second litters, particulars of which are not to hand at date of writing.

ADVANCED REGISTRY SCORE OF SEVEN QUALIFIED SOWS

Sow		Production	Maturity	Slaughter test
Private No.	A. R. No.	Minimum score to qualify 40	Minimum score to qualify 100	Maximum score allowed 100 — Minimum score to qualify 75
23G	ZA	55	102	87
43B	ZB	50	112	94
51C	ZD	45	111	89
1	ZF	60	110	83
2	ZJ	50	119	87
43E	ZC	40	104	82
86B	ZH	40	113	84

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	1	23G	43B	86B	43E	2	51C
Advanced registry number	ZF	ZA	ZB	ZH	ZC	ZJ	ZD
Date farrowed	Feb. 12	Feb. 17	Feb. 17	Feb. 17	Feb. 18	Mar. 6	Mar. 9
Number of pigs farrowed	15	9	12	9	8	15	12
Average weight at birth. lb.	1·86	2·66	2·25	2·77	2·63	1·63	2·33
Number of pigs weaned	12	9	10	8	8	10	9
Date of weaning	April 16	April 16	April 16	April 16	April 16	May 6	May 6
Age at weaning.....days	63	58	58	58	57	61	58
Average weight at weaning..... lb.	24·66	34·22	28·80	32·63	34·63	29·30	32·00
Meal consumed by sow and litter farrowing to weaning..... "	614	550	546	539	535	639	614
Skim-milk consumed by sow and litter farrowing to weaning..... "	1,710	1,549	1,458	1,449	1,422	1,476	1,267
Total value of feed consumed by sow and litter farrowing to weaning... $	15 093	13 563	13 266	13 109	12 981	14 949	13 985
Average feed cost per pig farrowing to weaning... $	1 2577	1 5070	1 3266	1 6386	1 6226	1 4949	1 5539

The lowest average cost per pig to weaning time is found, as would be expected, in the largest litter, where fifteen pigs were farrowed and twelve weaned. Two sows weaned all the pigs they farrowed. Apparently feed costs per pig to weaning can safely be estimated at less than two dollars.

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

Sow number	1	23G	43B	86B	43E	2	51C
Advanced Registry number	ZF	ZA	ZB	ZH	ZC	ZJ	ZD
Number of pigs in each lot	5	5	5	5	5	5	5
Weaning weight of 5 feeder pigs lb.	145	184	148	178	182	174	170
Weight 90 days after weaning "	849	924	852	911	918	954	930
Number of pigs marketed 106 days after weaning	5						
Number of pigs marketed 112 days after weaning						5	5
Number of pigs marketed 117 days after weaning		5	5	5	5		
Average number of days birth to finish	169	175	175	175	174	173	170
Total weight of pigs marketed lb.	983	1,152	1,120	1,190	1,171	1,134	1,107
Average weight of pigs marketed "	196·6	230·4	224·0	238·0	234·2	226·8	221·4
Total gain in weight "	838	968	972	1,012	989	960	937
Average daily gain per pig "	1·5811	1·6547	1·6615	1·7299	1·6906	1·7143	1·6732
Amount of meal consumed first 60 days after weaning "	749	842	840	842	842	963	963
Amount of skim-milk consumed first 60 days after weaning "	1,763	1,655	1,655	1,655	1,655	1,590	1,590
Amount meal consumed 60 to 90 days after weaning "	959	989	959	986	984	1,186	1,186
Amount skim-milk consumed 60 to 90 days after weaning "	915	620	620	620	620	675	675
Amount of meal consumed 90 days to finish "	639	1,008	1,078	1,080	1,080	798	798
Amount of skim-milk consumed 90 days to finish "	450	520	520	520	520	525	525
Total value of feed consumed weaning to finish $	56 38	65 74	66 53	67 17	67 13	67 96	67 96
Cost to produce 100 pounds gain $	6·728	6·791	6·845	6·637	6·787	7·079	7·252

The following rations were used during the feeding period:—

First Sixty Days	Pounds
Middlings	200
Ground oats	175
Ground corn	50
Ground barley	50
Shorts	50
Bran	25
Linseed oil meal	18
Tankage, 50 per cent protein	18
Bone char	6
Salt	3
Skim-milk or buttermilk	hand fed

Sixty to Ninety Days	Pounds
Middlings	100
Ground oats	200
Ground barley	100
Ground corn	100
Shorts	50
Linseed oil meal	18
Tankage, 50 per cent protein	18
Bone char	6
Salt	3
Skim-milk or buttermilk	hand fed

Ninety Days to Finish

	Pounds
Ground oats	150
Ground barley	100
Ground corn	200
Shorts	100
Linseed oil meal	18
Tankage, 50 per cent protein	18
Bone char	6
Salt	3
Skim-milk or buttermilk	hand fed

The cost of these feeds was as follows:—

	Per ton
Middlings	$45 00
Oats	35 00
Corn	46 00
Barley	38 00
Shorts	36 00
Bran	34 00
Linseed oil meal	60 00
Tankage	70 00
Bone char	60 00
Salt	30 00
Skim-milk	5 00

All of these pigs were marketed at good weights, well under six months of age. The results were very uniform and no one sow appears to have much advantage over the others. The average feed cost of one hundred pounds gain around seven dollars, is very satisfactory when the above feed prices are considered.

COST OF PORK PRODUCTION

After thirty-five young pigs were selected for Advanced Registry feeding and several young sows and boars were sold for breeding purposes, there remained thirty-two young pigs for feeding purposes. These young pigs were healthy and fairly uniform, but were the left-overs from seven litters. Due to lack of piggery space, it was decided to run these pigs in a new rough land pasture area of seven acres. Then from time to time as they grew and as space permitted, it was planned to place them in the piggery to finish off.

The thirty-two weighing 1,220 pounds were turned out May 6. On July 11, one died and fifteen were placed in the feeding pens to finish. On August 20, these fifteen were marketed and also four others direct from the pasture. The remaining twelve on this date were then confined to pens for finishing and on September 10 were marketed. This method of handling allowed the minimum of labour and feed, with consequent low cost. Whatever skim-milk was available the pigs received. From May 6 to the end of the month, only one pound of grain per pig per day was given. For the first nine days in June this was increased by a half pound, and then to July 11 they were given two pounds. After that, they received all they would eat. The grain mixture used throughout was the same as fed the first sixty days to the Advanced Registry pigs and cost 2.08 cents per pound.

The following data show the gains, feed consumption and costs for the several different periods:—

	Pounds	$
Total weight 32 pigs May 6	1,220	.....
Total weight 31 pigs July 11	2,816	.....
Total gain in 78 days	1,596	.....
Average daily gain per pig 78 days	0.6523	.....
Amount of meal consumed at 2.08 cents	3,312	68 89
Amount of milk consumed at 25 cents per cwt.	7,069	17 67
Total cost of feed	....	86 56
Feed cost per 100 pounds gain	....	5.4236
Weight 15 pigs put in finishing pens July 11	1,389	.....
Weight 15 finished pigs Aug. 20	2,580	.....
Total gain 15 finished pigs in 40 days	1,191	.....
Average daily gain per pig	1.985	.....
Amount of meal consumed 15 pigs 40 days at 2.08 cents	3,796	78 96
Amount of milk consumed 15 pigs 40 days at 25 cents per cwt.	2,274	5 63
Total cost of feed	....	84 59
Feed cost per 100 pounds gain	....	7.1024
Net receipts from 15 pigs	....	292 00
Weight 16 pigs returned to pasture July 11	1,427	.....
Weight 16 pigs off pasture August 20	2,321	.....
Total gain 16 pigs	894	.....
Average daily gain per pig for 40 days	1.3969	.....
Amount of meal consumed 16 pigs 40 days at 2.08 cents	2,624	54 58
Amount of milk consumed 16 pigs 40 days at 25 cents per cwt.	1,683	4 21
Total cost of feed	....	58 79
Feed cost per 100 pounds gain	....	6.5649
Net receipts from 4 pigs sold, 679 pounds	....	81 48
Weight of 12 pigs put in finishing pens Aug. 20	1,642	.....
Weight of 12 pigs finished Sept. 10	2,076	.....
Total gain in 20 days	434	.....
Average daily gain per pig	1.8083	.....
Amount of meal consumed 12 pigs 20 days at 2.08 cents	1,617	33 63
Amount of milk consumed 12 pigs 20 days at 25 cents per cwt.	2,325	5 81
Total cost of feed	....	39 44
Feed cost per 100 pounds gain	....	9 09
Net receipts from 12 pigs sold	....	232 61

SUMMARY

Date	Total gain	Total value of feed	Net returns
	lb.	$	$
July 11	1,596	86 56	.....
August 20	1,191	84 59	292 00
August 20	894	58 79	81 48
September 10	434	39 44	232 61
Grand totals	4,115	269 38	606 09

The average feed cost to produce 100 pounds gain was $6.55. Valuing the 32 pigs at $6 each on May 6 the net profit over original value and feed cost was $144.71, or an average of just under $5 per pig. With poorer pigs and less labour, this method of handling produced slightly cheaper pork than was secured where the Advanced Registry pigs were closely confined and fed all they would handle right from the start.

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 land was thoroughly cultivated as in former years, the entire area receiving a dressing of barnyard manure at the rate of 12 tons per acre, while the portion reserved for mangels also received an application of commercial fertilizer at time of seeding 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 variety grown being Danish Sludstrup. The total mangel crop amounted to 116 tons from 4 acres; i.e., 29 tons per acre.

The corn was sown in drills three feet apart, the varieties grown being Longfellow, Minnesota 13, and Northwestern Dent. The total yield of corn ensilage amounted to 208 tons 1,600 pounds from 16 acres; i.e., 13 tons 100 pounds per 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 the following:—

	Pounds per acre
Kentucky blue grass	2
Orchard grass	2
Meadow fescue	2
Tall oat grass	2
Timothy	2
Perennial rye grass	2
Alfalfa	2
Red clover	6
Alsike clover	2
White dutch clover	2

This mixture is intended to produce a permanent pasture which will be suitable for experimental work on a Close Grazing Project. The total crop of oats harvested amounted to 50 tons 1,340 pounds from 42 acres; i.e., $1\frac{1}{5}$ tons per acre.

HAY

From 38 acres 246 tons clover silage and 30 tons 200 pounds first cutting hay were harvested. The second cutting yielded 44 tons 1,000 pounds hay. The average yield per acre estimated in hay approximated $3\frac{1}{2}$ tons.

PASTURE

The past season had its drawbacks from a pasture standpoint. Early in the season conditions were good but towards the end of July and during August a continued spell of dry weather depleted pastures considerably, rain later in the fall revived growth.

COST OF PRODUCTION

Owing to the fact that considerable changes were made in lay-out of fields during the past season it was not possible to arrive at definite returns as far as cost of production of crops is concerned other than that exemplified in the comparison of root and ensilage crops experiment as follows:—

COMPARISON OF ROOT AND SILAGE CROPS

In order to compare the value, yield, and cost of production of mangels with that of silage crops such as corn, sunflowers, red clover, and peas and oats, an experiment was set out in the spring of 1930, to be continued for a number of years.

The following table gives a summary of results for the first season:—

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

Rotation year	Crop	Yield per acre, 1930	Value of crop, 1930	Cost of production, 1930	Profit or loss per acre, 1930
		tons	$	$	$
1	Mangels	24	80 40	95 90	−15 50
	Corn	15	99 75	86 38	13 37
	Sunflowers	23	131 10	94 15	36 95
2	Peas and oats ensilage	9	64 35	69 15	−4 80
3	Clover ensilage (1931)				

The foregoing results are only to be taken as preliminary. The experience of the first season's work indicates where certain modifications can be made to advantage. Next year the rotation will be complete.

COST OF PRODUCTION

The following table shows the cost prices and return values in determining the cost of producing the various crops of the root and silage experiment:—

COST PRICES

Rent including taxes	$13 00 per acre
Manure: none.	
Commercial fertilizers	46 00 per ton

The cost is distributed as follows:—60 per cent to the first crop of the rotation, 30 per cent to the second, and 10 per cent to the third.

Manual labour	$ 0 27½ per hour
Teamster labour	0 30 per hour
Tractor	6 00 per day
Tractor operator	0 35 per hour
Horse labour	0 15 per hour
Machinery	2 85 per acre
Twine	0 20 per pound
Oats	0 85 per bushel
Peas	5 30 per bushel
Corn	0 06 per pound
Sunflowers	0 10 per pound
Mangel seed	0 50 per pound
Grass seed to be charged in 1931.	

RETURN VALUES

Mangels	$ 3 35 per ton
Corn silage	6 65 per ton
Sunflowers silage	5 70 per ton
Peas and oats silage	7 15 per ton

FERTILIZERS

An experiment was commenced to compare the fertilizing value of various combinations of commercial fertilizers and manure.

The following table gives the yields for the past season from the various plots:—

RESULTS OF COMMERCIAL FERTILIZERS AND MANURES WITH MANGELS

Plot No.	Treatment in pounds per acre	Yield per acre	
		tons	lb.
3	Rotted manure 20 tons per acre in spring	28	720
6	Rotted manure 10 tons per acre in spring supplemented with— 100 pounds nitrate of soda, 250 pounds superphosphate of lime, 50 pounds muriate of potash	27	880
Average 1 and 2	Fresh manure 20 tons per acre in spring	26	1,200
4	Rotted manure 10 tons per acre in spring	24	1,120
8	200 pounds nitrate of soda, 500 pounds superphosphate of lime, 100 pounds muriate of potash	24	1,120
9	100 pounds nitrate of soda, 250 pounds superphosphate of lime, 50 pounds muriate of potash	23	1,760
11	100 pounds nitrate of soda, 250 pounds superphosphate of lime, 50 pounds muriate of potash	22	1,040
10	100 pounds nitrate of soda, 250 pounds superphosphate of lime, 50 pounds muriate of potash (drilled)	21	1,680
5	Rotted manure 10 tons per acre in spring	20	.....
7	No manure or fertilizer	10	1,520

These results must be looked upon as preliminary. After a definite rotation has been established, the mangels will in all cases follow the same crop of the previous year.

COUCH GRASS ERADICATION

On a fifty-acre rented field badly infested with couch grass a study was made regarding the best method of control. The western twenty-seven-acre portion was ploughed in the autumn of 1929 after having produced a crop of oats. Eleven acres in the southeast side was in pasture the spring of 1930.

Burning couch grass on a badly infested field. The grass was rolled up with harrows.

The balance of the field was sown to oats and not used in the couch grass investigation. The twenty-seven-acre field was reploughed in the spring, disked, cultivated, and harrowed during April, when it was divided into plots under the following plan:—

Plot 1.—Five acres, cultivate in spring and seed oats in the ordinary way as a check.

Plot 2.—Five acres, cultivate every week or ten days until time to seed buckwheat.

Plot 3.—Five acres, cultivate every week or ten days until late. Then seed barley.

Plot 4.—Six acres, cultivate every week or ten days until June 21, then seed corn in rows 36 inches apart.

Plot 5.—Six acres, summer-fallow, cultivate frequently throughout the summer. Use harrows when possible and gather up couch grass roots.

STATEMENT OF EXTRA LABOUR AFTER MAY 1, 1930

Item	Plot 1, 5 acres	Plot 2, 5 acres	Plot 3, 5 acres	Plot 4, 6 acres	Plot 5, 6 acres
May and June cultivation and weed burning labour—					
Tractor....hours	.....	12	12	29	.....
Horse....hours	.....	80	80	30	.....
Man....hours	.....	60	60	20	.....
Teamster and tractor operator....hours	.....	46	46	44	.....
July labour hoeing and cultivating—					
Horse....hours	.....	.....	.....	80	.....
Teamster....hours	.....	.....	.....	50	.....
Man....hours	.....	.....	.....	230	.....
Summer-fallow—					
Tractor....hours	.....	.....	.....	.....	36
Horse labour....hours	.....	.....	.....	.....	20
Operator and teamster....hours	.....	.....	.....	.....	46
	Oats	Buck-wheat	Barley	Corn	
Total weight of crop harvested....lb.	5,500	4,539	5,900	48,900	.....

Up to the end of April the labour was uniform on all plots. The seeding, harvesting, threshing, and silo filling are also considered equal. All plots, including No. 5, were fall-ploughed, so that the extra labour is what was put on Plots 2, 3, and 4 previous to planting after work on the check plot had ceased. On the summer-fallow plot the extra labour was done from May 1 to August 9 and included mostly tractor labour cultivating and harrowing. All crop yields were low and the value of oats, buckwheat, barley, straw and silage stored at the barns was about equal from each plot.

With regard to couch grass control, it is impossible to tell at time of writing which method was the most successful in killing the couch. From close observation the summer-fallow plot seems the cleanest, with the corn, barley, buckwheat, and oat plots next in the order named.

The stock was removed from the eleven-acre pasture field at the close of June and the sod was then ploughed, disked, cultivated, and harrowed to the end of September. From present appearances this method of handling was of little value for control purposes.

HORTICULTURE

Weather conditions play an important part in the production of horticultural crops, but the extreme variations usually occur in the months which do not affect materially plant growth. Unusual conditions have prevailed during the past three years in that they have been the three driest years recorded at this station since 1892. This moisture deficiency has occurred chiefly in the first three and the last three months of the year, the normal periods of heaviest rainfall. There has been, though, a falling off from the average of most months. During July and August there is usually a moisture deficiency and crop growth suffers in consequence.

One of the major fields of progress during the past year was the planting of a new area of land to raspberries. The plot consists of approximately two acres and immediate provision has been made to carry out four different experiments.

Variety testing of vegetables has largely been discontinued and in its place cultural experiments have been substituted. As occasion arises new varieties will be compared with those which have proved of most merit in the past.

The ornamental section of the grounds, including lawns, trees, shrubs, hedges, and flowers, proves to be of much interest to visitors and forms a valuable part of the work done. Progress in this field is not as readily shown as in some of the other branches, as much of the work is maintenance. Practically equal amounts of time and labour are devoted to the ornamental section as to the production of fruits and vegetables.

VEGETABLES

BEANS

Many varieties of dwarf beans have been tested during recent years. Information has been gathered as to which are the earliest and heaviest producing varieties. The project will be discontinued in the future, except when deemed advisable to compare new or untried varieties with those which have been found to be the most suitable for the district. The following have proved to be the best amongst the green podded kinds: Masterpiece, Early Red Valentine, Early Bountiful, Best of All; and for a late variety, Refugee; wax podded Davis White Wax, Jones White, and Hodgson Long Pod. (Project H. 61.)

CHINESE CABBAGE

Five varieties of this vegetable were tested. There was a marked difference in type of each variety, in shape, quality, size, and habit of growth. There is sufficient difference that each variety might be looked on as a different kind of vegetable. New Joy somewhat resembles celery in its habit of growth. Cooked and used as a vegetable it is of fair quality but has little to recommend itself. From this year's results it is a very reliable variety for uniform growth and giving good sized, well formed plants. Pe Tsai attained the greatest size; it is large and formed no heads, being comparable to leaf lettuce in habit of growth. Chihili was the smallest growing variety. Leaves are of dark green colour and coarse texture. In habit of growth it resembles Cos lettuce. No firm heads were produced. Wong Bok or Pasting (Vaughan). This proved to be the best variety in 1929 and 1930. It is of very good quality both as a salad plant and cooked in a manner similar to cabbage. Heads average three and a half pounds in weight and are very firm. It formed a high percentage of good heads. Wong

Bok—there is a considerable difference in type between this and the last mentioned variety, though the name would indicate similarity. The general type is between Pasting and Chihili. No good firm heads were formed.

Seeding was done on two different dates, June 30 and July 16. Both dates yielded satisfactory crops from the two varieties, New Joy and Pasting. Chinese cabbage has to be treated as a fall vegetable and will not stand being sown before the first of June. It is very subject to attacks of flea beetles and root maggots. (Project H. 670.)

HERBS

A variety test was commenced this year with different kinds of herbs. This test was undertaken in order to be able to supply information as to the success which could be expected from the cultivation of different varieties of this group of plants. No effort is being made to determine the marketing possibilities of each kind, but such problems that deal with production as yield, dates of maturity, and methods of cultivation will be studied. The following varieties were grown:—Sweet Marjoram, Pennyroyal, Lavender, Balm, Thyme, Horehound, Hyssop, Rosemary, Sage, Coriander, Caraway, Fennel, Dill, Sweet Basil, Anise, Summer Savory, and Borage. (Project H. 108.)

PEAS

Many different kinds of peas have been tested during the time this project has been under way. It is rarely that all the different desirable characters are combined in any one variety in any kind of plant life. In peas there are several main requirements, earliness, yield, habit of growth, and quality. These characters have not been all found in any one variety. The earliest maturing variety is Alaska, it is of inferior quality, grows approximately three feet high, and is of high average yield for an early variety. Little Marvel is a dwarf variety, averages two feet high, matures approximately one week later than Alaska, is of superior quality, and gives about the same yield. Two half dwarf varieties which grow approximately four feet tall and yield considerably more than either of the above and mature ten days later than Little Marvel are Bruce and Director; both are of good quality. The two highest yielding varieties are Duke of Albany and Golden. The latter excels in yield but is inferior in quality; both grow six or seven feet tall. These varieties mature at approximately the same date as Bruce and Director. Supreme is a late dwarf variety, averaging five days later than the last mentioned kinds. It is of good quality and yields approximately the same as Little Marvel. This variety has proved superior to Stratagem, which has been the standard late dwarf. During the past season the McTavish variety was tested for the first time. This is a tall variety; it yielded a little heavier than Supreme and matured two weeks later. It is promising for this reason and will be given further trials.

This project as conducted in the past is to be discontinued. From time to time, however, such varieties on which information is required will be tested out. (Project H. 153.)

ASPARAGUS

ANNUAL VERSUS BIENNIAL HARVESTING.—A new project was commenced this year to determine what results will be given from harvesting a crop each year from a given number of roots as compared to harvesting a crop every alternate year. There is a heavy drain on asparagus crowns each year as the crop is harvested from food stored during the previous season. The object of the experiment is to determine whether any increased yield from biennial harvesting will offset the yields obtained from annual cropping and whether such a cropping method will induce earliness and other characters. The variety

used is Mary Washington, plants were set out in 1928. Two rows are being tested, alternate plants in each row will be harvested annually and the remainder biennially. (Project H. 699.)

CABBAGE, CAULIFLOWER, AND BRUSSELS SPROUTS

SEED SOWN IN OPEN VERSUS SEED SOWN IN HOTBEDS.—Seed of cabbage, cauliflower, and Brussels sprouts was sown in a hotbed on March 10 and transplanted to the open on April 19. Like seedings were made in the open on March 12. Comparatively little success was had with any of the treatments due to attacks of flea beetles and maggots. The hotbed sown plants did best. Due to insects it is difficult to bring along seedlings in the open where no protection is given, particularly in the early season when growth is slow. (Projects H. 74, 84, and 669.)

CELERY

PLANTING IN TRENCH VERSUS PLANTING ON LEVEL.—A thirty-foot row was planted in a trench six inches deep and compared to a similar row planted on the level. There was practically no difference in yield or quality. Where surface soil is shallow trenching tends to put the young seedlings down to the less fertile subsoil with consequent ill effects. Blanching was done with earth and boards. Either method is satisfactory, earth, however, this year gave better blanched stalks. Boards do not give as rapid a blanching as earth and they have a tendency to cause a slime rot of the leaves and upper part of the stalks. (Project H. 700.)

Project H. 90, different methods of blanching celery has as a separate project been discontinued. It is now included in the above experiment.

CORN

A variety test of corn has been conducted here for a number of years. During recent years several new varieties have been put on the market, some of which show indications that they will displace the popular Golden Bantam. To-day a variety must be golden and usually Golden Bantam is asked for. Three varieties which have been tested during the past four years and compared to Golden Bantam are Sixty Day Golden, Groff Golden and Golden Giant. Sixty Day Golden during this period has matured on an average ten days earlier than Golden Bantam and has given a total yield of $104\frac{1}{2}$ pounds as compared to 90 pounds. Groff Golden has matured on an average the same date as Golden Bantam and has given a total yield of $137\frac{1}{4}$ pounds as compared to 90 pounds. Golden Giant has matured three days later than Golden Bantam and has yielded 102 pounds as compared to 90 pounds. The quality of all three of these varieties compares favourably to Golden Bantam.

In 1930 the total number of marketable cobs from each variety was counted. Golden Bantam yielded 58 cobs for an average weight of seven ounces, Sixty Day Golden 58 cobs for an average weight of twelve ounces, Groff Golden 69 cobs averaging twelve ounces, and Golden Giant 45 cobs averaging ten and three-quarter ounces.

The above figures indicate that under certain conditions Sixty Day Golden is an earlier maturing and slightly heavier yielding variety and that Groff Golden is a considerably heavier yielding variety than Golden Bantam.

SUCKERING VERSUS NOT SUCKERING.—During the past five years this project has been run to determine whether there is any value as regards yield or earliness in cutting away suckers from sweet corn. The experiment has been carried out with two varieties, Early Malcolm and Golden Bantam. The practice has been

to cut out suckers as they appear and to remove any new growth of a similar nature. The plot arrangement has been as follows:—

In 1926 and 1927 there were two thirty-foot rows of each variety adjacent to one another, one row was suckered and the other allowed to grow naturally.

In 1928 there were four adjacent thirty-foot rows of each variety. The rows of each variety were alternately suckered and allowed to grow naturally.

In 1929 and 1930 there were six adjacent thirty-foot rows of each variety. The rows of each variety were alternately suckered and allowed to grow naturally.

The following table gives the results obtained:—

RESULTS OF CORN SUCKERING EXPERIMENT

Variety	Year	Date ready for use, suckered	Yield, suckered	Date ready for use, normal	Yield, normal	Total yield, suckered	Total yield, normal
			lb. oz.		lb. oz.	lb. oz.	lb. oz.
Early Malcolm	1926	Aug. 5	17 8	Aug. 9	17 8	.....	.....
Early Malcolm	1927	Aug. 16	18 12	Aug. 16	23 12	.....	.....
Early Malcolm	1928	Aug. 27	57 18	Aug. 27	59 0	.....	.....
Early Malcolm	1929	Sept. 14	104 7	Sept. 14	106 14	.....	.....
Early Malcolm	1930	Aug. 23	100 10	Aug. 25	100 6	298 13	307 8
Golden Bantam	1926	Aug. 9	29 0	Aug. 13	27 8	.....	.....
Golden Bantam	1927	Aug. 21	22 8	Aug. 23	22 8	.....	.....
Golden Bantam	1928	Aug. 27	42 8	Aug. 27	48 4	.....	.....
Golden Bantam	1929	Sept. 10	42 1	Sept. 10	54 12	.....	.....
Golden Bantam	1930	Aug. 25	60 14	Aug. 25	71 12	196 15	224 12

The above table shows that corn allowed to grow normally yields more than when suckers are removed. There is an indication on the other hand of a slight advantage in earliness for rows from which the suckers have been removed. This phase with corn is very similar to the results obtained with pruning tomatoes, namely that it frequently happens that the date of first mature ears is approximately the same for both treatments but if the yields from the respective methods are totalled up weekly it will be found that there is a slight advantage for earliness when suckers are removed from Golden Bantam. The results with Early Malcolm have not been consistent. This increased earliness is comparatively small, it is obtained by sacrificing yield and involves considerably more labour. The above results indicate that under Agassiz Experimental Farm conditions suckering corn is not a practical operation, unless the grower is prepared to sacrifice some yield and to devote additional labour in order to obtain a slightly earlier maturity. The extent of earliness is best indicated by the following table based on the results of the last three years:—

CORN SUCKERING EXPERIMENT—YIELDS ON DIFFERENT DATES

Variety	Year	Total crop at corresponding dates		Total crop at corresponding dates		Total crop at corresponding dates		Total crop for season	
		Suckered	Normal	Suckered	Normal	Suckered	Normal	Suckered	Normal
		lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.
Early Malcolm	1928	36 0	43 4	55 12	56 12	57 8	59 0	57 8	59 0
Early Malcolm	1929	28 4	30 0	65 0	68 4	92 12	91 8	104 7	106 14
Early Malcolm	1930	8 10	2 8	11 14	6 0	53 4	44 0	100 10	100 6
Golden Bantam	1928	7 8	00 00	33 8	23 12	41 12	44 4	42 8	48 4
Golden Bantam	1929	14 0	11 6	24 12	25 0	36 3	40 10	42 1	54 12
Golden Bantam	1930	11 12	5 9	37 6	24 7	56 12	53 5	60 14	71 12

This project is now completed and will not be reported on further. (Project H. 101.)

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LETTUCE

SEED SOWN IN HOTBEDS AND TRANSPLANTED VERSUS SEEDED IN OPEN.—Seed of the two varieties, Grand Rapids and New York, was sown in hotbeds and in the open on March 12, seedlings from the hotbed were transplanted to the open on April 19. There was no difference in the earliness of the two treatments, both lots of Grand Rapids being ready for use on June 3 and both lots of New York being ready for use on June 23. In the two previous years of this experiment hotbed sown seed has given an earlier crop. (Project H. 113.)

DIFFERENT DATES OF SEEDING.—This project is being run to determine at what dates throughout the year lettuce can be seeded to obtain good crops; the varieties used are Grand Rapids and New York. The first date of seeding was March 5. Results from this year would indicate that the Grand Rapids variety will produce a satisfactory crop at any date of seeding up to July 15. Later planting dates did not grow quickly enough to produce a crop before killing frosts. With the New York variety results indicate that satisfactory crops can be obtained with seedings up to April 15 and approximately a thirty-three per cent stand from April 15 to May 1. Later seedings up to July 1 did not give any good heads. Seedings from July 1 to July 15 gave satisfactory crops for fall use. For summer seedings in July and August rainfall is an important factor, without moisture the seed is slow to germinate which retards the development of the plants. The above results are those of one year's work. (Project H. 114.)

ONIONS

SEEDED IN HOTBEDS AND TRANSPLANTED VERSUS SEEDED IN OPEN.—The results of this experiment are based on the crops harvested during the last four years. The system of planting and replication during this period has varied from year to year but the results of each year's crop have been identical, namely, that seed sown early in the hotbed and transplanted outyields seed sown in the open. Hotbed sown seed should be planted in February or early March and the young seedlings set out in April. Seed sown in the open has been planted in April or

Onions—transplanted (left) versus seeded in the open (right). Yields each from one thirty-foot row.

May at about the same time that seedlings are set out. In another experiment with onions conducted here during recent years the object has been to determine how early seed can be sown in the open trying both fall and early spring plantings. Trials have shown that such early sowings will not stand the cool moist weather which usually prevails, with the result that per cent of germination has been very low. It has therefore been concluded that it is not practical to plant seed in the open at the same time as seeding in the hotbed. The method of planting during the past four years has been as follows:—

In 1927 there were three seeded thirty-foot rows, one of each variety followed by three transplanted rows.

In 1928 there were two adjacent thirty-foot rows of each variety, one seeded and one transplanted alternating with one another.

In 1929 there were six adjacent thirty-foot rows of each variety, three seeded and three transplanted.

In 1930 the same planting system as followed in 1929 was adopted.

Transplanted onion seedlings have given large good quality bulbs. There is a tendency for bulbs to have thick necks due largely to the extensive top growth, there is also a tendency for the formation of double bulbs. Under climatic and soil conditions where satisfactory yields are not obtained from seeding in the open it would appear to be worth while to follow the cultural methods of transplanting seedlings from a hotbed. Experiments conducted at this farm have shown that for local conditions liming the soil proves beneficial for onions. The following table gives the results obtained during the past four years:—

ONIONS TRANSPLANTED FROM HOTBED VERSUS SEEDED IN OPEN—FOUR YEARS' RESULTS

Variety	Year	Date seeded in hotbed	Date transplanted	Date seeded in open	Yield transplanted rows	Yield seeded in open	Total yield	
							Transplanted	Seeded in open
					lb.	lb.	lb.	lb.
Ailsa Craig	1927	Feb. 28	April 16	April 12	51¾	25	.....	.....
Ailsa Craig	1928	Feb. 27	April 21	April 21	31½	23	.....	.....
Ailsa Craig	1929	Mar. 16	May 2	May 2	104¼	49¼	.....	.....
Ailsa Craig	1930	Mar. 10	April 19	April 19	121	65	308½	162¼
Southport Yellow Globe	1927	Feb. 28	April 16	April 12	36¾	30	.....	.....
Giant Yellow Prizetaker	1928	Feb. 27	April 21	April 21	45	21	.....	.....
Giant Yellow Prizetaker	1929	Mar. 16	May 2	May 2	107½	51¾	.....	.....
Giant Yellow Prizetaker	1930	Mar. 10	April 19	April 19	134	93	323¼	195¾
Southport Red Globe	1927	Feb. 28	April 16	April 12	23½	24¾	.....	.....
Large Red Wethersfield	1928	Feb. 27	April 21	April 21	40½	19	.....	.....
Large Red Wethersfield	1929	Mar. 16	May 2	May 2	60½	39¼	.....	.....
Large Red Wethersfield	1930	Mar. 10	April 19	April 19	112	86	236½	169

This project is now completed as the data collected after four years of experiment are both uniform and conclusive. (Project H. 137).

POTATOES

The better known varieties of early potatoes have been tested on the farm during recent years to obtain information as to which varieties will produce the largest crops at the earliest possible date and at approximately what date marketable tubers can be dug. The method of treatment has been as follows: Approximately in the middle of January whole small seed averaging between two

and three ounces a set have been selected and placed in flats with the stem end up for sprouting. During the first week these sets have been kept in a bright cool place and then transferred to the office basement where some warmth is available from the furnace. This additional heat causes the tubers to sprout. Examination of flats should be made periodically in order to determine that sprouts are developing properly. It is aimed to have growth of about one to one and one-half inches long. If sprouts do not show signs of development the flats can be covered over with sacks which hastens growth; if development is too rapid, less heat and more light should be given. Sprouts which develop slowly in a bright room are stronger and more satisfactory than those which develop quickly in dark places. Sprouts of different varieties will vary somewhat in colour, number to a tuber, in their tendency to produce short sturdy sprouts or long spindly ones and the rate at which they grow. Bermuda is a variety which sprouts slowly, in general it may be said that Bermuda, Epicure, and Early Saint George produce short thick sprouts, while Early Rose, Early Hero, Early Ohio, and Vicks Extra Early have a tendency to produce longer and more slender sprouts, the type of sprout which is more easily broken off at the time of planting.

Weather conditions influence the time of planting but in order to obtain the earliest possible crop, potatoes should be planted in early March. The soil should preferably be a good friable loam, warm and well drained. Sets should be planted about two inches deep and covered over with four inches of earth. In districts where late frosts are of common occurrence planting date and planting depth should be so regulated as to avoid any appreciable top growth before danger of freezing is over. Once during the past five years at Agassiz the tops have been frozen on April 19; there was a comparatively small amount of growth at the time; the injury did not appear to affect to any extent the date of harvesting or the yield.

The yield results over a period of years have not shown any one variety to be consistently the highest. Early potatoes can be considered in two general types, white skinned and rose or coloured skin varieties. Amongst the white skinned kinds Early Saint George has proved very satisfactory and amongst the rose coloured Early Ohio, Vicks Extra Early, Early Rose, and Bermuda have all done well. Bermuda (Bliss Triumph) is the most deeply pigmented. Much more difficulty has been experienced on the Agassiz farm in keeping early varieties up to a high producing standard than main crop varieties, even when both are planted at the same time. It frequently occurs that in one season there will be a fifty or even greater per cent of running out with no previous warning from the appearance and yield of the preceding crop.

Fertilizer at the rate of 750 pounds per acre made up with 228 pounds nitrate of soda, 438 pounds of superphosphate of lime and 84 pounds of muriate of potash has proved very beneficial, increasing the production per acre during 1926, 1927, and 1928 by 2,651 pounds. The following table gives some of the results obtained:—

POTATOES EARLY—RESULTS TEST OF VARIETIES

Year	Area planted	Date planted	Date harvested	Yield	Computed yield per acre	Wholesale price per lb. received	Value of crop per acre
	sq. ft.			lb.	tons lb.	cents	$
1926	2,700	Mar. 8	May 21	679	5 956	8½	931 26
1927	2,475	Mar. 16	June 24	556½	4 1,794	2	195 88
1928	3,525	Mar. 14	June 8	597½	3 1,381	6	442 86
1929	2,775	Mar. 19	June 25	874½	6 1,727	4	549 08
1930	2,850	Mar. 27	June 16	658½	5 65	4¾	478 09

TEST OF MAIN CROP POTATOES.—Many varieties of potatoes have been tested during the time this project has been under way. No one variety has consistently proved itself to be the highest yielding. Averaged over a period of years, however, it has been possible to determine the sorts that have done best. Considering the three most important main crop groups, namely Burbank, Green Mountain, and Up-to-Date, the leading varieties respectively have been in the first group, Burbank. The most important commercial kind of this group, the Netted Gem, has never proved a success here, indicating that it is not adapted to as wide a range of soil conditions as most other varieties. The Burbank has yielded satisfactorily and is of nearly equal quality to the Netted Gem, though in shape it is not quite as uniform. In the Green Mountain group the leading sorts have been Wee McGregor and Gold Coin. In the Up-to-Date group, Table Talk and Dalmeny Beauty have been the highest yielders. Taking an average of all the varieties in each group the Up-to-Date group has given the highest yield. Other high-yielding kinds from various groups are Rawlings Kidney, Dreer Standard, Empire State, Ormandy, and U.B.C. (Project H. 186.)

Satisfactory information having been obtained on most of the leading commercial potatoes, this project as carried on in the past will be discontinued and cultural experiments will replace it.

POTATOES, EARLY

DIFFERENT SIZES OF WHOLE SETS FOR EARLY POTATOES.—This project was commenced in 1929. It is being run to determine the comparative yield between whole two-ounce, four-ounce, and six-ounce sprouted sets. Each plot consisted of three rows, one row for each different weight of set; plots were replicated four times. Seed was planted on March 27; the crop was dug June 16, at which time potatoes were selling wholesale at five cents per pound.

Two-ounce sets averaged 2·29 ounces.

Four-ounce sets averaged 4·07 ounces.

Six-ounce sets averaged 5·96 ounces.

The following table gives the results obtained:—

EARLY POTATOES—SIZE OF WHOLE SETS

Size of sets	Seed required per acre	Total yield marketable potatoes	Yield per acre	Cost of seed per acre at 2 cents a pound	Value of crop per acre at 5 cents a pound	Difference in cost of seed and value of crop
	lb.	lb.	lb.	$	$	$
Two ounce sets	2,139	50¼	7,296	42 78	364 80	322 02
Four ounce sets	3,802	60	8,712	76 04	435 60	359 56
Six ounce sets	5,568	53	7,695	111 36	384 75	273 39

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

The computed yield per acre from comparatively small plots does not give reliable figures; for purposes of comparison for returns the figures should prove correct.

Results of this year vary from those of last in that the six-ounce sets in 1929 yielded more than the four-ounce sets. (Project H. 675.)

COATED VERSUS UNCOATED SEED.—This is the second year of this experiment. The material used for coating the seed is land plaster. The seed treatments were as follows:—

1. Seed planted at once.
2. Seed planted seventeen days later.
3. Seed coated and planted at once.
4. Seed coated and planted seventeen days later.

All sets are cut potatoes averaging slightly over two ounces.

It is aimed to plant the seed of lots 2 and 4 ten days after cutting. This year it was not possible to do so as rainy weather set in and planting had to be delayed. This factor cannot be controlled, so the actual number of days before planting some of the seed may be variable from year to year. Plots consisted of 30-foot rows replicated four times.

The following groups of comparisons were made:—

1. Seed uncoated and planted at once versus seed coated and planted at once.
2. Seed uncoated and planted at once versus seed coated and planted seventeen days later.
3. Seed coated and planted at once versus seed coated and planted seventeen days later.
4. Seed uncoated and planted at once versus seed uncoated and planted seventeen days later.

The following tables gives the results obtained:—

POTATOES—RESULTS WITH COATED VERSUS UNCOATED SEED

Seed treatment	Yield marketable four rows	Average yield from all rows marketable	Number of rows averaged	Average number of plants	Average yield from all rows corrected for misses	Corrected yield for misses
	lb.	lb.			lb.	lb.
Uncoated and planted at once	149	.....	.....	.....	.....	184½
Coated and planted at once.	148¾	35½	8	25·0	36¾	153
Uncoated and planted at once	137	.....	.....	.....	.....	154¾
Coated and planted 17 days later	152¼	36¼	8	25·7	36¾	152¼
Coated and planted at once	134¾	.....	.....	.....	.....	141½
Coated and planted 17 days later	138¼	.....	.....	.....	.....	142½
Uncoated and planted at once	145½	37¾	12	22·3	42	164½
Uncoated and planted 17 days later	153	38¼	4	24·5	40½	162¼

The number of rows averaged in column three is applicable to columns two, four, and five.

The result of this year's work is comparable to that of last year in so far as that untreated seed allowed to callus over for ten or seventeen days has given the highest average yield when the latter is not corrected for misses. When 1930 yields are corrected for misses untreated seed planted immediately after cutting gives the highest yield and untreated seed allowed to callus over gave the next highest yield. In 1929 coated seed planted ten days after cutting gave the second highest yield. It is interesting to note that untreated seed

planted immediately after cutting gave the lowest average of plants per row, that coated seed allowed to callus over gave the highest average of plants per row, and that untreated seed allowed to callus over gave the next highest average of plants per row and highest yield. While these figures are those of one year's work, they indicate that seed allowed to callus over gives a higher per cent germination and that coating seed with land plaster is somewhat injurious. The per cent of germination would possibly vary from year to year depending on seasonal conditions, in relation particularly to moisture and temperature. More experimentation is necessary before definite conclusions can be drawn. (Project H. 180.)

POTATOES—FERTILIZER TEST

A fertilizer test is being conducted with main crop potatoes to determine whether there is any advantage in yield comparing two mixtures 4-10-10 and 4-10-6 and the relative yields when applications are made at 750 and 1,500 pounds per acre. There were four thirty-foot rows in each plot, adjacent rows receiving equal amounts of fertilizer of the different formula, each plot was separated by an unfertilized check row. Replications were in quadruplicate. In 1929 the 4-10-10 mixture gave a slightly higher yield than the 4-10-6 mixture, this year results were reversed. In both years the heavier application of fertilizer gave increased yields. The following table indicates the comparative cost of fertilizer per acre and the value of increased yield. The acreage yield cannot be accepted as exact due to the small size of plots but as representative of yields between plots it is correct.

POTATOES—RESULTS OF FERTILIZER TEST

Fertilizer and rate of application	Yield per acre	Cost of fertilizer per acre	Value of crop at $30 a ton	Value of crop above fertilizer cost
	tons lb.	$	$	$
4-10-10 at 750 pounds	12 938	20 90	374 00	353 10
4-10- 6 at 750 pounds	12 1,891	18 65	388 36	369 71
4-10-10 at 1,500 pounds	14 1,856	41 80	447 84	406 04
4-10- 6 at 1,500 pounds	15 1,581	37 30	473 71	436 41
No fertilizer	5 688	.....	160 12	160 12

The amounts of different fertilizing material in the two formulas at 1,500 pounds per acre are approximately as follows:—

	4-10-10	4-10-6
Nitrate of soda	97 pounds	97 pounds
Sulphate of ammonia	214 "	214 "
Superphosphate of lime	937 "	937 "
Sulphate of potash	300 "	180 "

Applied at the rate of 750 pounds per acre the above figures are halved. (Project C. 8.)

POTATOES—DATE OF SEEDING

A new project was commenced this year to determine if the date of seeding potatoes has any effect on their producing capacity the following year. Five different dates of planting at semi-monthly intervals were made from April 15 to June 15 inclusive. In 1931 seed from these different lots will again be planted on the above dates as stock for 1932 and there will also be planted in 1931 seed from these different lots at the time of setting out main crop potatoes, in order to determine if there is any difference in yield. (Project H. 161.)

SPINACH

DIFFERENT DATES OF SEEDING.—This project is being run to determine during what months of the year spinach can be planted to obtain satisfactory crops. This was the first year during the last five that this crop has been grown that satisfactory growth was not obtained. For 1930 there are consequently no results to report. (Project H. 668.)

TOMATOES

METHOD OF PRUNING.—This project is being run to determine whether earliness in fruit can be induced by different methods of pruning, with the number of trusses allowed to form as the limiting factor. After 1927 the system of pruning to one truss was discontinued as the yield from such plants was very small and the quality inferior due to sunscald. The evidence to date indicates that the total weight of marketable fruit has a direct bearing on the number of fruiting trusses. There is also evidence that plants pruned to three trusses give a greater total amount of earlier fruit than plants pruned to one and two stems and allowed to develop to a full height. There is little or no advantage for the first individual fruit ripening on any method of pruning, individual fruits ripening as early on two stems as on three truss plants; there is however from present records a greater total amount of early ripe fruit on plants with a limited number of fruiting spurs. The average season for commencement of ripening is the first week in August; during the following three or four weeks fruit ripens slowly and it is during this period that plants headed back gain on those otherwise treated. When the fruit commences to ripen more rapidly towards the end of August or early in September the plants not headed back outyield the others in proportion to the number of fruiting trusses.

The following table gives the result of four years' crops over five weekly intervals (approximately) and the total yield for the season:—

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 fruit
	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.
Pruned to 2 stems.	27 7	67 9	168 15	333 13	542 15	918 10	103 8	156 11
Pruned to 1 stem..	36 11	85 6	188 6	299 10	441 11	668 9	75 0	102 15
Pruned to 3 trusses	35 12	92 4	176 10	293 6	378 4	424 2	1 4	32 5
Pruned to 2 trusses	34 8	88 2	141 7	179 12	186 1	188 9	0 0	15 13
Headed back late.	23 7	60 10	118 13	196 9	347 17	528 1	0 0	53 1

The yields for the first four methods of pruning are totals of the last four years of work. The yield for the fifth method is the total yield for 1929 and 1930. Plots in 1930 were arranged in quadruplicate, each plot consisting of one row of ten plants for each method of pruning. (Project H. 207.)

FOUNDATION SEED STOCK

Progress is being made in this branch of the work but satisfactory results come slowly. The main requisites for foundation seed are, seed of high germinating quality which will produce high yields of uniform crops of an accepted standard. With other than very closely pollinated plants it is somewhat difficult to isolate plants which will breed true from all seeds of one plant.

Several strains of Daisy peas have been isolated from single plant selections. The progeny of these strains, while typical in general respects to the required standard, show considerable variation in height of plants indicating that the plant which produced the strain was not pure for this character. It is necessary therefore to make further selections in order to fix this character.

MASTERPIECE BEANS.—Five strains have been isolated from individual plant selections. In 1930 these five strains were tested for yield, three proving superior. In seed coat colouring a considerable amount of yellow is apparent, varying from only just apparent to solid yellow. The results of the test for yield would indicate that a high degree of yellowing is associated with decreased yield. Efforts will be made to prove or disprove this apparent behaviour and to isolate strains which are of a uniform appearance without yellow colouration.

CHINA ROSE RADISH.—Two distinct strains were evident in the plant selections of 1929. This distinction was not apparent until the seed stocks were well grown. The two different types are represented by a solid green stem and a red pigmented one. It will be necessary to isolate these variations.

SCARLET RUNNERS.—No outstanding strains have as yet been isolated. It is difficult to purify and keep pure strains of scarlet runners due to crossing by bumble bees.

VEGETABLE MARROW—LONG TRAILING GREEN.—Three different strains of commercial seed were grown during the past season. In all, fifty-four plants were allowed to develop fruit until the characters of each could be determined. There was only one plant of the fifty-four grown which produced fruit of the desired type. Several of these were hand pollenized; there undoubtedly will be a considerable amount of variation for several years to come.

CARROT, DANVER HALF LONG.—Nine strains of seed were planted from individual plant selections made in 1928. The method of producing seed was outlined in the 1929 report. Results on the whole were not satisfactory as the bulk of the crop was very rough, more so than the original source of seed. The best roots were selected for further seed production.

CABBAGE, COPENHAGEN MARKET.—Nine strains were planted from individual plant selections made in 1928. Seed from flowers which were either selfed or pollenized from the same plant gave satisfactory germination (see 1929 report). Forty-five heads out of a total population of three hundred were selected for seed production in 1931.

LETTUCE, NEW YORK.—Two strains of this variety were grown during the past season, each the progeny of an individual plant. Both gave indications of being superior to the average commercial strain. There is a slight difference between the two in the leaf shade of green and the date of head formation.

BEET, EARLY FLAT EGYPTIAN.—Three strains were grown from individual plant selections made in 1928. There was one markedly superior strain and from this the best roots were selected for seed production in 1931. (Project H. 652.)

PAPER MULCH

This experiment was carried out along similar lines as in 1929 but with some minor changes. The plots were in two ranges opposite one another and the different kinds of vegetables were opposite one another in both ranges so that a mulched and an unmulched row were adjacent in a range but opposite one another in different ranges. Rows were thirty feet long. This method of planting allows for two comparisons instead of one. Seeded crops were planted and the paper was then laid down on either side of the row. The adjacent edges were

held down with laths fastened with long staples; the outside edges were covered with earth. Transplanted crops were planted through holes in the centre of the paper and the edges held down with dirt. These methods proved satisfactory for the respective types of crops and no difficulty was experienced in holding the paper in place.

The results as compared to 1929 were somewhat similar. With beans two varieties, Round Pod Kidney Wax and Giant Stringless Green Pod—the results for yield and earliness were slightly in favour of mulched rows but the difference was of minor importance.

CABBAGE, GOLDEN ACRE.—There was a slight advantage in earliness and yield for mulched rows, though not as marked as in 1929.

CAULIFLOWER, SUPER SNOWBALL.—Both in 1929 and 1930 there was practically no evidence in favour of paper mulch.

Cucumbers—paper mulch on left, unmulched on right.

PEPPER, HARRIS EARLIEST.—There has been no evidence to date of any advantage for mulched rows.

CELERY, GOLDEN PLUME.—No conclusive evidence as to any benefit from mulching.

BEET, DETROIT DARK RED.—Indications are that mulched rows produce an earlier crop.

CORN, GOLDEN BANTAM.—There is evidence that slightly earlier and heavier crops are produced with paper mulch.

CUCUMBER, PERFECTION.—Cucumbers responded very favourably to the use of paper mulch. The total yield during 1929 and 1930 is unmulched rows 1,519 pounds, mulched rows 2,150 pounds.

LETTUCE.—There has been no evidence in favour of mulching.

MUSKMELON, HEARTS OF GOLD.—There has been a very marked response to the use of paper mulch, both in earliness and yield. Muskmelons and cucumbers are the two outstanding crops in this respect. The other crops with the exception of egg plants have benefited to only a very minor extent.

ONIONS, YELLOW GLOBE DANVERS.—There has been no significant difference in the respective treatments.

POTATOES.—Both early sprouted and main crop varieties have been tested. No beneficial results have been obtained.

TOMATOES, BONNY BEST.—There has been no advantage for tomatoes produced under paper mulch, plants have been pruned to two stems and staked.

SPINACH, KING OF DENMARK.—No significant difference has been obtained.

EGG PLANT, NEW YORK PURPLE.—The results have been favourable to the use of paper mulch.

This project will be continued until more conclusive evidence is available on the doubtful crops. (Project H. 685.)

CHEMICAL WEED KILLERS

An experiment was commenced this year to test the efficiency of chemical weed killers both in the form of commercial brands and pure chemicals. The materials used satisfactorily demonstrated that the green growth of couch or quack grass, Canada thistle, and lawn weeds such as dandelion and plantains were killed back. On the plots of Canada thistle and couch grass no crop was growing, therefore no consideration had to be given to other vegetative growth. On the lawn areas treated consideration had to be given to the turf and the chemicals applied in such doses that the weeds be killed and no damage caused to the grasses. A sufficient number of tests of different strength solutions were not carried out to satisfactorily determine this though it was apparent that broad leaved weeds are more susceptible than grasses. All weeds treated were perennials and the work of this year cannot be checked up until 1931, when it will be possible to determine whether the root systems of the plants were affected in proportion to the green vegetative growth. It will also be necessary to determine whether the chemicals applied will have any ill effects on future plant growth. (Project H. 698.)

SMALL FRUITS

The type and extent of work in small fruits has been considerably altered during the past year, certain projects have been discontinued and new ones substituted, this refers particularly to the discontinuance of variety testing of currants and blackberries and the commencement of new projects with raspberries, reference to which is made below.

BLACKBERRIES

During recent years two upright varieties of blackberries have been tested, Snyder and Erie. The Snyder has proven more satisfactory giving a higher yield and proving itself more resistant to cold. This project will be discontinued. (Project H. 2.)

CRANBERRIES

The three varieties planted in 1928 fruited for the first time in 1930. The growth and general vigour of the crop has so far been unsatisfactory and the yield of fruit this year was very small. It is hoped that applications of fertilizer will remedy this condition.

CURRANTS

During recent years the following varieties of red currants have been tested for yield:—Perfection, Wilder, Pomona, Cherry, and Fay Prolific. Perfection, Pomona, and Fay Prolific have proved satisfactory varieties, with the first two giving the highest yield. Pomona averaged the smallest sized fruit. Wilder and Cherry averaged considerably less yield than the others.

The following varieties of black currants have been tested:—Black Naples, Clipper, Boskoop Giant, Buddenborg, Kerry, and Victoria. Of these Kerry, Victoria, and Buddenborg averaged the highest yield, the other varieties giving considerably less. This project will be discontinued. (Project H. 4.)

GOOSEBERRIES

In 1929 four bushes of Spinefree and two bushes of Thornless gooseberries were planted to test their adaptability. These varieties are productions of the Central Experimental Farm. No fruit has been obtained up to the present time. (Project H. 6.)

RASPBERRIES

In small fruits at the present time raspberries are receiving more attention than the other kinds. A new area was planted out this spring on which the following projects will be commenced in 1931:—

Project H. 11.—Variety Testing.—During recent years only three varieties have been under test, Count, Viking, and Brighton and their yield and quality were compared to Cuthbert.

Count and Brighton are both a few days earlier than Cuthbert but the yield and quality of fruit is inferior. Viking has proved more satisfactory though present indications do not indicate it superior to Cuthbert. The canes are more upright and stronger, the fruit is of slightly less quality but there is not the variation in colour that is apparent in Cuthbert due to different degrees of maturity.

The new area planted out this spring has been laid out in four ranges, rows in each range are fifty feet long with twelve feet of headland between each range. In the variety test plot two fifty-foot rows of each of the following varieties were planted and were so arranged as to give as uniform distribution as possible:—Victory, Cuthbert, Viking, Count, Brighton, Herbert, Latham, St. Regis, Honey Sweet, Lloyd George, Flaming Giant, Newman, Newman 23, and Adams 87.

Project H. 642—Cover Crop Experiment.—The area for this experiment is divided into four ranges, rows fifty feet long. Each range is divided into six plots consisting of two adjacent rows, each plot is separated by a guard row. The different plots will receive the following treatments, seeding of crimson clover, vetch, and rye, an application of barnyard manure, a complete fertilizer and one plot clean cultivation, no cover crop or fertilizer. Each range is to be given the same treatment and the different plots are so arranged that they will be spread as uniformly as possible over the whole field giving four replications for each treatment.

Project H. 697. Hill System versus Hedge Row System.—The area for this experiment is divided into four ranges and each range consists of four rows. Each individual row to receive one or other treatment so arranged that the maximum distribution is obtained with eight replications.

Project H. 538. Different Methods of Pruning.—Methods of pruning as follows:—(1) canes headed back to three feet; (2) headed back to four feet; (3) headed back to five feet six inches; (4) not headed back and trained along the supporting wires. The area for this experiment is divided into four ranges,

each range consists of eight rows, individual rows to receive one method of pruning so that in each range the method of pruning is duplicated and throughout the field the plots so arranged that the maximum distribution is obtained, giving in all eight replications.

RASPBERRY CULTURAL PROBLEMS IN THE MISSION-HATZIC DISTRICT

During recent years in the Mission-Hatzic-Dewdney area there has been a marked decrease in production in many of the raspberry patches. In order to determine the underlying causes for this condition a survey of the district was made.

It is an established fact based on statistics supplied by the Horticultural Division of the Provincial Department of Agriculture that during the past ten years the yields from raspberry patches have decreased and due to this decreasing yield many growers have been forced to abandon the growing of this kind of small fruit. These statistics substantiate the claims of many growers, but when it is realized that there are farms which still produce satisfactory crops, the equal, according to some growers of any crops previously produced over a long period of years, it is readily determined that there is a condition or a combination of conditions which militate against the successful production of this cane fruit, but conditions which can under proper management be controlled.

In all fields of endeavour there is a considerable difference between the ability, enthusiasm, and temperament of different individuals engaged in the same line of production. The personal factor, or the managerial ability of different raspberry growers is not overlooked in this instance. Much of the difficulty encountered by some unsuccessful growers is no greater than that which successful operators have had to contend with. There is a vast difference in practically all respects of cultural attention of the highly efficient, the moderately efficient, and the inefficient grower. These three types of managers are put in the following classes: Those who have been successful and continue to be so; those who are marginal producers and still manage to hang on; and those growers who have been forced out of business. There are, needless to say, conditions on some properties which have made it difficult for any grower to succeed no matter what his ability, and there are also conditions on which the still successful grower needs information and experimental evidence, pertaining particularly to fertilization and cover cropping. The Dominion Experimental Farm at Agassiz hopes, within the next few years, to make available such necessary information as will enable the growers to carry on the production of raspberry growing with the maximum efficiency.

It is not intended here to enumerate what are considered good berry-growing practices but rather to point out where certain practices now in vogue are at fault, and to draw attention to certain prevalent diseases and insects on which there is already published information and to offer some suggestions. The following factors are considered of prime importance: Disease, insects and moles, soil fertility, cultural practices, winter injury, and managerial ability; the latter has already been referred to. It is believed that it is a combination of one or more of the above factors to which most of the trouble can be traced. The following remarks are based on observations made during the growing season of 1930; they are not based on experimental evidence—until such is available they are best interpreted as suggestions:—

Disease.—Diseases of various kinds play a large part in the production of practically all plant and animal life. Raspberries are subject to various kinds and the following were found to be most prevalent:—

Cane blight.
Anthracnose.
Rust.
Mosaic.

The above have all been previously reported and nothing new or unknown is being offered here. Control remedies for the majority have been established by plant pathologists. Those mentioned were found to be limiting factors in production. The same remarks apply to insects, and information on both subjects is available from the Dominion and Provincial Departments of Agriculture.

PROPAGATING MATERIAL.—Suitable propagating material from which to obtain young canes for new plantations requires careful attention and is particularly related to disease. Red raspberries are propagated from suckers, and therefore the normal expectation is that any named variety has not changed in any hereditary characteristics from the original parent. Prevalence of disease, however, and especially mosaic, has a direct bearing on the vigour and productiveness of each plant. It is therefore suggested that growers should obtain either by their own selection from a small nursery plantation or from some dependable source canes which have come from disease-free parents and from parent plants which have proved themselves to be vigorous growers and yielders of abundant crops of the right kind of fruit.

INSECTS.—There are mainly two insects which cause damage in our raspberry patches: the crown borer and the cane maggot.

It is not supposed that one or two crown borers will materially affect a strong healthy plant in one or two seasons. However, where the crown system is very definitely limited to a certain area by the annual removal of all other suckers, the effect of crown borers is cumulative over a period of years, with the result that the sap-conducting area of the main root is much weakened and frequently that upper part of the crown from which new canes normally arise has little but dead tissue due to the girdling of the caterpillars.

Strawberry root weevils when in sufficient number may cause injury by eating the young rootlets, but no case of severe injury has so far been noted.

Moles may be included in this group though they are not insects.

SOIL FERTILITY.—There is little experimental evidence to make definite recommendations as to the most suitable methods of soil treatment. Soils in a virgin state vary as to fertility in essential plant foods and mineral content and also in the amount of decayed vegetable matter or humus. As such varying circumstances are encountered no one particular recommendation would be applicable for all conditions. There is no doubt that virgin or uncropped soil is ordinarily richer in essential plant foods than soil which has been cropped for a number of years when no plant food has been returned. It is, therefore, a natural condition that many successive years of cropping such as is done with raspberries will eventually cause reduced vigour and vitality of bushes, which permits at the same time a lessened resistance to insects, diseases, and winter injury. Some system of soil replenishment must, therefore, be followed. Barnyard manure is recognized as being one of the most suitable materials for this purpose, but where not available some substitute must be found. Complete chemical fertilizers contain the three most essential plant foods: nitrogen, phosphoric acid, and potash. Formulas approximating 5-10-8 applied at the rate of 750 pounds per acre should prove beneficial. There is no experimental evidence to show whether nitrogen or phosphoric acid from an organic source is more suitable than that obtained from an inorganic source. Potash, in the so-called complete organic fertilizers, is essentially the same as that in the inorganic fertilizers. Such materials do not in any way restore humus to the soil and provision must be made for this. During the years in which raspberry plants are occupying the ground some system of cover cropping should prove beneficial, though there is little evidence of such a nature. Suggested crops are spring vetch and fall rye or a combination of both. When careful ploughing

can be done these crops can be turned down in August and May respectively and reseeding done shortly after. Disking with one-horse disks should also prove satisfactory. Many growers of raspberries are also poultry producers, and consequently have supplies of chicken manure. There is some prejudice against this kind of manure, but if applied early in February at the rate of one-third to one-quarter of ordinary barnyard manure it should prove beneficial, particularly in adding nitrogen.

Cultural Practices.—Amongst the majority of raspberry growers there is not much variation in the methods used in producing crops. The hill row system is generally followed in laying out the field. Ploughing, horse cultivation, and hand hoeing of the rows are usual practices. Certain recommendations are, however, pertainable to these conditions. Ploughing, where carefully done, can safely be recommended. There are, however, many instances where the plough is run too closely to the row and at such a depth that many of the feeding roots and rootlets are cut off; the same can be said for cultivation with horse drawn implements. Examination will readily show the injury that is done. Too frequently also deep ploughing is done throwing the soil towards the row and where during the season of hand hoeing sufficient of this soil is not pulled away, the rows in a few years become elevated above the average level thus exposing a greater surface for evaporation and also causing a draining away of moisture from the root system. Level cultivation is strongly recommended. Ploughing, especially those furrows close to the row, must be shallow.

The system of confining the crowns of plants to a definite hill by hoeing away and cutting out all suckers which spring up along the row is in some cases too rigidly followed. Such a system undoubtedly facilitates weeding, pruning, and harvesting; on the other hand however it does not permit of any renewal system of crowns which is desirable particularly where crown borer is present and where some other form of injury prevents the crown from being vigorous. During the early years of the patch the definite hill system is desirable and as long as the crowns are producing a sufficient number of strong canes this method of pruning and hoeing is satisfactory. On the other hand where crown borers are present to any great extent or where crowns are no longer producing satisfactorily, a renewing of the crowns by the sucker method is to be recommended; this can be accomplished by allowing a strong sucker to grow up which will permit in two years that the original crown be removed. The result of this method will be a renewal of crowns on a staggered hill system.

It cannot be stated with any definiteness what is the normal period of productiveness of a raspberry patch. Some patches produce satisfactorily over long periods of years, while others produce good crops for a much shorter period, approximately six to ten years. It is safe to say that under most conditions, when a marked decrease in yield has become apparent, that the patch should be taken out as experience of many growers proves that it is not profitable to try to re-establish an unthrifty lot of plants. Conditions on individual patches indicate when the time for renewal has come, so it is not practical to recommend a rotation period. Nevertheless, soil conditions in the majority of cases indicate that when raspberries have occupied the ground for a number of years the land should be given a change, a rest and a feeding. It is recommended, therefore, that the average farm be divided into sections and that when one section requires renewal the plants be taken out as soon after the harvest as possible; that the land be thoroughly cultivated to remove perennial weeds, and that in the early fall or immediately after the last cultivation fall rye be sown. The following spring this crop should be ploughed down and clover sown; this should be allowed to grow for two summers and ploughed down the second fall after taking out the old crowns. The next spring the field should once again be ready for berries.

Where acreage is limited such an unproductive area of land is a handicap; on many of the larger farms the reduced producing area is not as important a factor.

When a new plantation is set out the next care after attending to soil conditions is suitable stock. That the best roots obtainable be got is most important. The disease which to the average grower is most hidden is possibly the most important, namely, mosaic, to which reference has been made elsewhere. Good healthy stock should be grown on each farm or obtained from reliable sources. A small isolated home nursery can be kept where plants can be carefully watched for signs of disease, yield, and type characteristics. The sooner disease free material is available for growing the better will be the yields obtained. If the rotation methods mentioned elsewhere are carried out, each grower should be prepared to replant new areas with stock of proven quality.

Within the young plantation close attention should be paid to all plants which do not appear to be healthy or vigorous, abnormal inferiorities should be rogued out.

Winter Injury.—There is reason to believe that during recent winters there has been more injury than was previously the case. The chief reason for this would appear to be due to the fact that as the Mission-Hatzic district has become more densely settled much native timber and other growth has been cleared away. This condition permits the cold dry winds of winter to sweep unchecked over many parts of the district with much greater force than was formerly the case; the consequence is that without more degrees of frost there is a greater amount of injury than during the early years of raspberry production. A weakened condition of plants due to insects, disease, and lack of soil fertility are other factors which increase winter injury. Winter injury of canes manifests itself by certain buds not coming into leaf in the spring. Wind injury can to a certain extent be lessened by planting tree windbreaks. It is claimed that every foot in height of windbreak offers ground protection for twenty-five to fifty feet. In other words, a ten-foot windbreak will offer ground protection for 250 to 500 feet. Another type of injury appears to be one in which the basal buds fail to open in the spring. Observations on this condition are being made. It manifests itself in the patch by the leggy appearance of canes, there being few or no laterals on the lower 18 or 24 inches of the canes. In some cases these lower buds will give a late growth with fairly good laterals well filled with berries. It is generally accepted that any companion crop such as fall rye will use up a considerable amount of moisture and thus retard late growth. Other preventions for winter injury are to discontinue cultivation after August 15 and plant fall rye immediately after the last cultivation. Winter injury is also aggravated by late cultivation and a late application of fertilizers and nitrogenous manures.

New Varieties.—There is little evidence available for British Columbia conditions as to the commercial value of new varieties. One of the most promising kinds, however, is the Viking. In Ontario it is claimed for this variety that it yields well, that the fruit ships well, stands up well in canning and that plants are hardier and more resistant to mosaic than many other varieties. The Viking and other new productions have largely displaced the Cuthbert, which was not sufficiently hardy for Ontario conditions. This variety has fruited on the Agassiz Experimental Farm during the past four years and appears nearly equal to Cuthbert, though no shipping and canning tests have been made. On the Experimental Farm the Cuthbert has always proved satisfactory. The canes of Viking are more upright than those of the Cuthbert, the fruit is of equal quality according to many palates and is of a bright red colour, which is not as variable as Cuthbert in different stages of maturity.

Conclusions.—So far as one year's observations permit there is no one factor which can be stated as a general rule to be responsible for decreased rasp-

berry yields. The raspberry is a heavy producer, producing from a good patch a weight of berries equal to the average hay crop; over and above this yield there is the production of canes and foliage. Such a heavy annual growth demands that manure and fertilizer must be returned in liberal quantities.

The cultural practices must be vigorous and intensive and accompanied by keen observation to detect the presence of insects and diseases so that poor and infected plants can be rogued out.

The material for new plantings should come from patches which are known to be free from disease, and which are known to produce good crops of berries.

There are at the present time many patches which are producing as good crops as have ever been obtained. It is safe to say that under good management and careful supervision these conditions will continue to prevail.

There are problems in raspberry production which require experimental evidence. One of the most important of these is that of maintaining or increasing soil fertility. The Experimental Farm at Agassiz is undertaking some of those lines of work on which information is required.

SUMMARY.—Decreased yields from raspberry patches have been found to be due to several causes, the most important of which are:—

1. Poor management where the farm owner devotes only a part of his time to fruit production or makes it a secondary consideration.

2. The presence of diseases, of which cane blight and mosaic are the most important.

3. The presence of insects and animals of which crown borers and moles are the most important.

4. A depletion or lack of soil fertility.

5. Winter injury caused chiefly by the removal of virgin timber and underbrush.

6. Poor cultural practices.

The following bulletins deal with some of the phases of raspberry production mentioned in this article:—

Dominion Department of Agriculture Publications:—

The Raspberry and its Cultivation in Canada.....M. B. Davis.
Mosaic and Leaf Curl of the Cultivated Red Raspberry.....J. F. Hockley.
Two Insects Affecting Cane Fruits in British Columbia....W. Downes and R. Glendenning.
Trapping Moles.....J. J. Woods.

B.C. Department of Agriculture Publications:—

Raspberry Culture.....K. W. Munson, E. W. White.
Diseases and Pests of Cultivated Plants....J. W. Eastham, M. H. Rhuman, B. Hoy.

ACKNOWLEDGEMENT.—The writer is indebted for the co-operation and friendly helpful advice given by many of the growers in the Mission-Hatzic district who gave freely of experiences gained during the past thirty years. He wishes particularly to mention Messrs. T. Thompson, A. E. Dann, A. S. Henry, W. Manson, T. Northcote, T. Van Velzen, and A. Ketchinson.

TREE FRUITS

The yield of tree fruits averaged a small crop during the past year. The King apple trees, however, bore the heaviest crop that has so far been obtained. The Melba trees yielded a small crop for the first time. The trees are seven years old. Burbank and Damson plums were the best yielders of plums, and Montmorency cherries yielded well. The pear crop was very light. Bosc and Boussock were the best varieties. Dates of spraying for apple scab were determined by the date of emergence of the spores of this disease from leaves of the previous year's crop. A wire screen of approximately one inch mesh was placed over some leaves. Microscope slides smeared with vaseline were laid on the wire, smeared side down. Daily examinations of the slides were made under the microscope to determine if any spores had emerged. The first ones were detected on April 15. Scab control sprays were applied on April 16, April 25, and May 7. Although there was a comparatively small amount of fruit in the orchard on which to check up scab infestation and no check trees were used, control of this disease appeared satisfactory with the above measures.

Climatic conditions are the factors which chiefly influence the date of scab infestation, particularly moisture and temperature. These variable conditions determine the date of spore emergence. For adequate control a cover spray should be applied previous to spore emergence, subsequent sprays depending on growth conditions. The first spray should be applied when the leaves are about the size of a ten cent piece and, as leaf growth increases, additional sprays should be applied. In some seasons it would be advisable to apply two sprays before the pink blossom stage depending on the amount of leaf growth, a spray during the pink stage and a spray immediately after the blossoms have fallen and one later spray. The main essential is to have a covering spray on all new leaf and fruit growth.

Several trees were removed from the orchard during the year. Three Northern Spy apples were taken out. These trees had been planted in 1913 and this was the only variety which had had no trees killed by anthracnose. The King variety has proved to be the next most resistant to this disease. The following kinds of plums were removed: Peach plum, Yellow Egg, and Ponds Seedling. The Peach plum has been the earliest variety to mature of those tested. The fruit is of good quality and size but subject to brown rot and trees are not heavy yielders. The Yellow Egg and Ponds Seedling are both high yielding kinds but the fruit is very subject to brown rot and spotting and is ordinarily, therefore, unmarketable. One tree of Belle Magnifique cherries died from collar rot. This has been the latest maturing cherry. The fruit is tart but of good quality, and the tree growth is about one-third the size of Bing. The sweet cherry trees have all attained considerable size since planted in 1913 and are now crowding an adjacent row of plums. There is also an apparent deficiency in pollination and for this reason a new row will be planted out. In order to do this it has been necessary to remove three trees of Olivet, three of Morello, and three of Windsor.

Three trees of Marguerite Marilat pears were planted to fill up the space made vacant by the removal of three trees of Easter Beurre in 1929. The orchard was again grown in a cover crop of red clover.

NUTS

Three trees of Gosford filberts were planted in the early spring. During 1931 it is intended to increase the area and the number of varieties of this kind of nut in order to obtain more detailed records of their performance.

ORNAMENTALS

In the spring two new hedges were added to the collection, one of English laurel and one *Berberis thunbergi*. The *Deutzia crenata* and caragana hedges had become very ragged so each was cut down to within six inches of the ground in the early spring. They both made vigorous new growth and during the growing season attained a height of three feet.

During the year several trees were removed from the lawns as they were crowding other more valuable specimens or were themselves in very poor condition. The following is a list of those removed: Sycamore maple, Nordmann fir, European ash in poor condition, European larch in poor condition and crowding a planetree. Two large branches had to be cut from a Spanish chestnut due to infection from blight. In the fall of the year the following trees were removed: one Laburnum, American Mountain ash in very poor condition, Cut Leaved beach, *Viburnum lentago*, Booth arborvitae and one Scotch pine.

The following variety testing projects were discontinued: H. 263 Asters, H. 380 Antirrhinums, and H. 272 Gladiolus.

Asters in this district are very subject to wilt and during some seasons the ravages of this disease were almost one hundred per cent, infestation occurring chiefly at blossom time. It is advisable to change the area of planting from year to year. Plants started in the open are not as susceptible to this disease and in this district seeding in the open is satisfactory. Plants seed freely and in the spring many volunteer seedlings are obtained. Some of the best varieties tested are Snow White, Southcote Beauty, Lavender, Rochester Purple, Autumn Glory, King of the Belgians, Peerless Pink, and Rochester White.

Numerous varieties of antirrhinums have been tested. These plants succeed well under local conditions but to obtain the best results they should be planted under glass in March or early April. In mild seasons or in protected places they can be treated as perennials but such plants are more subject to rust than when treated as annuals. Abundant seed is produced annually and in the spring many volunteer seedlings can be obtained. Some of the best varieties have been Fire King, Rosy Queen, Victory, and Deep Crimson.

The number of varieties of gladioli tested has not been extensive when the total number of varieties that are available to-day are considered. Some difficulty has been experienced in producing and keeping first class corms due most likely to the fact that the ornamental section of the garden is composed of rather light, silty loam and no water is available during the dry summer months. Some of the more satisfactory varieties have been Jack London, E. J. Shaylor, Halley, Messenger, Baron Hulot, Mary Pickford, War, and White Giant.

CEREALS

LAND AND TREATMENT

The land on which the cereal plots were located had been in sod the previous season and was in pretty good heart in consequence of which yields were very satisfactory.

Before sowing, all cereal grains which were likely to be benefited by treatment, were treated with formalin as a smut preventive. Seeding commenced on April 29 and harvesting of barley on July 31.

OATS—VARIETIES OR STRAINS

Fifteen 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 being discarded. Yields were taken from the foregoing while a fifth group was grown and harvested for seed purposes only.

The results shown as follows are the average of four plots:—

OATS—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.
Abundance (U.B.C.)	114	53	7	3,250	37
Banner (Ott. 49)	114	54	8	3,490	37
Columbian (Ott. 78)	112	54	8	2,960	38
Conqueror (U.B.C.)	112	58	8	3,610	36
Crown (U.B.C.)	112	57	8	3,570	38
Gold Rain (Swedish)	107	55	8	3,440	42
Gopher	101	44	7	3,000	41
Ligowo (U.B.C.)	107	51	8	3,290	37
Longfellow (Ott. 478)	111	54	8	2,950	37
Prolific	111	55	8	3,710	38
Star (Swedish)	111	52	8	3,760	38
Victory	111	54	8	3,690	38
White Cross	102	49	7	2,960	37
1006-32	106	52	8	2,910	42
1006-115	106	53	8	3,050	40

OATS—RESULTS OF TEST OF VARIETIES OR STRAINS

Five-Year Average 1926-30

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.
Banner (Ott. 49)	107	46	8	2,973	35
Columbian (Ott. 78)	107	47	8	2,832	35
Gold Rain (Swedish)	106	49	8	2,978	40
Longfellow (Ott. 478)	106	49	8	2,473	36
Prolific (Ott. 77)	108	49	9	3,204	39
Victory	108	49	9	3,272	38

From the foregoing figures it will be observed that Victory still maintains its position as an oat of first importance in this section of the country.

OAT VARIETY CLASSIFICATION

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

BARLEY—VARIETIES OR STRAINS

Twelve varieties of barley were sown on April 30 under the same conditions as the oats.

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.
Bearer (6)	100	48	7	3,140	45
Charlottetown 80 (2)	101	46	7	2,380	50
Chinese (6)	98	47	8	2,760	46
Early Chevalier (2)	96	48	8	2,690	53
Gold (2)	101	42	7	2,580	52
Himalayan (hulless) (6)	94	38	8	2,290	64
O.A.C. 21 (6)	98	42	8	3,240	54
Plumage Archer	103	38	8	2,000	50
Star (6)	96	39	7	3,350	50
Success (awnless)	92	40	7	2,590	45
Trebi (6)	98	36	8	3,340	46
Velvet	101	48	8	3,520	47

BARLEY—RESULTS OF TEST OF VARIETIES OR STRAINS

Five-Year Average 1926–30

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.
Bearer (6)	98	51	7	2,926	46
Charlottetown (80) (2)	99	47	7	2,626	53
Chinese (6)	94	46	8	2,819	47
Early Chevalier (2)	94	49	8	2,632	52
Gold (2)	99	45	8	2,661	53
Himalayan (hulless) (6)	93	30	8	2,480	63
O.A.C. 21 (6)	97	48	8	3,045	50
Success (awnless)	90	40	7	2,633	46

It will be observed from the foregoing table that O.A.C. 21 takes first place.

SPRING WHEAT

After many years' tests with varieties of spring wheat conclusions have been arrived at that local conditions are unfavourable for the growing of this crop, not only from the standpoint of climate but also as a result of destruction caused by the wheat midge. Consequently the testing of spring wheat has been discontinued.

FALL WHEAT

The testing of varieties of winter wheat has been commenced here for the first time, this past fall eleven varieties having been sown.

INFLUENCE OF ENVIRONMENT INVESTIGATION

In conjunction with the cereal plots one plot of Marquis wheat was sown for the Chemistry Division. As usual the yield per acre was extremely low.

PEAS—VARIETIES OR STRAINS

Six varieties of field peas were tested. Yields were only fair.

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	93	48	5	1,300	61
Chancellor	93	40	4½	1,010	62
Early Blue	93	41	5	1,540	60
Early Raymond	93	49	5	1,770	61
O.A.C. 181	93	54	4½	1,440	62
Stirling	93	48	6	1,130	61

PEAS—RESULTS OF TEST OF VARIETIES OR STRAINS, FIVE-YEAR AVERAGE, 1926-30

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	1,395	62
Chancellor	94	47	3	1,707	63

HIGH PROTEIN MIXTURES

An experiment was commenced in sowing mixtures of oats and peas, the objective being to produce a combination capable of being harvested with the binder and which will produce the maximum amount of protein per acre. Gold Rain oats were sown at the rate of one bushel per acre plus Chancellor peas at the rate of one and a quarter bushels per acre; Star oats at one bushel per acre plus O.A.C. 181 peas at one and a quarter bushels per acre.

The following table gives the total yield of grain per acre in each case:—

HIGH PROTEIN MIXTURES—PEAS AND OATS

Varieties	Yield of grain per acre
	lb.
Chancellor peas and Gold Rain oats	3,170
O.A.C. 181 peas and Star Oats	3,320

As the foregoing plots were sown in rod-rows it is rather difficult to arrive at a satisfactory interpretation of results. After various desirable mixtures suggest themselves by methods of comparison such as the foregoing, larger areas will be utilized so that actual harvesting with the binder may be given trial. In a dairying district such as the Fraser Valley it would seem well worth while to stress such crops as yield the highest digestible nutrients per acre with emphasis particularly on protein.

FORAGE CROPS

Weather conditions during the season of 1930 were not so favourable to the growth of forage crops as were those of the previous season and consequently yields were lower on an average. Furthermore, clovers and grasses had been previously affected by a somewhat severe winter. Variety tests were carried on with corn, mangels, carrots, sugar beets, millets as annual hays, clovers and grasses alone and in combination, while comparative tests were also made with miscellaneous perennial grasses and legumes. 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 that already seeded down to grasses and clovers, had been ploughed the previous fall, reploughed in the spring and well worked. 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 five varieties, was sown three feet apart each way. This crop met with adverse growing conditions from the time the seed was sown until right through the month of June. The crows were especially vigorous in devouring the sprouting corn and as a result of this, coupled with cool wet weather delaying germination and retarding growth, the results were below average in most cases.

The following table gives, in order of yield per acre dry weight, the results of corn varieties tested (Project Ag. 1):—

CORN—RESULTS OF TEST OF VARIETIES

Name of variety	Yield per acre, green weight		Yield per acre, dry matter	
	tons	lb.	tons	lb.
Northwestern Dent	14	1,771	3	567
Golden Glow	14	452	2	1,918
Wisconsin No. 7	10	1,559	2	42
Minnesota 13	8	1,305	1	1,786
Longfellow	9	625	1	1,499

CORN—RESULTS OF TEST OF VARIETIES, FIVE-YEAR AVERAGE, 1926-1930

Name of variety	Yield per acre, green weight		Yield per acre, dry matter	
	tons	lb.	tons	lb.
Northwestern Dent	10	1,879	2	1,337
Golden Glow	11	1,440	2	656
Longfellow	11	1,892	2	5
Wisconsin No. 7	12	530	1	1,899

After many years' tests of a great number of varieties results show that Northwestern Dent, Golden Glow and Longfellow form a desirable combination for ensilage in this district.

MANGELS

Eight varieties of mangels were sown on May 9 and harvested on November 5. Despite a considerable spell of dry weather in August, when the growth of all root crops was practically at a standstill, there was sufficient moisture later in the fall to add new life as a result of which yields were very satisfactory. (Project Ag. 16.)

MANGELS—RESULTS OF TEST OF VARIETIES

Name of variety	Yield per acre, green weight		Yield per acre, dry matter	
	tons	lb.	tons	lb.
Yellow Intermediate (C.E.F.)	29	1,044	2	1,697
Danish Sludstrup (Steeves)	30	900	2	1,540
Giant White Feeding Sugar	30	1,306	2	1,529
Ferritslev Barres	31	1,336	2	1,440
Giant Yellow Half-Long Intermediate	32	380	2	1,279
Giant Yellow Globe	31		2	550
Yellow Eckendorfer	29	1,276	2	538
Danish Sludstrup (McDonald)	26	954	2	220

MANGELS—RESULTS OF TEST OF VARIETIES, FIVE-YEAR AVERAGE, 1926-30

Name of variety	Yield per acre, green weight		Yield per acre, dry matter	
	tons	lb.	tons	lb.
Giant Yellow Half-Long Intermediate	30	810	2	1,390
Giant White Feeding Sugar	26	1,554	2	1,364
Yellow Intermediate (C.E.F.)	24	1,892	2	1,167
Danish Sludstrup (Steeves)	23	1,814	2	561
Ferritslev Barres	27	866	2	187
Giant Yellow Globe	26	736	2	89
Yellow Eckendorfer	24	473	2	66

Of the foregoing varieties the Yellow Intermediate stands in good favour under local conditions.

CARROTS

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

CARROTS—RESULTS OF TESTS OF VARIETIES

Name of variety	Yield per acre, green weight		Yield per acre, dry matter	
	tons	lb.	tons	lb.
Mammoth Short White	32	1,888	2	1,402
New Yellow Intermediate	24	1,996	2	649
Improved Intermediate White	25	460	1	1,547

CARROTS—RESULTS OF TEST OF VARIETIES, FIVE-YEAR AVERAGE, 1926-30

Name of variety	Yield per acre, green weight		Yield per acre, dry matter	
	tons	lb.	tons	lb.
Mammoth Short White	27	1,397	2	850
Improved Intermediate White	25	1,361	2	199
New Yellow Intermediate	24	104	1	907

Mammoth Short White or Improved Intermediate White can well be recommended for this locality.

SUGAR BEETS

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

SUGAR BEETS—RESULTS OF TEST OF VARIETIES

Name of variety	Yield per acre, green weight		Yield per acre, dry matter	
	tons	lb.	tons	lb.
Rabbethge and Giesecke	20	20	3	1,159
Fredericksen	18	1,468	3	939
Dippe	19	1,556	1	1,694

The following results were obtained on the examination of samples of sugar beets grown this past season at this farm:—

RESULTS OF ANALYSIS.

Name of variety	Sugar in juice	Coefficient of purity	Average weight of one root	
	p.c.	p.c.	lb.	oz.
Rabbethge and Giesecke	16·70	86·74	2	7
Fredericksen	16·49	85·88	2	9
Dippe	16·68	86·00	2	9

These beets were excellent as to size, shape, juiciness, and purity but the sugar content is decidedly low. The cool wet autumn preventing proper ripening and sugar formation was no doubt answerable for the results in respect to sugar content. Beets of first quality have been grown on this farm in many years in the past.

SUGAR BEETS—TEST OF VARIETIES—AVERAGING FROM TWO TO FIVE YEARS, 1927–30

Name of variety	Yield per acre, green weight		Yield per acre, dry matter	
	tons	lb.	tons	lb.
Rabbethge and Giesecke (2 years)	19	910	3	960
Fredericksen (3 years)	14	1,686	2	1,668
Dippe (5 years)	12	1,667	2	278

RESULTS OF ANALYSIS —1927–30

Name of variety	Sugar in juice	Coefficient of purity	Average weight of one root	
	p.c.	p.c.	lb.	oz.
Fredericksen	16·57	86·10	2	9
Dippe	16·30	85·30	1	5
Rabbethge and Giesecke	15·98	84·22	3	3

HAY MIXTURES

A series of crops 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 in 1929 and a third group in the spring of 1930. (Project Ag. 264.)

The experiment in each seeding comprises 4 ranges of 12 plots in a range; i.e., 48 plots in all. The following table gives the results of the second season's crop from the seeding of 1928, the results of the first season having been reported in this Report of 1929. The area comprising this particular section was ploughed under after one cutting.

GRASSES AND CLOVERS: ALONE AND IN COMBINATION—SECOND-YEAR CROP

	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	5	1,800	1	430	1	858
2	Red top—10 pounds per acre	6	300	1	1,760	2	423
3	Alsike—6 pounds per acre	0		0		0	
4	Perennial rye grass—14 pounds per acre	4	500	1	224	1	616
5	Italian rye grass—14 pounds per acre	1	1,600	0	966	0	1,135
6	Orchard grass—14 pounds per acre	3	100	1	13	1	368
7	Red clover 9, alsike clover 2, Italian rye 3, and orchard grass 3 pounds per acre	6	1,800	1	964	1	1,487
8	Red clover 6, alsike clover 2, Italian rye 3, and orchard grass 3 pounds per acre	7	1,200	2	423	2	1,203
9	Red clover 8, alsike clover 2, and red top 6 pounds per acre	9	200	2	1,190	3	105
10	Red clover 9, alsike clover 2, perennial rye 3, and Italian rye 3 pounds per acre	7	1,550	1	854	1	1,357
11	Red clover 9, alsike clover 2, perennial rye 3, and orchard grass 3 pounds per acre	6	1,200	2	176	2	907
12	Red clover 8, alsike clover 2, and orchard grass 6 pounds per acre	6	100	2	123	2	850

The following table gives the results of the first season's crop from the seeding of 1929:—

GRASSES AND CLOVERS: ALONE AND IN COMBINATION—FIRST-YEAR CROP

—	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	20	1,300	3	1,814	4	1,198
2	Red top—10 pounds per acre	5	1,900	2	345	2	1,111
3	Alsike clover—6 pounds per acre	9	1,700	1	1,420	2	23
4	Perennial rye grass—14 pounds per acre	4	100	1	325	1	735
5	Italian rye grass—14 pounds per acre	3	1,400	0	1,980	1	329
6	Orchard grass—14 pounds per acre	3	200	1	70	1	447
7	Red clover 9, alsike clover 2, Italian rye 3, and orchard grass 3 pounds per acre	18	1,800	3	1,759	4	1,128
8	Red clover 6, alsike clover 2, Italian rye 3, and orchard grass 3 pounds per acre	18	600	4	139	4	1,634
9	Red clover 8, alsike clover 2, and red top 6 pounds per acre	20	1,300	4	830	5	388
10	Red clover 9, alsike clover 2, perennial rye 3, and Italian rye 3 pounds per acre	19	1,600	4	41	4	1,460
11	Red clover 9, alsike clover 2, perennial rye 3, and orchard grass 3 pounds per acre	18	1,000	3	1,983	4	1,391
12	Red clover 8, alsike clover 2, and orchard grass 6 pounds per acre	17	900	3	1,161	4	953

At so early a stage of the above experiment no definite conclusions are made as yet. Certain features which suggested themselves last year are confirmed again this year. For example, the single grasses do not show to best advantage when grown alone. White Dutch clover obtrudes itself to a serious extent whether sown or not and it is especially vigorous where grasses have been sown singly.

Winter-killing had affected some of the grasses in rows whereas this was not quite so evident where these same grasses had been sown in $\frac{1}{100}$ acre plots. Bulbosa blue grass apparently will not succeed in the Agassiz district.

Owing to the fact of the area where the foregoing grasses were grown being reserved for another purpose this section was discarded, another group of similar grasses having been sown in a different location.

ANNUAL HAY CROPS

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

Weather conditions during the summer of 1930 were utterly unfavourable to the growth of millets. After many years' tests with millets as to their suitability for annual hays indications are that it is advisable to discontinue experimenting with such because weather conditions at Agassiz are not favourable to the growth of crops which have characteristics peculiar to dry-climate plants.

MISCELLANEOUS

Ten different perennial grasses were sown in replicated rows 30 inches apart in the spring of 1928. A like number were sown in 1929 and similarly in 1930. (Project Ag. 255.)

The following table gives the results from one cutting of the second-year crop:—

MISCELLANEOUS PERENNIAL GRASSES—SECOND-YEAR CROP

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	5	170	1	1,366	1	1,960
Italian rye grass	..	....	..	....	..	....
Perennial rye grass	..	....	..	....	..	....
Timothy (Boon)	3	1,779	1	453	1	886
Timothy (commercial)	5	1,413	1	1,388	1	1,986
Kentucky blue grass	3	328	1	218	1	609
Meadow fescue	7	125	2	932	2	1,802
Tall oat grass	5	735	1	1,296	1	1,877
Red top	5	170	1	1,406	2	....

The following table gives the results from one cutting only of the first season's crop from the seeding of 1929:—

MISCELLANEOUS PERENNIAL GRASSES—FIRST-YEAR CROP

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	6	640	2	134	2	863
Italian rye grass	..	....	..	....	..	....
Perennial rye grass	..	....	..	....	..	....
Timothy (Boon)	8	432	2	1,583	3	568
Timothy (Commercial)	5	1,060	1	1,628	2	268
Kentucky blue grass	1	1,950	0	1,430	0	1,682
Meadow fescue	7	694	2	703	2	1,533
Tall oat grass	5	1,376	1	1,454	2	69
Red top	9	12	3	806	4	....

MISCELLANEOUS LEGUMES

Eighteen varieties of legumes were sown in replicated rows in the spring of 1928, a similar group in 1929 and a third in 1930. (Project Ag. 256.)

The following table gives the results from one cutting of those from which a crop was harvested the second year:—

MISCELLANEOUS LEGUMES—SECOND-YEAR CROP

Name of variety	Yield per acre, green weight		Yield per acre, dry matter		Yield per acre, cured hay	
	tons	lb.	tons	lb.	tons	lb.
Alsike	2	520	0	935	0	1,100
Alfalfa (Grimm, not inoculated)	9	1,662	1	1,802	2	473
Alfalfa (Grimm), inoculated	7	125	1	1,140	1	1,694
Alfalfa (Baltic), inoculated	10	....	2	706	2	1,536
Alfalfa (Cossack) inoculated	9	63	2	516	2	1,313
Alfalfa (New Zealand), inoculated	8	837	2	98	2	821
Alfalfa (Medicago falcata), inoculated	6	995	1	1,147	1	1,702
Alfalfa (Ontario variegated), inoculated	6	1,447	1	1,243	1	1,815
Mammoth white clover	6	1,108	0	1,971	1	319

The following table gives the results from one cutting only of the first season's crop from the seeding of 1929:

MISCELLANEOUS LEGUMES, FIRST-YEAR CROP

Name of variety	Yield per acre, green weight		Yield per acre, dry matter		Yield per acre, cured hay	
	tons	lb.	tons	lb.	tons	lb.
Alsike	4	1,322	0	1,330	0	1,564
Red clover (Early Swedish)	4	1,322	0	1,920	1	253
Red clover (Late Swedish)	6	1,746	1	986	1	1,513
Red clover (Alta Swede)	9	969	2	353	2	1,121
Red clover (Kenora)	4	1,006	0	1,705	1	....
Red clover (St. Clet, Que.)	5	1,850	0	1,874	1	204
Red clover (New Zealand)	4	690	0	1,654	0	1,946
Alfalfa (Grimm, not inoculated)	4	1,480	1	471	1	907
Alfalfa (Grimm), inoculated	5	428	1	626	1	1,089
Alfalfa (Baltic), inoculated	6	798	1	785	1	276
Alfalfa (Cossack), inoculated	3	952	0	1,514	0	1,781
Alfalfa (New Zealand), inoculated	6	324	1	503	1	945
Alfalfa (Ontario variegated), inoculated	4	1,796	1	538	1	982
Alfalfa (Medicago falcata), inoculated	4	1,164	1	120	1	494
White sweet clover	6	640	1	295	1	700
Sweet clover (common yellow)	4	532	0	1,741	1	48
Wild White Dutch (Sutton's)	1	1,160	0	573	0	674
Mammoth white clover (Sutton's)	3	1,900	0	1,465	0	1,722

The effect of a rather severe winter on the alfalfa was watched closely and it is satisfactory to note that the crop seeded in 1928 and that seeded in 1929 both came through in good condition. As previously reported the plots (not inoculated) compared well with those inoculated.

MAMMOTH WHITE CLOVER INDICATES VALUABLE POSSIBILITIES

Owing to the fact of the area where the foregoing grasses were grown being reserved for another purpose this section was discarded, another group of similar legumes having been sown in a different location.

LAWN GRASS PLOTS

An area approximately sixty feet deep by one hundred and forty feet wide adjoining the apiary was seeded down with different grasses in order to determine their value for lawn purposes. Ten different kinds of grasses were sown in plots eleven feet wide and sixty feet deep and an eleventh plot was sown with a complete mixture of all the single plot varieties. The following notes indicate some of the characteristics of the various grasses:—

Agrostis tenuis.—Browntop or Rhode Island Bent. This grass formed a very satisfactory turf by July 19. It is one of the fine leaved grasses and for one year has proved satisfactory.

Festuca pratensis.—Meadow Fescue. The outstanding feature of this grass was its resistance to drought. During July and August when all other grasses were brown from burning Meadow Fescue retained a bright green colour. It is somewhat coarse and did not form a close compact turf.

Agrostis vulgaris.—Red Top. Red Top was the quickest grass to germinate. It made a satisfactory close turf of desirable texture, its chief disadvantage was an unattractive light brown colour during the summer and early fall.

Festuca rubra.—Chewing's Fescue. This was the slowest germinating of the different kinds tested. It formed a very desirable, compact, dark green turf of fine texture.

Lolium perenne.—Perennial Rye. Grows quickly, forms an open coarse turf similar to Meadow Fescue. By weight there was a uniform rate of seeding for all varieties. Results would indicate that these two grasses to form a compact turf would require double the weight of seed of the other kinds sown. Perennial Rye maintained a bright green colour throughout the summer and for the first half of winter, up to the time of writing. It was particularly outstanding in that the lawn mower which cut satisfactorily all the other plots made practically no impression on this variety.

Festuca duriuscula.—Hard Fescue. This variety was slow to germinate but formed during the summer a very satisfactory, fine leaved, compact turf of dark green colour.

Agrostis stolonifera.—Creeping Bent. This proved a very satisfactory variety forming a close, compact, fine leaved turf. It lacks somewhat in colour, having a tendency to turn brown in summer heat, otherwise very desirable.

Poa trivialis.—Rough Stalked Meadow Grass. This variety did not make a satisfactory turf during the growing season. The foliage is of medium coarse texture; the turf was patchy, open, and lacking in colour.

Cynosurus cristatus—Crested Dogstail. This variety made quick growth, texture medium coarse and turf somewhat open.

Poa pratensis—Kentucky Blue. It is recognized that Kentucky Blue is a slow grass to become established. It made the poorest turf of the different kinds sown, *Poa trivialis* was next. Weeds grew very profusely in this plot and had a tendency to choke out the young grass with the result that there was practically no turf at the end of the growing season.

The plot containing all the above grasses proved very satisfactory forming a dense turf of desirable texture and colour. This mixture, Rhode Island Bent, Chewing's Fescue, Hard Fescue, and Creeping Bent all gave a satisfactory compact turf. Meadow Fescue and Perennial Rye had the best colour during the summer. In establishing a lawn it is desirable to plant grasses which give in as short a time as possible a dense turf as this is an aid in keeping down weed growth. (Project Ag. 251.)

TOBACCO

Variety testing of tobacco was discontinued this year as it had been satisfactorily established that the Burley types were the most suitable for the district. A new experiment was commenced to determine the effect on quality and yield of different heights of topping and different number of times of suckering after topping. The different topping heights have been termed medium and low; in the former case fifteen leaves are left on each plant and in the latter case twelve leaves are left on each plant. Three different methods of suckering were adopted, namely, plots suckered once, the day before harvesting; plots suckered twice, one week after topping and one day before harvesting; plots suckered weekly after the date of topping and one day before harvesting. Plots were arranged in duplicate and each plot consisted of two thirty-foot rows. The young plants were set out in the field on June 2, topped on August 19, and August 27, harvested September 19 and leaves stripped from the stems on December 17.

The quality of the tobacco is analyzed at the Central Farm, Ottawa. The results are not available at the time of writing but will be included in next year's report.

FERTILIZERS

A series of experiments was commenced in the spring of 1930 to compare the value of various commercial fertilizers: (1) to obtain data with respect to the value of ammonium phosphate as a combined nitrogenous and phosphatic fertilizer (project C. 167); (2) to obtain data with respect to the relative value of nitrate of soda and sulphate of ammonia as sources of nitrogen for the mangel crop (project C. 193); (3) to obtain data with respect to the value of nitrophoska as a fertilizer for the mangel crop in a rotation of mangels, oats and clover hay (project C. 194); (4) to obtain data with respect to the relative values of various phosphatic fertilizers and to obtain data with respect to the plant food requirements of the soil (project C. 195).

The following table gives the results for the first season:—

Results of Fertilizer Experiments with Mangels

Plot No.	Treatment in pounds per acre	Yield per acre	
		tons	lb.
6	Nitrate of soda (15½% N) 200; triple superphosphate (Trail 40% P_2O_5) 200; muriate of potash (50% K_2O) 100	28	240
5	Nitrate of soda (15½% N.) 200; superphosphate (16% P_2O_5) 500; muriate of potash (50% K_2O) 100	26	80
8	Nitrate of soda (15½% N) 200; superphosphate (16% P_2O_5) 500	24	1,920
3	Sulphate of ammonia (21% N) 150; superphosphate (16% P_2O_5) 500; muriate of potash (50% K_2O) 100	23	1,840
1	Ammonium phosphate (Trail 9·2% N and 44% P_2O_5) 182; muriate of potash (50% K_2O) 100	22	1,760
7	Nitrate of soda (15½% N) 200; basic slag (16% P_2O_5) 500; muriate of potash (50% K_2O) 100	22	1,120
10	Superphosphate (16% P_2O_5) 500; muriate of potash (50% K_2O) 100	22	240
9	Nitrate of soda (15½% N) 200; muriate of potash (50% K_2O) 100	22	....
2	Sulphate of ammonia (21% N) 80; superphosphate (16% P_2O_5) 500; muriate of potash (50% K_2O) 100	21	1,760
4	No fertilizer	21	800
11	Nitrophoska (15–30–15)	16	1,840

It is premature to come to any conclusions as far as the foregoing results are concerned. After a definite rotation has been established when the mangel crop will follow the year of hay more reliable comparisons can be made. Con-

trary to previous experience at this Farm, the plots which received no fertilizer gave fairly satisfactory yields. This fact suggests that the results of this experiment should be considered as preliminary in the first year.

POULTRY

The Farm flock consisting entirely of Barred Plymouth Rocks, totalled on December 31, 1930, five hundred and forty-six birds consisting of 81 males, 178 hens and 287 pullets. Thirty-six settings or 540 eggs were sold for hatching purposes. Two hundred and ninety-three pullets were sold in the fall and 88 hens and 38 cockerels were sold for breeding purposes.

INCUBATION

The following summary shows the 1930 hatching results:—

Total eggs set	3,199
Number fertile	2,747
Per cent fertile	85.87
Number of chicks	1,432
Per cent total eggs hatched	44.76
Per cent fertile eggs hatched	52.13
Number of chicks alive when wing-banded	1,312
Per cent chicks hatched alive when wing-banded	91.62
Total eggs required for one chick hatched	2.2
Total fertile eggs for one chick hatched	1.9
Total eggs required for one chick when wing-banded	2.4

BACILLUS PULLORUM

(Project P. 191)

In February, 1930, one hundred and fourteen hens were subjected to the blood test for bacillus pullorum and of these, seven reacted. Of 147 tested in November of the same year, twelve reacted. The reactors were slaughtered in both cases.

LONG-DISTANCE LAYERS

The following table gives some very interesting figures in relation to records made by long-distance layers in the farm flock of Barred Plymouth Rocks with records ranging from two to five years and the respective average egg weights in each case. All the sixteen birds here referred to laid 170 eggs or more in their second year.

RECORDS OF LONG-DISTANCE LAYERS

Hen	1st year	2nd year	Average egg weight per dozen
	eggs	eggs	oz.
J 31	291	218	21
VC 294	288	209	25
M 187	287	236	26
M 211	245	220	25
M 278	230	188	24
M 300	233	184	24
L 27	271	188	22
AF 399	288	176	23
M 311	239	171	26
M 76	269	177	26
M 256	237	173	24
M 244	243	170	27
VF 227	232	183	24
M 58	257	173	21
L 90	243	170	24
M 4	200	170	24

J 31 laid a total of 1,076 eggs in five years.
VC 294 laid a total of 935 eggs in five years.

It will be noted that the first bird on the foregoing list (J 31) was a very consistent layer for five years, but her eggs have been small. This bird, however, mated to a sire of a large-size egg strain produced daughters over 50 per cent of which laid eggs averaging 24 ounces and over to the dozen, with a production which was also good. The male used was from a dam which laid 321 eggs averaging 26 ounces to the dozen.

The following list gives the records of the daughters referred to, one of whom died at 9 months of laying with a record of 244 eggs averaging 24·5 ounces to the dozen:—

DAUGHTERS OF J-31

Eggs	Average egg weight per dozen	Eggs	Average egg weight per dozen
196	24.5	201	24.0
213	24.0	240	24.5
244	24.5	244	24.5
(Died at 9 months of laying)		236	25.0
186	24.0	220	25.0
245	24.5	211	24.5
249	24.5	175	25.0

The foregoing tables offer a very interesting study not only of J 31, but of the possibilities in pedigree breeding as a whole.

FEEDING LAYING PULLETS

A series of feeding experiments was conducted from November 1, 1929, to August 31, 1930. Seven pens were included consisting of 130 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 cornmeal, 100 crushed oats, 60 beef scrap, 20 oilmeal, 10 bonemeal, 10 charcoal; scratch grain consisted by weight of equal parts wheat, oats and cracked corn and 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 $2.20; mash, $2.27; green feed, 25 cents; shell $1.50.

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

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

Prices per 100 pounds: grain $2.20; mash $2.04; skim-milk 25 cents; green feed 25 cents; shell $1.50.

(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 being the same in each case; viz., 12 per cent.

Prices per 100 pounds: grain $2.20; mash $2.25; green feed 25 cents; shell $1.50.

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

This lot was cared for 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 $2.20; mash $2.26; green feed 25 cents; shell $1.50.

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

The grain (standard) was composed by weight of 100 parts bran, 100 shorts, 100 cornmeal, 100 crushed oats, 35 beef scrap, 35 fish meal, 10 bonemeal, 10 charcoal, 5 oilmeal, 5 salt.

Prices per 100 pounds: grain $2.20; mash $2.20; skim-milk 25 cents; green feed 25 cents; shell $1.50.

(6) Project P. 107-A—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.

(7) Project P. 107-A—Grain in hopper versus grain in litter.

This group differed from the latter two only in that grain was fed in litter in morning and in a trough at night.

EXPERIMENTS IN FEEDING—RESULTS FROM LAYING PERIOD NOVEMBER 1, 1929, TO AUGUST 31, 1930

Group	Number of birds per pen	Eggs per bird	Value of eggs per bird	Cost of feed per bird	Profit over cost of feed per bird	Mortality—per pen
			$	$	$	
1. Basal ration with beef scrap; no skim-milk	10	177	4 87	2 15	2 72	0
2. Basal ration without beef scrap; skim-milk fed	10	138	3 80	1 96	1 84	1
3. Basal ration using fish meal instead of beef scrap; no skim-milk	10	92	2 53	1 80	0 73	6
4. Basal ration with 6 per cent each of beef scrap and fish meal; no skim-milk	10	185	5 08	2 08	3 00	1
5. Basal ration—grain in litter	30	165	4 55	2 04	2 51	3
6. Basal ration—grain in hopper	30	171	4 70	2 03	2 67	2
7. Basal ration—grain in trough at night	30	167	4 59	2 07	2 52	2

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 is in keeping with last year's results and would suggest that where a good brand of fish meal is procurable a combination of beef scrap and fish meal has its place.

Beef scrap group (No. 1) followed second. The lots so fed are always well to the front.

The groups fed grain in hopper, grain in trough at night and grain in litter followed in the order named.

The birds fed skim-milk did not give results according to previous experience at this farm. This is unaccountable unless due to the individuality of the particular birds concerned.

The lot fed fish meal (No. 3) gave very poor returns but it may be noted that the mortality was very high in this pen.

EXPERIMENTS IN FEEDING—SUMMARY OF RESULTS, FOUR-YEAR AVERAGE 1927-1930

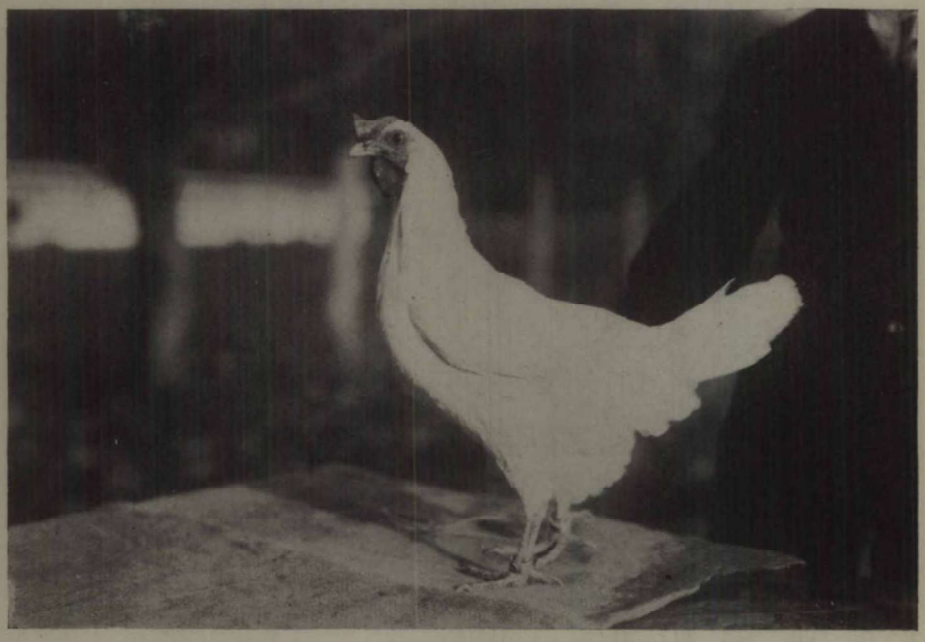
Group	Eggs per bird	Value of eggs per bird	Cost of feed per bird	Profit over cost of feed per bird
		$	$	$
1. Basal ration with beef scrap; no skim-milk	182	4 81	2 38	2 43
2. Basal ration without beef scrap; skim-milk fed	176	4 63	2 24	2 39
3. Grain (standard) in hopper; skim-milk fed	163	4 30	1 95	2 35
4. Basal ration with 6 per cent each of beef scrap and fish meal; no skim-milk	170	4 48	2 14	2 34
5. Grain (standard) in litter; skim-milk fed	157	4 14	2 14	2 00
6. Basal ration with fish meal; no skim-milk	146	3 82	2 00	1 82

The foregoing table indicates some very interesting comparisons, although conclusions can hardly be come to as yet.

EGG-LAYING CONTEST

The tenth British Columbia Egg-Laying Contest terminated on October 23, 1930. The Contest contained the usual forty-six pens of ten pullets in each under the same rules and regulations as in previous years. Each contestant is allowed to keep his pen of ten birds up to full strength throughout the year, spares being held in reserve to allow of substitution as deaths occur in the pen.

As was the case in the year just previous, casualties were heavy in consequence of a severe attack of infectious bronchitis in the early part of the season. As a result of this and severe weather during the months of December and January egg-production was affected very unfavourably.



New world's record White Leghorn hen, owned by W. Whiting, Port Kells, B.C., layed 357 eggs in 365 days in the Agassiz Contest.

In spite of these handicaps just mentioned, the 1929-30 Contest made records which class it as one of the most important in the history of Agassiz Egg-Laying Contests. The outstanding feature was the world's record White Leghorn belonging to W. Whiting, Port Kells, B.C. This bird laid 349 eggs in 357 days or 51 weeks, which is the duration of the Contest. In other words, she made a score of 406·3 points with eggs which averaged 26 ounces to the dozen. The marvel of the record is all the more intensified when the egg-weight is taken into consideration. Special concession was made in the case of this hen whereby the entire pen was held over for the completion of the year, the final score of this world's record hen being 357 eggs averaging 26 ounces to the dozen in 365 days. The second highest bird, belonging to A. Pennington, Agassiz, B.C., made the very creditable record of 328 eggs in 51 weeks. This bird, a Barred Plymouth Rock, laid eggs also averaging 26 ounces to the dozen.

Apart from these high individual records just mentioned is the splendid record of the winning pen belonging to F. C. Evans, Abbotsford, B.C., with a score of 2,366 eggs or 2,770·2 points, and that of A. Pennington's pen with a credit of 2,425 eggs or 2,677·6 points. The former was a White Leghorn pen and the latter a Barred Plymouth Rock pen.

Of the birds entered in the Contest, 226 or 41 per cent 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
S.C. White Leghorns	32
Barred Plymouth Rocks	5
Rhode Island Reds	4
White Wyandottes	3
Anconas	1
Black Minorcas	1

British Columbia Egg-laying Contest, Dominion Experimental Farm, Agassiz, B.C.

Summary of Final Results 1929-1930

Total number of eggs laid	92,493
Average number of eggs laid	201
Winning pen (by points), F. C. Evans, Abbotsford, B.C. (W.L.)	2,770.2
Winning bird (by points, also registered), W. Whiting, Port Kells, B.C., bird No. 5 (W.L.)	406.3
Highest pen according to egg-production— A. Pennington, Agassiz, B.C. (B.R.)	2,425
Highest bird according to egg-production— W. Whiting, Bird No. 5 (W.L. registered)	349
2nd highest bird according to egg-production— A. Pennington, Bird No. 6 (B.R., registered)	328
Number of birds laying 200 to 224 eggs	102
" " " 225 to 249 eggs	102
" " " 250 to 274 eggs	43
" " " 275 to 299 eggs	10
" " " 300 and over	3
" " " 200 and over	260

Breed Average per Bird

Barred Rocks	212.5
White Leghorns	202.5
White Wyandottes	200.1
Rhode Island Reds	199.8
Anconas	180.4
Black Minorcas	127.4

BEES

In the fall of 1929 fifty-five colonies went into winter storage in quadruple cases, double cases and Kootenay cases. The winter of 1929-1930 was severe, prolonged cold windy spells prevailing in December and January. At the first spring examination on March 3 all colonies were alive but three were found to be queenless. One of these died later and the other two were united with an overwintered queen, leaving fifty-three colonies to commence spring work.

Weather conditions throughout the year were drier than average, but during April, May and June the usual dull, cloudy, and showery days prevailed which limits to a great extent the possibility of gathering nectar from early bloom. During July and up to August 16 good weather conditions prevailed and the surplus of honey produced was the largest average obtained since the apiary has attained its present size. Forty-five colonies averaged a surplus of 134 pounds each.

During the season an increase of sixteen colonies was made, making a total of sixty-nine packed for winter. Twenty are being wintered in quadruple cases, eight in double cases, and the remainder in Kootenay cases.

In all projects there is a considerable amount of difficulty in controlling the colonies so that uniform conditions are maintained throughout the season. A condition which frequently arose during the past season was that during May a queen would be superseded and difficulty was found in introducing a new queen. In cases where virgin queens were introduced it happened that dull wet weather of prolonged duration in June prevented the queen from going on a mating flight. It is during the latter part of May and through June that the colonies ordinarily build up to prepare for the main honey flow. Colonies which fail to do this are thus severely handicapped. European foul brood, failing queens, and swarming are other factors which have a bearing on surplus honey produced. When several colonies in a project are affected by such conditions the results of the season cannot be satisfactorily determined.

WINTERING

Of the fifty-five colonies packed for winter thirty-eight were in Kootenay cases, thirty-four with bottom entrance, two with middle entrance, two with top entrance; twelve were in quadruple cases and five in double cases, one double case having only a single hive. It is difficult to make an exact comparison between each group as the number of hives varied. The first spring examination, however, indicated that the Kootenay cases with bottom entrances offer the poorest winter conditions. The middle entrance hives wintered very satisfactorily as did one of the top entrance hives. In the second top entrance hive the cover was blown off one night and this undoubtedly affected the bees adversely. There was little apparent difference between the double and quadruple cases.

In the spring all colonies were classified as very good, good, fair, and poor. Due to different methods of handling such as dividing, queen rearing, etc., all hives could not be included in final surplus production. The relation of strength of colony in the spring to the amount of honey produced in the following season is shown in the following figures:—

Twenty-three colonies classified as very good gave an average surplus of 170 pounds.

Twelve colonies classified as good gave an average surplus of 135 pounds.

Six colonies classified as fair gave an average surplus of 139 pounds.

Five colonies classified as poor gave an average surplus of 91 pounds. (Project Ap. 8, 9, and 10.)

TOP ENTRANCE HIVES

Two top entrance hives were again checked with two hives in Kootenay cases. These hives during the past two winters have proved very successful for wintering purposes as colonies have come through in a strong condition, and combs have been practically free from mould which is a considerable asset. During the spring and summer the colonies have built up well and have shown great strength. On two occasions colonies have swarmed proving that this condition is not controlled.

Four supers were put on one hive and three on the other. When the main honey flow was over and supers were removed the colony with four supers had brood in all but the bottom one and the colony with three supers had brood in them all. Such a condition offers a considerable amount of difficulty at the time honey is taken away and in large colonies such as these, where the queen has a free run through all supers, she is difficult to find.

The average strength of the top entrance hives was greater than that of the checks, they produced however a smaller average surplus, 138½ pounds as compared to 211½ pounds. (Project Ap. 62.)

MIDDLE ENTRANCE HIVES

Two colonies of bees were wintered in middle entrance hives and both were in a satisfactory condition in the spring. One colony was queenless from May 29 to July 6. Efforts made to requeen the colony failed until a mated queen with bees and brood from another colony was introduced. The second colony swarmed and bees showed a disinclination to take to the super. One check colony owing to an attack of European foul brood made a poor showing, the second one was in normal condition throughout the season. Due to the variable factors throughout the colonies in this experiment, it is not practical to make comparisons on surplus production of honey. During manipulation of such colonies the bees became confused when returning to the hive. If two brood chambers are used and the lower one is being examined it necessitates the removal of the lighting board. (Project Ap. 72.)

PROTECTED VERSUS UNPROTECTED HIVES DURING SUMMER

The method adopted in this project is to use single walled hives, hives with brood chambers protected, and hives with brood chambers and supers protected. Five colonies were used in each group. Uniform conditions did not prevail throughout all colonies as two were infected with foul brood, and two colonies superseded their queens, one colony swarmed. The average surplus counting all hives in the single wall group was 164 pounds, in the group with brood chamber protected 127 pounds, and in the third group 159 pounds. Eliminating the two poorest hives from each group, the first group produced an average surplus of 201 pounds, the second group 182 pounds, and the third group 218 pounds. During the years this project has been carried on there has been no one method of greater merit than the others. Recent experiments in wintering have shown that the quadruple case is very satisfactory and works in very well with unprotected brood chambers or supers during the summer. (Project Ap. 42.)

SWARM CONTROL BY DEQUEENING AND REQUEENING

In this project at the commencement of the season no given colonies can be isolated but during the season such colonies as make preparations for swarming are treated to determine the most suitable methods of control. During the season there were fifteen such hives and various treatments were applied.

Method one.—When preparations for swarming were noticed the old queen was removed and all queen cells destroyed. Ten days later all queen cells again were destroyed and a young queen introduced. Of the colonies treated this way two swarmed and two gave no further trouble. No conclusions can be drawn other than that this method did not give complete control.

Method two.—The old queen was removed and all but one queen cell destroyed. One colony treated in this way gave no further trouble. Two others swarmed fourteen days after the previous examination each with three young queens indicating that some queen cells had been overlooked.

Two colonies swarmed and were returned to the hive. In one case a young queen was left and with the other all queens were destroyed and a young mated queen was introduced with some brood. This queen was killed and a young queen was found in the colony indicating that it had been overlooked. Neither colony made any further effort to swarm.

With two other colonies the old queen was removed and queen cells destroyed on two occasions, leaving three on the second examination. In one hive these were placed above the brood chamber and in the other they were allowed to remain in the brood chamber. The first queen to emerge destroyed the others. No further preparations for swarming were made.

With the above seven colonies the method involved is essentially the same, namely, that a young virgin queen or a few queen cells are left. In five cases no further trouble was experienced. With the two colonies that swarmed it was apparent that either queen cells or young queens had been overlooked and swarming was therefore a natural result. If there is a tendency for some strains to have a greater inclination to swarm than others the chief fault with the above method is that requeening is done with the progeny of queens that already show this tendency.

Method three.—Three colonies were treated by removing the old queen and two frames of brood. In two of the colonies the queen cells were destroyed twice and mated queens introduced. In the third a young queen was allowed to remain. She did not get mated so colony was requeened. There were no further indications of swarming. This method proved satisfactory, essentially it consists of relieving the brood chamber and introducing a laying queen. (Project Ap. 1).

DISEASES AFFECTING BROOD

European Foul Brood each year makes its appearance in the apiary in a few colonies. A frequently recommended method of combating this disease is to dequeen and requeen. This practice is of some assistance when a colony in which the queen is failing is affected, it quite often happens however that strong colonies which have a prolific queen are affected. It is of little help to dequeen such colonies as the chances are that an introduced queen will be no better. The period of greatest infection is usually during May and June, a time when there is little nectar coming in.

In order to test the value of a new queen this year an infected colony was divided as equally as possible on May 20 and to the nucleus a new queen was added. A division board was put in each colony and only enough frames were given that the bees could cover. Periodical examinations were made as to which colony cleaned up first. The old colony was clean on July 3 and made a surplus for the season of 91 pounds. The new colony was clean on July 7 and made a surplus of only 6 pounds, indicating the superiority of the old queen.

Another colony which was badly infected was put into clean frames on May 12 and showed a slight infection on July 10. As brood in all stages was removed from this colony when put on new frames it received a severe check and during the season produced only sufficient honey for stores. A third hive

when the outbreak was first noticed was crowded in the hive by removing all frames that the bees would not cover. This colony cleaned up satisfactorily and produced a surplus of 53 pounds. Based on this year's work the most effective means of combating this disease was to crowd the bees and allow no more frames than could be covered. (Project Ap. 18).

QUEEN BREEDING

Two methods of raising queens were followed, the first by placing eggs in wooden cups and second by taking queen cells from colonies preparing to swarm. In the wooden cup method 73 eggs were transferred and 46 produced queens, of these 37 were mated.

Four were put over super clearers and 4 were mated.
Twenty-four were put in mating boxes and 18 were mated.
Eighteen were put in colonies and 15 were mated.

During the month of June with dull cloudy weather prevailing it is difficult to get good results as far as mating is concerned.

Thirty-eight natural queen cells were selected and of these 23 were mated.
Four were put in nuclei and 4 were mated.
Two were put over super clearers and 2 were mated.
Twelve were put in a mating box and 10 were mated.
Twenty were put in colonies and 7 were mated.

Six cells put in colonies were torn down due to young queens already in the hive and not known at the time. Of the sixty-nine colonies in the apiary sixty-two are headed by Agassiz queens. Of the fifty-six Agassiz raised queens introduced in 1930 forty produced large bees true to type. Nine produced bees of a smaller size and not quite uniform in colour. Seven queens were put into nuclei in the fall and progeny could not be classified. (Project Ap. 34).

INTRODUCTION OF QUEENS

Three methods of introducing queens are followed according to the time of the year that the work is done.

When colonies examined in the spring are found to be queenless but strong enough to save, the most satisfactory method is to take the queen with a frame of brood from a queenright colony and introduce this into the queenless hive. The other hive can be requeened from a mailing cage. The mailing cage does not work satisfactorily for colonies which have been without a queen for a considerable time.

When a colony has been queenless for only two or three days during the active season the mailing cage is a quite satisfactory method.

When a colony has been queenless for several days and especially if queen cells have been destroyed it is more satisfactory if the mailing cage is pushed into some comb, especially where there is brood. This project is complete and will be discontinued. (Project Ap. 38).

METHODS OF DETECTING SWARMING

The procedure in this experiment is to have a double brood chamber using a deep and shallow super. Experience with this method to date indicates that if there are queen cells in the colony the majority will be on the bottom of the shallow super or there will at least be some there and the condition of the brood chamber for this feature can be determined by tilting back the shallow super. There are, however, a few cases where such cells are found only on the side of comb in the main brood chamber. During the past season eight colonies were

used in the experiment and no efforts were made to control swarming when queen cells were noticed as it is necessary to determine whether queen cells are being built for natural supersedure or for other reasons.

Three colonies had queen cells only on the bottom of shallow super and these were for natural supersedure.

One colony did not build any queen cells.

One colony had four queen cells on the side of comb in the main brood chamber, none on the bottom of the shallow super, these proved to be natural supersedure.

Three colonies swarmed; one had cells only on the bottom of the shallow super, the other two had queen cells both on the shallow super and in the main brood chamber.

Taking the seven colonies which built queen cells an examination of the bottom of the shallow super indicated in eighty-five per cent of the cases the condition of the brood chamber in regard to this feature.

Shallow supers are used to a considerable extent throughout the apiary. Unless the queen cells are allowed to fully develop it is difficult to say whether they are built for swarm purposes or supersedure. Proper management of the apiary does not permit full development, there is however considerable evidence that in the majority of cases where the number of cells is large swarming is the object in view and where only a few cells are built three or four supersedure is the most likely thing. The result obtained with fifteen colonies that had shallow supers and that built queen cells were as follows:—

Three built queen cells only in the main brood chamber, two were considered to be supersedure cells.

Four built cells on the bottom of shallow super only.

Eight built cells on the bottom of shallow super and in brood chamber, of the total number of cells sixty-eight were on the bottom of shallow supers and thirty-seven in the main brood chamber.

An examination of the bottom of the shallow super would have given in eighty per cent of the cases a correct indication of the condition of the brood chamber. (Project Ap. 5).

STIMULATIVE FEEDING FOR BROOD PRODUCTION

The procedure in this experiment is to keep all colonies supplied with an adequate amount of stores up to 20 pounds and during the early spring before nectar flows and during any subsequent periods of dearth to feed sugar syrup. This year five colonies were fed sugar syrup, during such periods each receiving $7\frac{1}{2}$ pounds of sugar and an equal number of hives were used as controls. In each group there was a colony affected by foul brood so that only four colonies are included in the average amount of surplus honey produced. The hives fed sugar syrup produced an average of 187 pounds and the controls 164 pounds, a net gain of 23 pounds for each colony. On the first spring examination the control hives were slightly stronger in bees and brood. At the commencement of the main honey flow they averaged 3·84 frames less to a colony than those which had been fed.

A comparison was made this year in feeding two nuclei made on April 21 from the same hive and given two imported queens. One colony was fed milk and sugar and the other sugar and water. Small quantities were given every second evening and the amounts increased in accordance with the number of bees. The milk fed bees received food in the proportion of one pound of sugar to two pounds of milk until they covered ten frames, when the mixture was reduced to one pound of sugar to three pounds of milk. The sugar syrup was fed in the proportion of one pound sugar to two of water and was later reduced to one of sugar to three of water.

The milk fed colony consumed 13 pounds of sugar and 32 pounds of milk. The sugar fed colony consumed 16 pounds of sugar and 24 pounds of water. The following table indicates the rate of increase of the two hives:—

RESULTS FROM MILK FED AND SUGAR FED COLONIES

Date of examination	Milk syrup		Sugar syrup	
	Frames of brood	Number of combs covered by bees	Frames of brood	Number of combs covered by bees
April 21	2	2	2	2
May 13	3	4	2	4
May 28	5	7	3	5
June 4	7½	10	3½	5½
June 10	9	13	4	6
June 23	13	17	6	8
July 2	13	19	6	8½
Surplus Honey	128 pounds		51 pounds	

The results are those of one season and require more experimental evidence. (Project Ap. 25).

FIBRE PLANTS

Three plots of J.W.S. fibre flax were grown with satisfactory results (Project E. 3).

The following table gives the results per acre:—

FLAX PLOTS AT AGASSIZ, B.C., 1930

Average of triplicates A B and C—		
Green straw	6,300	pounds
After deseeding	4,620	"
Retted straw	3,480	"
Fibre	630	"
Tow	180	"
Seed	14.4	bushels per acre

Three plots of hemp were grown giving quite good yields (Project E. 4). The accompanying table shows the results per acre:—

HEMP PLOTS AT AGASSIZ, B.C., 1930

Average of triplicates A B and C—		
Retted straw	6,120	pounds
Fibre	1,140	"
Tow	210	"

FLAX

Being assured after experimenting for a dozen years or more that flax for fibre could be grown successfully in the Agassiz district as far as climatic conditions are concerned an effort was made during the past season to gain some information as to the possibilities of growing flax for fibre in a more commercial way. Several farmers in the district were asked to grow an acre each of fibre flax, the seed for which was supplied free from the Fibre Division, Central Experimental Farm, Ottawa. Results were fairly satisfactory as far as yields of seed and fibre are concerned. The same would apply to value of seed but indications are with reference to price obtained for fibre that the market is too far distant at present for best returns. Further and more complete information with reference to this investigation would seem to be worth while.

GENERAL NOTES

In co-operation with the Summerland Farm and the Publicity Division at Ottawa, an agricultural exhibit was staged at Vancouver Exhibition. A small exhibit of fibre flax was shown at a couple of local fairs. The Clydesdale horses exhibited at Vancouver Summer and Winter Fairs attracted attention to the quality of the horses bred here. The Holstein cattle shown at Portland and Vancouver made a good impression. The Superintendent besides attending the exhibitions where the stock was shown, judged sheep and dairy cattle at the Calgary Fall Show. He was president of the British Columbia Dairymen's Association and on the directorate of the British Columbia Holstein, Horse and Sheep Breeders' Associations. In June, a motor tour was made of Central British Columbia in company with Directors of the Dairymen's Association; this included stops at several of the Illustration Stations. With the help of two assistants, many farmers' meetings, fairs and conventions were attended. The Horticultural Assistant spent some considerable time in the Mission-Hatzic district, on survey work of the small fruit problems, and also made an inspection trip over the Illustration Stations in Central British Columbia. Due to the exceedingly fine quality of fibre flax produced on this farm for many years, arrangements were made with a few farmers to grow one acre blocks with the object of getting commercial results on this project. The Field Crops Assistant in charge of this work, has collected some valuable data on this crop and more than local interest has been aroused.

Numerous private motor parties visited the farm during the year. More and more the Fraser valley farmers are visiting their Experimental Farm during the summer season; many having lunch on the lawn and later going over the live stock, field and garden work, with a view to getting useful information. These visits are being encouraged. The British Farmers' National Tour visited the farm and the Alaskan Highway Caravan also stopped for a short time on their return from the North.

The usual repair work to buildings, fences, roads, etc., was accomplished. Due to a rearrangement of some of the field work, by the addition of enlarged raspberry, fertilizer and ensilage crop projects, some new fences had to be erected. A new basement was completed under the foreman's house and a furnace installed. The old verandah was removed from the superintendent's house and a larger new one built. The boarding house was redecorated inside and the old furnace replaced by a new one.

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