DOMINION OF CANADA
DEPARTMENT OF AGRICULTURE
DOMINION EXPERIMENTAL FARMS

EXPERIMENTAL STATION

KENTVILLE, N.S.

REPORT OF THE SUPERINTENDENT

W. SAXBY BLAIR

FOR THE YEAR 1928

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CONTENTS

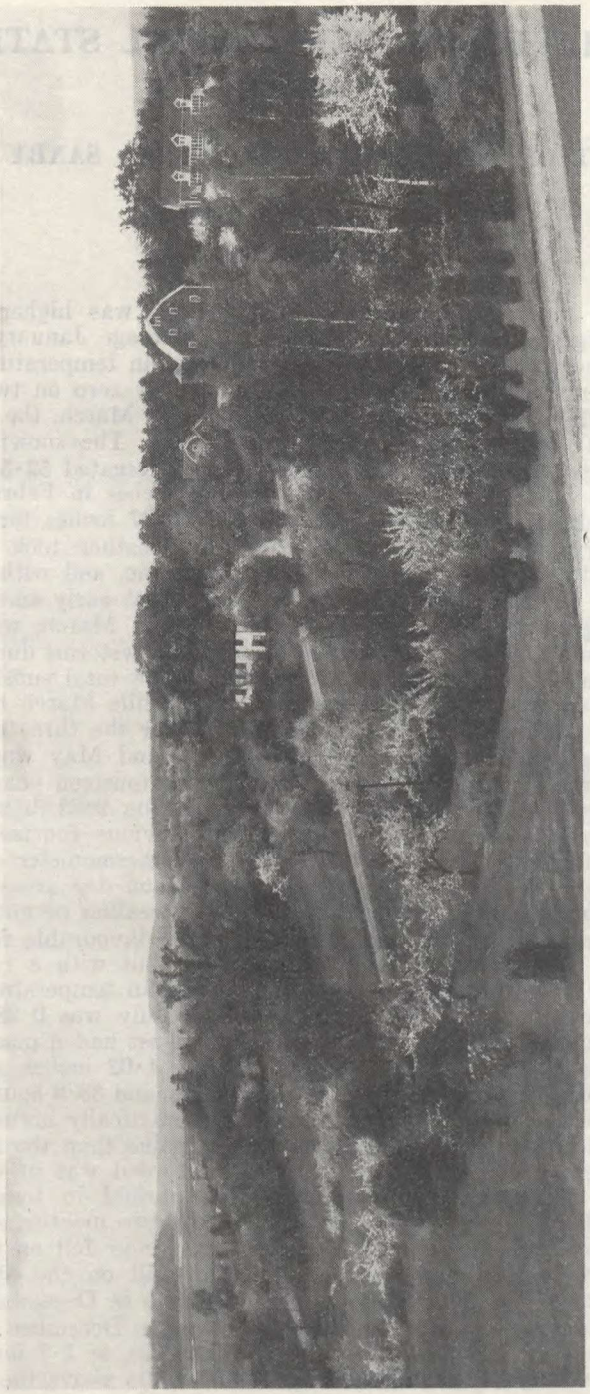
DOMINION EXPERIMENTAL STATION, KENTVILLE, N.S.

REPORT OF THE SUPERINTENDENT, W. SAXBY BLAIR

THE SEASON

The mean temperature during January, 1928, was higher than normal, being 22·14 degrees, or 2·4 degrees above the average January mean during the previous fourteen years. February was normal in temperature, and March slightly below normal. The temperature went below zero on two days during January, four days during February and one day in March, the readings being 4, 4, 1, 8, 1, 1, and 1 degrees below, respectively. The snowfall was fairly evenly distributed during the three months, and aggregated 52·5 inches, which, with a rainfall of 2·43 inches in January, 0·96 inches in February and 1·63 inches in March, made a total precipitation of 10·27 inches for these months. During January and February frequent warm weather took off the snow, resulting in only short periods of sleighing at a time, and with little snow at any one time. A snowfall the last of February and early in March, with a fairly low temperature, gave sleighing to the 14th of March, when the sleighing for the season finished. There were no heavy snowstorms during the winter, and the snowfalls, though frequent, were light. The total sunshine for January and February was 29·2 hours below normal, while March had 16·7 hours above normal, making 12·5 hours below normal for the three months.

The average mean temperature during April and May was 2·43 degrees above that of the same period during the previous fourteen years, the precipitation was slightly above normal, and the sunshine 9·51 hours greater per month than for the same months during the previous fourteen years. The latest spring frost occurred May 9, when the thermometer registered two degrees of frost. Work on the land was possible on dry areas April 26, but general field work did not start until May 4. The weather permitted practically continuous work during May, and conditions were favourable for the germination of seed. June was normal in temperature, but with a rainfall of only 1·88 inches, or 1·18 inches below normal. The mean temperature during July was 2·3 degrees above normal. The rainfall in July was 0·28 inches above normal, with sunshine slightly above normal. August had a mean temperature of 2·36 degrees above normal, a rainfall of only 1·02 inches, or 2·51 inches below the August average of the past fourteen years, and 33·9 hours less sunshine than the fourteen-year average. September was practically normal in temperature than precipitation, with 30·5 hours less sunshine than the average of the previous fourteen years. The first fall frost recorded was of one degree, on September 30. October and November were normal in temperature, with 1·84 inches below the normal precipitation for the two months, and 31·6 hours below the normal sunshine for the same period. Snow fell on the 22nd, 23rd and 26th of November, and there was a light fall on the 8th and 9th of December, followed by rain. There was no sleighing in December. In December the mean temperature was 6·4 degrees above the December average of the past fourteen years; the precipitation was 5·45 inches, or 1·7 inches above the fourteen-year average, and the sunshine was 20 hours above the average.



General view of the Kentville Experimental Station.

The following table gives some meteorological data recorded at the Station:—

METEOROLOGICAL RECORDS AT THE DOMINION EXPERIMENTAL STATION, KENTVILLE, N.S., FOR THE YEAR 1928

Month	Temperature (Fahrenheit)						Precipitation				Sunshine	
	Mean		Maximum		Minimum							
	1928	Average, previous 14 years	Highest	Mean maximum	Lowest	Mean minimum	Rainfall	Snowfall	Total precipitation, 1928	Average, previous 14 years	1928	Average, previous 14 years
	°	°	°	°	°	°	inches	inches	inches	inches	hours	hours
January	22·14	19·74	55	29·03	—4	15·25	2·43	18·0	4·23	3·68	64·9	79·30
February	19·31	19·31	46	26·69	—8	11·93	0·96	20·3	2·99	3·19	84·3	99·10
March	28·19	28·77	60	35·29	—1	21·10	1·63	14·2	3·05	2·87	150·1	133·40
April	41·26	38·70	73	50·80	15	31·73	2·18	.....	2·18	2·89	198·6	149·46
May	51·65	49·34	74	61·87	28	41·42	3·16	.....	3·16	2·16	170·0	200·12
June	58·53	58·82	87	69·53	38	47·53	1·88	.....	1·88	3·06	196·2	212·79
July	67·92	65·62	86	78·22	40	57·61	3·32	.....	3·32	3·04	239·5	218·40
August	66·53	64·17	93·5	76·39	40	56·68	1·02	.....	1·02	3·53	177·7	211·60
September	55·42	56·98	83	66·30	31	44·53	2·76	.....	2·76	2·84	149·8	180·30
October	47·16	48·03	74	55·71	23	38·61	3·12	.....	3·12	4·32	125·9	145·60
November	35·11	36·94	58	41·46	5	28·76	2·28	9·3	3·21	3·85	73·4	85·30
December	31·42	25·02	60	37·55	9	25·29	5·08	3·7	5·45	3·75	77·3	57·30
Totals or averages	43·72	42·62	.....	52·40	.....	35·04	29·82	65·5	36·37	39·18	1,707·7	1·772·67

ANIMAL HUSBANDRY

CATTLE

SHORTHORN HERD

The Shorthorn (dual-purpose) herd at the end of the year 1928 consisted of one herd bull, twenty-eight cows, four 2-year-old heifers, six yearling heifers, two yearling steers, sixteen heifer calves, and one bull calf, a total of fifty-eight head. Sixteen heifer and fourteen bull calves were born during the year. There were disposed of during 1928 three cows for breeders, and three for beef, five heifers and nine steers for beef, and sixteen bull calves for breeders, a total of thirty-six head. Good health has been maintained in the herd during the year, and there has been no loss by death or accident.

Twenty-three of the calves born during the year were sired by Comet 3rd —176361—, the herd bull purchased in April, 1927, and the heifers are developing into a very promising lot of individuals. There was a brisk demand for the bull calves, and with the exception of one, all were sold during the year.

Eight heifers by our former herd bull, Major Maud—116374—, freshened in 1928, and are showing fairly persistent milking qualities. It is hoped to qualify this bull in the Record of Performance test within a few months.

All normal cows were entered for Record of Performance testing, and twelve qualified this year, with an average production of 6306·5 pounds of milk and 298·95 pounds of butter. Five of these cows were mature, with an average of 7501·7 pounds of milk and 346·78 pounds of butter; two were four years old, with an average of 5856·9 pounds of milk and 286·31 pounds of butter, and five were three years old, with an average of 5291·0 pounds of milk and 256·17 pounds of butter.

Except in August, September and October the following meal mixture was used during the year: 400 pounds of gluten feed, 300 pounds of wheat bran, and 200 pounds each of ground oats and linseed oil meal. During the above three months oil meal was not available, and a mixture of 200 pounds of gluten feed and 100 pounds each of oats and wheat bran was used. The cost of these mixtures was $2.35 per cwt. for the first seven months, $2.30 for the next three months, and $2.42 for November and December. The hay fed was for the most part a mixture of clover and timothy, and was charged at $8 per ton. For the first part of the year roots and ensilage were charged at $3.20 per ton, and for the last three months of the year at $4 per ton. The pasture, being very limited, is charged at $1 per month.

The tabulated data show the feed consumption, and the milk production of twenty-four cows which completed their lactation periods during the year. These are made up of nine mature cows with an average production of 6283·2 pounds of milk and 292·21 pounds of butter; four 4-year-olds with an average of 5351·7 pounds of milk and 258·12 pounds of butter; nine 3-year-olds with an average of 4887·9 pounds of milk and 238·1 pounds of butter, and two 2-year-olds with an average of 4326·7 pounds of milk and 207·84 pounds of butter. The average production of the twenty-four cows and heifers was 5441·7 pounds of milk and 259·2 pounds of butter. The approximate milking period was 9 months, and 3 months dry.

The price of butter varied during the year from 46 cents per pound in April to 37 cents per pound in the month of June; the average value of the butter for the year was 41·58 cents per pound. Skim milk is valued at 20 cents per cwt.

The cow is charged with the food consumed each month, at the prices paid for the feed for the month, and is credited with the butter produced, according to the local wholesale prices. The monthly profits are added together at the end of the lactation period, the sum of these being the profit from the cow. The total feed cost is similarly arrived at by adding together the cost of the feed consumed each month, from calving to calving.

AMOUNT AND VALUE OF MILK PRODUCED BY SHORTHORN COWS WHICH COMPLETED LACTATION PERIODS DURING THE YEAR ENDING DECEMBER 31, 1928

Name of cow	Age in years	Date of dropping calf	Number of days dry	Number of days milking	Total milk	Daily average yield of milk	Average per cent fat	Butter produced	Value of butter	Value of skim milk	Total value of product
					lb.	lb.	%	lb.	$	$	$
Kentville Susan	9	Sept. 1, 1927	68	274	5,171·1	18·87	4·47	271·96	115 97	9 88	125 85
Kentville Victoria 3rd	8	March 7, 1928	151	315	7,709·4	24·47	4·04	366·18	153 59	14 79	168 38
Kentville Lady	8	April 12, 1927	80	295	7,795·4	26·43	4·09	375·27	150 27	14 95	165 22
Kentville Meadow Flower 2nd	8	Jan. 25, 1928	117	299	6,100·4	20·40	3·90	279·70	116 93	11 72	128 65
Kentville Jessamine 4th	8	Feb. 11, 1928	82	263	7,129·1	27·11	3·54	296·99	123 63	13 75	137 38
Kentville Jessamine 6th	7	March27, 1928	123	248	4,507·1	18·17	3·72	197·23	81 53	8 68	90 21
Kentville Victoria 6th	6	Jan. 7, 1928	146	379	8,774·5	23·15	4·03	415·75	174 48	16 84	191 32
Kentville May 3rd	5	Oct. 23, 1927	110	221	4,152·3	18·79	4·03	197·00	82 18	7 97	90 15
Kentville Susan 7th	5	March 2, 1928	133	262	5,209·6	19·88	3·75	229·84	95 80	10 02	105 82
Kentville Primrose 4th	4	Feb. 11, 1928	102	245	5,466·6	22·31	4·13	265·91	110 84	10 48	121 32
Kentville Jessamine 14th	4	April 17, 1928	181	264	6,091·6	23·07	4·06	291·27	118 90	11 60	130 50
Kentville Susan 9th	4	April 9, 1928	131	223	4,226·3	18·95	3·90	193·94	79 15	8 12	87 27
Kentville Lady 4th	4	April 11, 1928	133	259	5,622·2	21·71	4·25	281·36	115 82	10 76	126 58
Kentville Victoria 11th	3	Aug. 14, 1927	43	290	4,940·9	17·04	4·32	250·84	106 03	9 45	115 48
Kentville Susan 10th	3	Nov. 1, 1927	94	197	3,849·9	19·54	3·74	169·39	71 33	7 41	78 74
Kentville Victoria 12th	3	Jan. 20, 1928	112	254	5,449·2	21·45	4·12	264·52	110 58	10 44	121 02
Kentville Fairy 6th	3	Feb. 2, 1928	64	228	5,532·6	24·27	4·16	270·81	112 30	10 60	122 90
Kentville Victoria 13th	3	Nov. 2, 1927	104	280	4,912·7	17·55	4·47	258·28	106 83	9 38	116 21
Kentville Jessamine 16th	3	Feb. 24, 1928	85	279	5,151·2	18·46	3·93	238·11	100 11	9 89	110 00
Kentville Fairy 7th	3	Feb. 28, 1928	151	216	3,605·5	16·69	4·11	174·75	72 62	6 91	79 53
Kentville Susan 11th	3	Jan. 19, 1928	80	246	5,381·3	21·88	4·05	256·60	106 78	10 32	117 10
Kentville Victoria 14th	3	July 26, 1927	1st calf	359	5,168·0	14·40	4·27	259·62	107 94	9 89	117 83
Kentville Victoria 15th	2	March10, 1928	"	288	3,968·8	13·78	4·23	197·41	82 41	7 60	90 01
Kentville Victoria 16th	2	Feb. 29, 1928	"	306	4,684·7	15·31	3·96	218·28	91 06	9 00	100 06
Totals	111	.....	2,290	6,490	130,600·4	.....	.....	6,221·01	2,587 08	250 45	2,837 53
Averages	4·6	.....	109*	270·4	5,441·7	20·12	4·05	259·21	107 00	10 44	118 23

*Average of 21 cows.

AMOUNT AND COST OF FEED CONSUMED BY SHORTHORN COWS WHICH COMPLETED LACTATION PERIODS DURING 1928

Name of cow	Age in years	Date of dropping calf	Amount of meal consumed	Amount of roots and ensilage consumed	Amount of hay consumed	Amount of green feed consumed	Months on pasture	Total cost of feed	Cost to produce 100 pounds of milk	Cost to produce 1 pound of butter	Profit on one pound of butter, skim, milk not considered	Profit on cow
			lb.	lb.	lb.	lb.		$	$	cts.	cts.	$
Kentville Susan	9	Sept. 1, 1927	2,526	8,800	3,928	1,010	3·0	95 73	1 85	35·20	7·44	30 12
Kentville Victoria 3rd	8	March 7, 1928	3,379	10,660	6,118	600	1·75	126 03	1 63	34·42	7·52	42 35
Kentville Lady	8	April 12, 1927	3,023	10,495	3,756	1,010	3·0	120 56	1 55	32·12	7·92	44 66
Kentville Meadow Flower 2nd	8	Jan. 25, 1928	2,873	8,560	5,562	500	1·75	110 49	1 81	39·50	2·31	18 16
Kentville Jessamine 4th	8	Feb. 11, 1928	2,647	6,940	4,326	500	1·75	95 62	1 34	32·19	9·44	41 76
Kentville Jessamine 6th	7	March 27, 1928	2,297	7,420	4,602	500	1·75	89 48	1 98	45·37	−4·03	0 73
Kentville Victoria 6th	6	Jan. 7, 1928	3,727	10,940	6,694	1,400	2·75	141 32	1 61	33·99	7·98	50 00
Kentville May 3rd	5	Oct. 23, 1927	1,652	7,990	3,396	.....	3·5	73 27	1 76	37·19	4·53	16 88
Kentville Susan 7th	5	March 2, 1928	2,608	8,760	5,282	500	1·75	100 77	1 93	43·84	−2·16	5 05
Kentville Primrose 4th	4	Feb. 11, 1928	2,455	7,420	4,374	500	1·75	92 38	1 69	34·74	6·94	28 94
Kentville Jessamine 14th	4	April 17, 1928	2,850	10,020	5,790	500	1·75	110 69	1 82	38·00	2·82	19 81
Kentville Susan 9th	4	April 9, 1928	1,927	6,920	4,846	500	1·75	79 49	1 88	40·98	−0·17	7 78
Kentville Lady 4th	4	April 11, 1928	2,245	7,420	4,848	500	1·75	88 37	1 57	31·41	9·75	38 21
Kentville Victoria 11th	3	Aug. 14, 1927	2,436	8,675	3,868	835	3·0	91 32	1 85	36·41	5·86	24 16
Kentville Susan 10th	3	Nov. 1, 1927	1,743	8,120	3,536	1,000	1·75	72 48	1 88	42·79	−0·68	6 26
Kentville Victoria 12th	3	Jan. 20, 1928	2,185	6,980	4,822	500	1·75	86 73	1 59	32·79	9·01	34 29
Kentville Fairy 6th	3	Feb. 2, 1928	2,092	6,200	3,510	500	1·75	77 52	1 40	28·63	12·85	45 38
Kentville Victoria 13th	3	Nov. 2, 1927	2,112	7,400	4,076	400	1·75	74 94	1 53	29·02	12·35	41 27
Kentville Jessamine 16th	3	Feb. 24, 1928	2,229	7,260	4,694	500	1·75	88 36	1 72	37·11	4·93	21 64
Kentville Fairy 7th	3	Feb. 28, 1928	1,959	7,620	4,702	500	1·75	82 95	2 31	47·47	−5·91	−3 42
Kentville Susan 11th	3	Jan. 19, 1928	2,034	7,320	4,030	500	1·75	80 63	1 50	31·42	10·19	36 47
Kentville Victoria 14th	3	July 26, 1927	2,706	8,460	4,258	830	3·5	100 95	1 95	38·88	2·69	16 88
Kentville Victoria 15th	2	March 10, 1928	1,966	4,260	3,564	500	1·75	71 66	1 81	36·30	5·44	18 35
Kentville Victoria 16th	2	Feb. 29, 1928	2,139	4,840	3,764	500	1·75	77 52	1 65	35·51	6·20	22 54
Totals	111	.....	57,810	189,480	108,366	14,585	50·25	2,229 26	.....	.....	.....	608 27
Averages	4·6	.....	24·10	7,895	4,515	608	2·09	92 89	1 71	35·83	5·75	25 34

RECORD OF PERFORMANCE

The following are the Station records of the twelve cows which qualified in the Record of Performance test during 1928:—

Name of cow	Age	Number of days milking	Milk produced	Fat produced	Average per cent fat
			lb.	lb.	p.c.
Kentville Victoria 3rd	8	315	7,709·4	311·25	4·03
Kentville Lady	8	295	7,795·4	319·37	4·11
Kentville Meadow Flower 2nd	8	299	6,100·4	237·75	3·89
Kentville Jessamine 4th	8	263	7,129·1	252·44	3·54
Kentville Victoria 6th	6	379	8,774·5	353·39	4·02
Kentville Jessamine 14th	4	264	6,091·6	247·58	4·06
Kentville Lady 4th	4	259	5,622·2	239·16	4·25
Kentville Victoria 11th	3	290	4,940·9	213·22	4·31
Kentville Victoria 12th	3	254	5,449·2	224·84	4·12
Kentville Fairy 6th	3	228	5,532·6	230·19	4·16
Kentville Jessamine 16th	3	279	5,151·2	202·39	3·92
Kentville Susan 11th	3	246	5,381·3	218·11	4·05
Totals	61	3,371	75,677·8	3,049·69	
Averages	5	281	6,306·5	254·14	4·03

SWINE

The swine on hand January 1, 1928, numbered seventeen, consisting of one herd boar, Ottawa Augustus, —226—101981—, one young herd boar, Ottawa Beau, 34—127522—, four breeding sows, and eleven young feeders. During the year fifty-four pigs were born, two sows producing two litters each, and one sow one litter. From these litters ten were lost when very young, 81·5 per cent of the pigs born being raised to weaning age, or an average of 8·8 pigs per litter. Six boars and twelve sows were sold for breeding purposes, six for feeders, fifteen for bacon, and one for pork. There were on hand at the end of the year one herd boar, five breeding sows, and fifteen young feeders.

The meal mixture for the breeding hogs was made up of 100 pounds each of wheat bran and ground oats, and 200 pounds of middlings; the average cost per hundred pounds was $2.40. Mangels were fed to the breeding hogs during the winter and spring months, and skim-milk was added to the ration of the sows while nursing their young. The sows were on pasture during the summer months.

The following table shows the feed consumption and maintenance costs of the mature breeding swine for the year:—

FEED CONSUMED BY MATURE BREEDING SWINE DURING THE YEAR 1928

——		Ottawa Beau	Kentville Bonnie	Kentville Rose	Kentville Charlotte
Sex		Boar	Sow	Sow	Sow
Age	years	1	3·5	4	4
Number of days fed	days	366	366	366	328
Total meal eaten in period (at $2.40 per cwt.)	lb.	1,796	1,887	2,081	1,501
Average meal eaten per day	"	4·9	5·16	5·69	4·58
Total mangels eaten in period (at $3.20 per ton)	"	2,080	2,020	1,600	1,640
Total skim-milk eaten in period (at 20 cents per cwt.)	"	.....	1,859	2,865	1,609
Months on pasture (at $1.50 per month)		.....	2	3	3
Total cost of feed	$	46 43	55 24	62 73	46 37
Average cost per day	cts.	12·69	15·09	17·14	14·14

COST OF PORK PRODUCTION

Eighteen Yorkshire pigs five weeks old were fed for 192 days. These were fed for the purpose of obtaining data for the Advanced Registry Policy for Swine, and were fitted for the bacon market. Three litters were represented in the feeding trial, six pigs from each litter. At the end of the period fifteen pigs were shipped to Moncton for inspection and classification, and three sows were retained in the herd for breeding. The following data relative to the cost of production were obtained. The returns from this feeding test show considerable loss, due to the advanced price of mill feeds, and to the low market price of hogs at the time of sale. The pigs were all good feeders, gaining nearly one pound per day each during the feeding period.

COST OF PORK PRODUCTION

Value of 18 pigs at beginning of test at $4 each	$	72 00
14,037 pounds of skim-milk at 20 cents per cwt	$	28 07
10,344 pounds of meal at $2.51 per cwt	$	259 63
Total cost of 18 pigs to time of sale	$	359 70
Value of 15 pigs sold for bacon	$	252 73
Value of 3 pigs retained for breeders	$	50 22
Total sale value of the 18 pigs	$	302 95
Loss over feed and cost of pigs	$	56 75
Average loss per pig	$	3 15
Total weight of pigs at beginning of test	lb.	378
Average weight of pigs at beginning of test	lb.	21
Total weight of pigs at end of 192 days	lb.	3,549
Average weight of pigs at end of 192 days	lb.	197
Total gain in 192 days	lb.	3,171
Average gain per pig in 192 days	lb.	176
Average daily gain per pig	lb.	0·91
Average cost per pound of gain	cts.	9·07

FIELD HUSBANDRY

A COMPARISON OF DIFFERENT FODDER CROPS

This project, begun in 1922, consists of the growing of mangels, turnips, corn, sunflowers, and oats, peas and vetches on half-acre plots, all treated alike as to fertilizing and cultural methods, the land for the test being selected with due regard to uniformity. The object of the experiment is to determine the average yields of fodder per acre and the cost of production.

The land used for this work in 1928 was in hay in 1927. It was manured, 16 tons per acre, and ploughed in the fall in 1927, and thoroughly worked up with heavy disc harrows hauled by the tractor, in the spring of 1928. A 5-9-6 fertilizer was then applied at the rate of 500 pounds per acre, and well worked into the soil with a spring-tooth wheel cultivator. The corn, sunflowers, and O.P.V. were seeded with a grain drill May 23. Rows were run with a horse hoe, and rolled with a two-row turnip seeder, with seed spouts detached, to level them, and the mangel and turnip seeds sown May 23 with a garden drill.

The varieties used were Longfellow corn, Mammoth Russian sunflower, Bangholm, Kentville, turnip, and Giant Yellow Intermediate mangel. The O.P.V. was mixed as follows: oats, 2½ bushels; peas, ½-bushel, and vetches, ⅓-bushel, and this mixture was sown at the rate of 3 bushels per acre, May 23. The O.P.V. was harvested August 11; the sunflowers, September 5; the corn, September 18; the mangels, October 9, and the turnips October 25.

In figuring production costs manure is valued at $2 per ton, spread, and 40 per cent is charged to the first crop of the rotation. Labour is charged at the current rate of wages, which in 1928 was 30 cents per hour. Ten cents per hour is allowed for each horse, $1.25 for tractor and driver, $2.85 per acre for the use of machinery, and $3 per acre for rental of land, this being based on a valuation of $50 per acre at 6 per cent interest.

COST PER ACRE OF PRODUCING CORN

Item	1928	Average, 1922–1928
	$ cts.	$ cts.
Rent	3 00	3 00
Manure and fertilizer	24 75	20 65
Seed	1 50	1 33
Machinery	2 85	2 59
Twine	0 48	0 53
Manual labour	16 50	20 09
Horse and tractor labour	6 85	6 17
Kerosene and oil	1 30	1 04
Total cost per acre	57 23	55 40
Yield per acre tons	21·39	17·88
Cost per ton $	2 61	3 10

COST PER ACRE OF PRODUCING SUNFLOWERS

Item	1928	Average, 1922–1928
	$ cts.	$ cts.
Rent	3 00	3 00
Manure and fertilizer	24 75	20 65
Seed	1 20	1 44
Machinery	2 85	2 59
Twine	0 48	0 52
Manual labour	18 75	27 65
Horse and tractor labour	6 75	6 52
Kerosene and oil	1 40	1 44
Total cost per acre	59 18	63 61
Yield per acre tons	19·56	20·60
Cost per ton $	3 03	3 09

COST PER ACRE OF PRODUCING TURNIPS

Item	1928	Average, 1922–1928
	$ cts.	$ cts.
Rent	3 00	3 00
Manure and fertilizer	24 75	20 65
Seed	1 08	1 05
Machinery	2 85	2 59
Manual labour	36 90	36 07
Horse and tractor labour	6 90	6 40
Total cost per acre	75 48	69 76
Yield per acre bush.	621·2	661·8
Cost per bushel cts.	12·1	10·5
Yield per acre tons	15·53	16·54
Cost per ton $	4 86	4 22

COST PER ACRE OF PRODUCING MANGELS

Item	1928	Average, 1922–1928
	$ cts.	$ cts.
Rent	3 00	3 00
Manure and fertilizer	24 75	20 65
Seed	3 30	2 98
Machinery	2 85	2 59
Manual labour	31 50	34 75
Horse and tractor labour	6 80	6 45
Total cost per acre	72 20	70 42
Yield per acre ... bush.	828·0	786·9
Cost per bushel ... cts.	8·7	8·9
Yield per acre ... tons	20·7	19·67
Cost per ton ... $	3 49	3 58

COST PER ACRE OF PRODUCING O.P.V.

Item	1928	Average, 1922–1928
	$ cts.	$ cts.
Rent	3 00	3 00
Manure and fertilizer	24 75	20 65
Seed	4 72	4 74
Machinery	2 85	2 32
Manual labour	6 75	6 55
Horse and tractor labour	4 75	3 87
Kerosene and oil	0 50	0 54
Total cost per acre	47 32	41 67
Yield per acre ... tons	8·51	7·88
Cost per ton ... $	5 56	5 29

SUMMARY—COMPARISON OF DIFFERENT FODDER CROPS

Year	Yield per acre				
	Corn	Sunflowers	Turnips	Mangels	O.P.V.
	tons	tons	tons	tons	tons
1922	19·92	20·80	21·28	17·59	5·01
1923	14·90	19·80	19·14	16·47	8·26
1924	13·31	18·13	13·41	19·62	4·95
1925	23·18	27·50	17·37	25·56	10·30
1926	16·86	17·41	16·63	19·30	7·40
1927	15·56	20·98	12·46	18·47	10·70
1928	21·39	19·56	15·53	20·70	8·51
Average yield per acre	17·87	20·60	16·55	19·67	7·88
	Cost per acre				
	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
1922	60 78	63 73	69 34	69 89	47 37
1923	45 32	53 91	58 25	69 60	30 44
1924	56 57	69 70	69 34	72 08	41 46
1925	60 55	73 59	80 84	77 52	43 48
1926	54 93	61 25	66 35	67 90	38 43
1927	52 51	63 90	68 76	63 76	43 21
1928	57 23	59 18	75 48	72 20	47 32
Average cost per acre	55 41	63 61	69 77	70 42	41 67
Average cost per ton	3 10	3 08	4 21	3 58	5 29

COST PER ACRE OF PRODUCING OATS

Item	1928	Average, 1922-28
	$ cts.	$ cts.
Rent	3 00	3 00
Manure and fertilizer	16 00	11 89
Seed	2 40	2 96
Machinery	2 85	2 31
Twine	0 48	0 54
Manual labour	6 30	7 39
Horse and tractor labour	4 45	3 83
Total cost per acre	35 48	31 92
Yield per acre: grain ... bush.	62·6	63·2
straw ... tons	1·38	1·32
Cost per bushel after deducting value of straw at $6 per ton ... cts.	43·5	38·0

COST PER ACRE OF PRODUCING CLOVER HAY

Item	1928	Average, 1922-1928
	$ cts.	$ cts.
Rent	3 00	3 00
Manure	6 00	6 15
Seed	2 51	3 54
Machinery	2 85	2 85
Manual labour	7 75	7 97
Horse labour	1 50	1 53
Total cost per acre	3 61	25 04
Yield per acre ... tons	3·03	2·80
Cost per ton ... $	7 70	8 96

GRAIN AND HAY YIELDS FOLLOWING DIFFERENT FODDER CROPS

For the season of 1928 it was found necessary to discontinue the work of recording the yields following different fodder crops, but this will be taken up again in 1929.

CROP ROTATIONS

Crop rotations of various lengths and with different sequences of crops are being tested under different soil treatments, and the annual results tabulated. These will be published when sufficient data of value are accumulated.

HORTICULTURE

THE SEASON

During the early development of the apple foliage commencing about the 12th of May, the weather was dry, with no rain until the 24th. The period from the 24th to the 30th was damp and dark, and favourable for the discharge of apple scab spores, with the heaviest discharge on the 28th, just before the first early bloom. Apple foliage not well protected at this time was infected. There was rain on the 2nd of June, with further spore discharge. This was followed by bright weather, accompanied by high temperature, during the period of full bloom, resulting in a good set of fruit. The bloom in general was light, but the favourable conditions for pollination and the fertilization of the blossoms aided very materially in giving a fairly satisfactory apple crop.

Early cherries and plums were in bloom on the 19th of May, and some varieties of apples were in bloom on the 26th of May, with full bloom about the third of June. Although rain is recorded on twelve occasions between the 11th of June and the 13th of July the precipitation was light, and eleven of these showers aggregated only 0·32 inches. This shortage in moisture checked the growth of small fruits, particularly the strawberry, which was a light crop. Vegetable crops suffered greatly, and the field crops suffered considerably. Frequent rains from the 14th to the 29th of July aggregated 3·27 inches, and improved crop conditions greatly. Through August the rainfall was light, amounting to only 1·02 inches. This dry weather continued to the 10th of September, with the result that apples were not the size they otherwise would have been. They coloured well, however, and a good quality of marketable fruit resulted.

SMALL FRUITS

STRAWBERRIES: NITRATE OF SODA AS A TOP-DRESSING IN SPRING

Tests have been conducted with nitrate of soda applied as a surface dressing to the strawberry plantation early during the fruiting year. The application has been made during early May, before the plants have started to make much growth. The fertilizer is scattered evenly over the plants. It should be stated that the soil is a light, sandy loam, not high in fertility, and while on such soils the use of nitrate of soda has been profitable, it is possible that on richer soils nitrate of soda may promote too vigorous a foliage growth, resulting, should the season be damp, in much rotting of fruit. The weather during the fruiting period has been dry during the past six years, and the plants receiving nitrate of soda for the most part have benefited, evidently because of a better root development, which makes them able to withstand the effect of the dry weather. The yields from 1923 to 1928, inclusive, are given in the table below.

NITRATE OF SODA AS A TOP-DRESSING TO STRAWBERRIES IN SPRING OF FRUITING YEAR—VARIETY, SENATOR DUNLAP

Nitrate of soda, pounds per acre	Yields per acre						
	1923	1924	1925	1926	1927	1928	Average, 6 years
	qt.	qt.	qt.	qt.	qt.	qt.	qt.
200	11,880	8,820	4,260	5,082	4,620	15,840	8,417
100	8,280	10,440	4,620	4,686	4,356	14,380	7,794
None	3,660	7,380	2,160	2,838	4,224	13,200	5,577

TREE FRUITS

PLUMS

The plum orchard contains for the most part only two trees of a kind, and because of not having a large quantity of any one variety the development of a satisfactory market is not to be expected. However, about 1900 6-quart baskets were disposed of at fair prices. The fact that many varieties are growing together, and that there is an ample bee population, permits of a good set of fruit.

Considerable trouble has resulted in the past from black-knot fungus on some trees, but careful fall inspection and removal of any knots that form, with a dormant application of 1 to 10 lime-sulphur in the early spring, has kept this, as well as the plum pocket disease, in check. Lime-sulphur arsenate is applied

just before the blossoms open. This is followed by wetable sulphur or sulphur dust applied at intervals of two weeks during July and early August, to prevent the development of the brown rot fungus, which under our climatic conditions develops rapidly when the fruit is about ready to ripen.

The trees are grown under the sod belt method, with 2½ feet of grass at each side of the tree in the row, and the rest of the area kept cultivated. The fertilizer used is a 10-5-7 mixture made up of 200 pounds each of nitrate of soda, sulphate of ammonia, and superphosphate, and 100 pounds of muriate of potash. This is applied at the rate of 5 pounds per tree. The trees are 20 feet by 20 feet apart.

The demand is greater for the blue and red plums, with less call for the green ones. Earliest of All, Red June, and Shiro, the latter a yellow plum of good size, are the earliest of the Japanese sorts. These, particularly the first two, will run small unless well thinned, as the set is usually heavy. They are valuable as early sorts, but are of poor quality and not advised except for limited planting to meet the demands of an early market. Early Rivers and Paul Early are two early, blue European plums, small in size but valuable for early fruit of fair to good quality. Burbank is the most desirable of all Japanese sorts tested. The set is generally heavy and much undersized fruit will result if thinning is not practised. This variety is well liked by the trade because of its good handling qualities and appearance. Quackenboss, a European plum, is a large, round, dark purple plum of good quality, and well liked by the trade, following Burbank in season. Peter's Golden Gage is a medium-sized plum of excellent quality, and the tree is prolific. Washington is a medium to large plum of good quality, and desirable as a mid-season yellow plum. Bradshaw is a large, purplish-red plum of good quality, but does not come into fruiting early. It should, however, be included as one of the most desirable sorts. Miller Superb is a golden yellow plum of good size and excellent quality, and the tree is productive. Monarch, of a rich purple colour, and of good quality, is one of the best of the late plums, and is well liked by the trade. Reine Claude is one of the best late, green plums. The tree is vigorous and productive, and the fruit should be thinned. The quality is of the best when properly ripened. The Fellenberg or Italian prune is one of the best of the late prune plums. It is of good quality, and should be more extensively grown.

QUINCES, TEST OF VARIETIES

Seven varieties were planted in 1913. The total yield since planting of the highest-yielding tree of each variety is given in the table, together with other data as to the growth and condition of the trees, etc.

QUINCES—RESULTS OF TEST OF VARIETIES

Variety	Remarks	Condition of tree	Growth of tree	Total yield, highest-yielding tree since planting
				pk.
Van Deman	Good cropper; thrifty tree	Good	Strong	17·5
Missouri Mammoth	Fair cropper; thrifty tree	Fair	Medium	9·9
Meech's Prolific	Good cropper; thrifty tree	Good	Medium	8·4
Rea's Mammoth	Very dwarf; not very hardy	Fair	Medium	7·5
Orange	Fair cropper; tree healthy and strong	Fair	Medium	6·0
Champion	Not very thrifty nor productive	Fair	Medium	3·6
Bourgeat	Very dwarf and very unproductive			(8 fruits)

APPLES

ORCHARD CULTIVATION

The sod-belt method of cultivation is practised in the orchards, with the exception of a small area in sod. During the last seven years a strip of sod ten feet wide, five feet on either side of the row of trees, has been allowed to remain in sod. The grass growing in this strip is cut twice during the growing season, mid-June and mid-August, and is left as a mulch about the trees. Outside of this strip of sod, cultivation is practised. In the orchards that are set 40 feet by 20 feet some inter-crops are still being grown. A three-year rotation has been generally adopted, consisting of corn, oats, and clover hay. Where these crops are being grown it is necessary to have sufficient space beyond the spread of the branches of the 16-year old trees to permit of the passage of the sprayer on either side of the row. These strips, usually from 8 to 10 feet wide, are kept cultivated until the middle of July. In the apple, plum and cherry orchards, where the trees are planted 20 feet by 20 feet, the entire area outside of the sod belt is cultivated frequently until mid-July. Ploughing was commenced in the orchards on April 25, and all cultivation was discontinued after July 4, when the last harrowing was given the strips to conserve the soil moisture by the formation of a dust mulch.

ORCHARD FERTILIZATION

Annual applications of commercial fertilizers are made to the Station orchards. This was applied in 1928 between May 2 and 5. Orchard ploughing and cultivation had commenced on April 25, so that at the time the fertilizer was applied the soil was dried out sufficiently to permit of these operations and the fruit buds were at the green-tip stage. The fertilizer used was composed of 200 pounds each of nitrate of soda, sulphate of ammonia and superphosphate, and 100 pounds of muriate of potash. Trees set 40 feet by 20 feet and 15 years planted received the above mixture at the rate of 7 pounds per tree or 378 pounds per acre. Trees of the same age but set 20 feet by 20 feet received 5 pounds per tree, or 540 pounds per acre, while mature orchard trees 30 years or older, received 600 pounds per acre. The fertilizer was carefully sown by hand to the area of soil under and about each tree. In the mature orchard where the trees are headed high the fertilizer was sown with a distributor. All the fertilizer was applied at the one application.

COMPARATIVE TIME OF BLOOM AND YIELDS OF STANDARD COMMERCIAL VARIETIES OF APPLES PLANTED IN 1912

The varieties Gravenstein, McIntosh, Ribston, Blenheim, and Fallawater bloomed heavily and were a good crop. Wagener, Baldwin, Greening, King and Stark were a light crop. The weather was favourable for the transfer of pollen during bloom, and the fifty colonies of bees, placed approximately at the rate of one colony per acre, assisted in giving a good set of fruit, although on the whole the bloom appeared to be light. Dry weather from the first of August to the middle of September seemed to favour the development of a crop of apples exceptionally free from fungous diseases, but considerably checked the growth of the fruits; however, a crop of about 3,300 barrels of well-matured fruit was harvested. Picking was completed by October 26. The table below gives the yields and the comparative dates of blooming of the different varieties.

COMPARATIVE TIME OF BLOOM AND YIELDS OF STANDARD COMMERCIAL VARIETIES OF APPLES PLANTED IN 1912

Variety	Number of trees fruiting	Average number of days after full bloom of Crimson Beauty to full bloom of variety	Total yield of lowest-yielding tree since planting	Total yield of highest-yielding tree since planting	Total yield per acre, 54 trees, since planting	Total yield per tree since planting
			bbl.	bbl.	bbl.	bbl.
Astrachan	6	*	5·09	10·50	420·66	7·79
Baldwin	41	5	2·05	10·34	345·53	6·40
Baxter	5	3	4·74	8·25	339·66	6·29
Ben Davis	19	5	9·14	14·98	305·20	5·65
Bishop Pippin	19	8	2·54	8·09	261·90	4·85
Blenheim	38	3	1·36	12·91	363·96	6·74
Cox Orange	16	2	3·63	12·77	410·40	7·60
Crimson Beauty	16	*	3·72	10·18	370·44	6·86
Duchess	15	*	5·20	13·36	496·36	9·19
Dudley (North Star)	2	2	11·59	18·32	807·30	14·95
Fallawater	21	5	3·09	14·68	442·52	8·19
Fameuse	20	3	7·27	20·40	784·08	14·52
Gano	16	7	7·98	20·64	718·81	13·31
Golden Russet	16	4	1·05	6·61	249·92	4·63
Gravenstein	19	1	3·23	23·32	488·41	9·04
Gravenstein, Banks	17	1	2·34	12·14	415·16	7·69
Greening (R.I.)	40	4	3·59	18·05	430·08	7·96
Hubbardston	8	4	1·30	12·82	389·47	7·21
King of Tompkins	29	3	0·61	10·29	286·09	5·30
McIntosh	20	2	4·48	10·89	666·90	12·35
McMahon	4	5	6·20	17·91	630·45	11·68
Milwaukee	20	*	9·70	20·05	760·18	14·08
Nonpareil (Roxbury Russet)	15	2	3·45	9·16	337·00	6·24
Northern Spy	38	7	0·86	14·02	366·60	6·79
Ontario	18	5	5·05	14·80	491·73	9·11
Ribston	35	2	3·77	16·33	594·25	11·00
Rome Beauty	17	5	8·27	21·02	649·65	12·03
Stark	17	2	4·64	15·98	675·54	12·51
Tolman Street	24	6	5·73	11·59	459·22	8·50
Wagener	37	2	1·36	12·05	441·33	8·17
Wealthy	46	4	6·27	15·59	580·50	10·75
Wellington	20	4	6·36	15·91	564·30	10·45
Wolf River	11	6	4·09	16·07	508·68	9·42
Yellow Transparent	18	*	4·93	11·86	423·90	7·85

*May 31, as for Crimson Beauty.

CLOSE PLANTING OF APPLE TREES

A block of apple trees was set 10 feet by 10 feet in the spring of 1913. Practically all reached bearing age in good condition, but the production from different trees has been very uneven. The total yields to 1923, inclusive, from this block of close-planted trees are given in the table. (At the end of 1923 the trees had become too crowded, and every other tree was removed, the removals being alternated in adjacent rows. The trees removed were transplanted to another section of the orchard in the spring of 1924, and the success of this transplanting is reported separately, in the following experiment).

CLOSE PLANTING OF APPLE TREES

Variety	Number of trees set in 1913	Number reaching bearing-age	Condition of trees	Growth of trees	Total production from planting to 1923		
					Highest yielding tree	Lowest yielding tree	Average of variety
					pk.	pk.	pk.
Wagener	9	9	Good	Strong	15·0	1·5	5·77
Stark	36	36	Good	Strong	25·0	(2 fruits)	12·20
Nonpareil	21	21	Good	Strong	10·5	0·5	4·29
Milwaukee	26	26	Good	Strong	42·5	14·5	28·21
Ribston	30	27	Good	Strong	14·5	1·0	6·28

TRANSPLANTING APPLE TREES ELEVEN YEARS PLANTED

In the spring of 1924 fifty-five apple trees were transplanted from a block set 10 feet by 10 feet apart in the spring of 1913. These were taken up by digging off the surface soil and cutting the roots five feet out from the trunk of the trees, and lifting the trees out with a block and tackle. They were at once moved to where they were to be re-set, and were planted in practically the condition in which they had been dug. The soil was carefully worked in around the roots and firmed, and the tops were well headed back. The trees were later mulched with strawy manure and during the first season, which was dry, were watered twice. The results obtained from this transplanting have not been satisfactory. (Some apple trees set out after growing six years have made satisfactory growth).

The cost of transplanting was as follows:—

Lifting trees: 137 hours at 27½ cents per hour		$ 37 68
Moving trees: men, 27 hours at 28 cents	$ 7 56	
horses, 54 hours at 10 cents	5 40	
		12 96
Digging holes and planting: 74 hours at 27½ cents	$ 20 35	
35 hours at 20 cents	7 00	
		27 35
Pruning and heading back: 14 hours at 27½ cents		3 85
Total cost of transplanting		$ 81 84
Cost per tree		$ 1 49

Eighteen of the trees were dead by the spring of 1927, and others which failed to show signs of making a satisfactory growth have been removed. The condition of the remaining trees is as follows:—

CONDITION OF TRANSPLANTED APPLE TREES

Variety	Number of trees transplanted	Trees making good growth	Trees making medium growth
Stark	18	5	4
Ribston	12	0	1
Milwaukee	11	1	4
Nonpareil	7	0	0
Wagener	5	0	0
Wealthy	2	1	0
	55	7	9

APPLE TREES IN SOD

As reported in our 1927 annual report (page 20) an area of 3¼ acres of orchard thirty years old was seeded to different grass and clover mixtures. These became well established in 1927. In the spring of 1928 a fertilizer made up of 200 pounds each of nitrate of soda and sulphate of ammonia, 200 pounds of superphosphate and 100 pounds of muriate of potash was applied at the rate of 600 pounds per acre. The grass was cut twice in 1928, and a record obtained of the green weight. The cut grass was allowed to remain as a partial mulch spread over the whole area. It was cut for the most part with the horse mower, although under the trees hand clipping was necessary. The fruit on this area was rather undersized, but of good quality and well matured.

There was much couch grass in this area at the start, amounting on the average to about one-third of the total, with approximately 30 per cent of clover, 30 per cent of timothy and the balance in the finer grasses. Very little of the alfalfa was in evidence.

RESULTS WITH DIFFERENT GRASS AND CLOVER MIXTURES

——	Plot 1	Plot 2	Plot 3	Plot 4
Seed used	Seed used per acre			
	lb.	lb.	lb.	lb.
Timothy	8	5	5	8
Red clover	5	5	5	5
Alfalfa	5	.....	.....	.....
White Dutch clover	2	2	2	2
Kentucky Blue grass	.....	8	.....	.....
Red top	.....	.....	8	.....
Alsike clover	.....	.....	.....	5
	Green weight of grass and clover			
Date cut	tons	tons	tons	tons
June 23	6·19	6·39	5·50	7·94
Sept. 13	4·13	4·26	4·04	3·97
Total	10·32	10·65	9·54	11·91

APPLES ON DWARFING STOCKS

A number of trees grafted on Paradise (dwarfing) and on Doucin (semi-dwarfing) apple stocks were planted in 1914, in rows 20 feet apart, the trees ten feet apart in the rows. The soil was variable, due to an abrupt elevation in the area, and because of this snow gathered in drifts, breaking some of the trees. As would be expected the growth of the trees on the Paradise stock has been much less than that of the same varieties on the Doucin stock. All the trees have been fertilized at the same rate per acre, and given the same cultivation. The results to date are as given in the table.

APPLES ON DWARFING STOCKS

Variety	Trees set	Trees dead	Trees not true	Trees fruiting	Growth	Total yield per tree since planting
						bbl.
Paradise Stock—						
Gravenstein	10	2	.....	8	Good	1·75
Wealthy	12	4	.....	8	Good	3·71
McIntosh	12	1	2	9	Good	4·14
King	5	1	.....	4	Good	0·51
Spy	5	2	.....	3	Fair	2·29
Wellington	5	.....	.....	5	Good	7·11
Cox Orange	5	.....	.....	5	Good	2·90
York Imperial	5	.....	.....	5	Good	6·44
Doucin Stock—						
Gravenstein	10	.....	2	8	Good	2·30
Wealthy	12	.....	.....	12	Good	4·24
McIntosh	12	.....	.....	12	Good	5·35
King	5	.....	.....	5	Good	0·59
Spy	5	.....	.....	5	Good	2·88

ORCHARD: SOIL MANAGEMENT, AND FERTILIZERS APPLIED AT DIFFERENT DATES

This experiment had two objects in view: one to determine the value of different methods of tillage, and the other to determine the best time for applying fertilizers to the orchard. The trees used were McIntosh and Wagener alternating, spaced 20 feet apart in the row and the rows 40 feet apart. Up to the spring of 1924 all the trees had received similar treatment and were fertilized alike. The trees were set in 1915, and were given clean cultivation until 1921, when a strip of grass six feet wide under the trees was allowed to remain uncultivated. These strips were clipped in mid-June and again in mid-August, and the clippings allowed to remain as a mulch. The area outside of the strips was cultivated to July 1. By 1924 the grass strip had widened to 8 feet (4 feet at each side of the tree-row), a space of 8 feet on each side of the grass strips was cultivated, and the areas between the cultivated rows were in a three-year rotation of field crops.

In 1924 the cultivated strips on either side of the tree were seeded down in one row and have not been cultivated since. Another row was left with the sod strip, and has been cultivated at each side of the strip to July 1. A third was ploughed, and has been kept cultivated close to the tree, and for a distance as wide as that with the sod strip cultivation. The areas in sod were cut twice each season, and the grass allowed to remain as a mulch. No additional mulching material has been used.

Under the clean and partial cultivation treatments the trees show a better and more healthy foliage, with better growth conditions and larger fruit than the trees in sod. The trees in sod show the effect of dry weather in a marked degree, as was evidenced during the dry August of this year.

The three rows under the different methods of management were each divided into four plots of five trees each, and the same fertilizer was applied to one plot in each row on April 25, to another three plots, May 17, and to another three plots June 8, one plot in each row being left unfertilized. The fertilizer used was made up of 150 pounds of nitrate of soda, 300 pounds of superphosphate and 50 pounds of muriate of potash, which is a 4.5-9.6-5 fertilizer. This was used at the rate of 5 pounds per tree in 1924, 1925, and 1926, and 7 pounds per tree in 1927 and 1928. This was applied broadcast around each tree to cover the area occupied by the roots of the tree, a distance around and under the tree three feet greater than the spread of the branches.

The early application of fertilizers to the orchard is not advised, as at that time in most orchards it is difficult to move readily because of the ground being soft. The time that suits the best is about the middle of May, and the practice of applying fertilizer from the 10th to the middle of May is, we think, satisfactory. The results indicate that the best yields were obtained from the plots fertilized on June 8. This we should think to be too late, and advise the mid-May application until further data are secured on this point.

The yields in the table below are the average of two trees each of McIntosh and Wagener from each plot, for the five years since this experiment started. The value of the McIntoshes is calculated at $3.50, and of the Wagener at $3 per barrel. The trees are calipered each year at a distance of ten inches from the ground, and the average diameter of these two trees is given in the table. These trees are planted 54 to the acre, so that the yield per acre of each variety is calculated on the basis of 27 trees of the variety per acre.

ORCHARD—SOIL MANAGEMENT AND FERTILIZERS APPLIED AT DIFFERENT DATES

Average for five-year period		Sod		Partial cultivation		Clean cultivation	
		McIntosh	Wagener	McIntosh	Wagener	McIntosh	Wagener
Not fertilized							
Total yield per tree...	bbl.	4·49	1·50*	6·91	2·98	8·78	3·11
Total yield per acre..	bbl.	121·23	40·50*	186·57	80·46	237·06	83·97
Value of apples.....	$	424 30	121 50*	652 99	241 38	829 71	251 91
Diameter of trees.....	in.	6·16	5·97*	6·82	5·95	7·83	6·31
Fertilized April 25							
Total yield per tree...	bbl.	5·64	3·53	7·44	3·59	6·15	3·57
Total yield per acre..	bbl.	152·28	95·31	200·88	96·93	166·05	96·39
Value of apples.....	$	532 98	285 93	703 08	290 79	581 17	289 17
Cost of fertilizer.....	$	12 61	12 61	12 61	12 61	12 61	12 61
Value of apples above cost of fertilizer.....	$	520 37	273 32	690 47	278 18	568 56	276 56
Diameter of trees.....	in.	6·40	6·18	6·34	5·99	7·41	7·27
Fertilized May 17							
Total yield per tree...	bbl.	7·28	2·90	6·85	3·23*	5·90	3·89
Total yield per acre..	bbl.	196·56	78·30	184·95	87·21*	159·30	105·03
Value of apples.....	$	687 96	234 90	647 32	261 63*	557 55	315 09
Cost of fertilizer.....	$	12 61	12 61	12 61	12 61*	12 61	12 61
Value of apples above cost of fertilizer.....	$	675 35	222 29	634 71	249 02*	544 94	302 48
Diameter of trees....	in.	6·35	6·12	6·05	6·40*	7·35	6·09
Fertilized June 8							
Total yield per tree...	bbl.	8·27	2·11	11·19	5·55	6·14	4·61
Total yield per acre..	bbl.	223·29	56·97	302·13	149·85	165·78	124·47
Value of apples.....	$	781 51	170 91	1,057 45	449 55	580 23	373 41
Cost of fertilizer.....	$	12 61	12 61	12 61	12 61	12 61	12 61
Value of apples above cost of fertilizer.....	$	768 90	158 30	1,044 84	436 94	567 62	360 80
Diameter of trees.....	in.	7·01	5·85	6·99	6·28	6·92	6·49
Average of the above three fertilizer series							
Total yield per tree...	bbl.	7·06	2·85	8·49	4·12	6·06	4·02
Total yield per acre...	bbl.	190·71	76·86	229·32	11·33	163·71	108·63
Value of apples.....	$	667 45	230 58	802 65	333 99	572 98	325 89
Diameter of trees.....	in.	6·59	6·05	6·46	6·22	7·23	6·62
Weight of 100 apples..	lb.	20·13	.....	22·58	.....	23·81	.....

*Records obtained from one tree only.

ORCHARD—FERTILIZERS APPLIED AT DIFFERENT DATES

Sod, partial and clean cultivation; average for five-year period		McIntosh	Wagener
Not fertilized			
Total yield per tree	bbl.	6·73	2·53
Total yield per acre	bbl.	181·62	68·31
Value of apples	$	635 67	204 93
Diameter of trees	in.	6·94	6·08
Fertilized April 25			
Total yield per tree	bbl.	6·41	3·56
Total yield per acre	bbl.	173·07	96·21
Value of apples	$	605 74	288 63
Cost of fertilizers	$	12 61	12 61
Value of apples above cost of fertilizer	$	593 13	276 02
Diameter of trees	in.	6·72	6·48
Fertilized May 17			
Total yield per tree	bbl.	6·68	3·34
Total yield per acre	bbl.	180·27	90·18
Value of apples	$	630 94	270 54
Cost of fertilizers	$	12 61	12 61
Value of apples above cost of fertilizer	$	618 33	257 93
Diameter of trees	in.	6·58	6·20
Fertilized June 8			
Total yield per tree	bbl.	8·53	4·09
Total yield per acre	bbl.	230·40	110·43
Value of apples	$	806 40	331 29
Cost of fertilizer	$	12 61	12 61
Value of apples above cost of fertilizer	$	793 79	318 68
Diameter of trees	in.	6·97	6·21

DIFFERENT NITROGENOUS FERTILIZERS FOR APPLE TREES

The object in starting this experiment was to determine the relative value for apple production of the different nitrogenous fertilizers now offered. The King variety, alternated with Wagener on two rows, and the Baldwin, alternated with Wagener on two rows, planted in 1915, were used. The trees were in rows 40 feet apart, and were 20 feet apart in the row. There were five trees in each plot, and the records were taken from two trees of each variety in a plot. The plots were in duplicate for King and Baldwin, and in quadruplicate for Wagener.

The same amount of nitrogen was given to each tree. Nitrate of soda and nitrate of lime, each containing 15 per cent of nitrogen, were applied at the rate of 5 pounds per tree. Sulphate of ammonia, 20 per cent nitrogen, was applied at the rate of $3\frac{3}{4}$ pounds per tree, and Cyanamide, 21·5 per cent nitrogen, at the rate of $3\frac{1}{2}$ pounds per tree. The plots also received 2 pounds of superphosphate and 1 pound of muriate of potash per tree. Two plots of King and Wagener and two plots of Baldwin and Wagener each received 2 pounds of superphosphate and 1 pound of muriate of potash without nitrogenous fertilizer, and two similar plots were not fertilized at all. The fertilizer was applied May 4 in 1927, and May 14 in 1928.

The average yield of fruit per tree from the different plots for 1927 and 1928 is given in the table below. The value per acre is calculated on the basis of 27 trees per acre, and at a value of $3 per barrel of fruit.

DIFFERENT NITROGENOUS FERTILIZERS FOR APPLE TREES—YIELD AND VALUE OF APPLES AND FERTILIZERS PER ACRE (27 TREES)

—		King	Baldwin	Wagener	Average of the three varieties
Nitrate of soda, 270 pounds; superphosphate, 108 pounds; muriate of potash, 54 pounds—					
Yield per tree, two years	bbl.	3·15	3·50	2·37	3·01
Yield per acre, two years	bbl.	85·05	94·50	63·99	81·18
Value of apples, two years	$	255 15	283 50	191 97	243 54
Cost of fertilizers, two years	$	9 88	9 88	9 88	9 88
Value of apples above cost of fertilizers	$	245 27	273 62	182 09	233 66
Nitrate of lime, 270 pounds; superphosphate, 108 pounds; muriate of potash, 54 pounds—					
Yield per tree, two years	bbl.	2·89	2·54	1·70	2·38
Yield per acre, two years	bbl.	78·03	68·58	45·90	64·17
Value of apples, two years	$	234 09	205 74	137 70	192 51
Cost of fertilizers, two years	$	9 30	9 30	9 30	9 30
Value of apples above cost of fertilizers	$	224 79	196 44	128 40	183 21
Sulphate of ammonia, 202.5 pounds; superphosphate, 108 pounds; muriate of potash, 54 pounds—					
Yield per tree, two years	bbl.	1·71	1·93	1·95	1·86
Yield per acre, two years	bbl.	46·17	52 11	52 65	50·31
Value of apples, two years	$	138 51	156 33	157 95	150 93
Cost of fertilizers, two years	$	8 12	8 12	8 12	8 12
Value of apples above cost of fertilizers	$	130 39	148 21	149 83	142 81
Cyanamide, 189 pounds; superphosphate, 108 pounds; muriate of potash, 54 pounds—					
Yield per tree, two years	bbl.	2·11	2·61	1·84	2·19
Yield per acre, two years	bbl.	56·97	70·47	49·68	59·04
Value of apples, two years	$	170 91	211 41	149 04	177 12
Cost of fertilizers	$	7 97	7 97	7 97	7 97
Value of apples above cost of fertilizers	$	162 94	203 44	141 07	169 15
Superphosphate, 108 pounds; muriate of potash, 54 pounds					
Yield per tree, two years	bbl.	2·41	1·93	1·66	2·00
Yield per acre, two years	bbl.	65·07	52·11	44·82	54·00
Value of apples, two years	$	195 21	156 33	134 46	162 00
Cost of fertilizers, two years	$	2 05	2 05	2 05	2 05
Value of apples above cost of fertilizers	$	193 16	154 28	132 41	159 95
Not fertilized					
Yield per tree, two years	bbl.	1·73	2·54	1·91	2·06
Yield, per acre, two years	bbl.	46·71	68·58	51·57	55·62
Value of apples, two years	$	140 13	205 74	154 71	166 86

APPLE PRODUCTION AS INFLUENCED BY APPLICATIONS OF GROUND LIMESTONE

In order to secure information as to the value of lime in apple tree growth and fruit production, tests have been made using ground limestone at the rate of two tons per acre, applied in the spring of 1916, 1919, 1923, and 1926, a total of eight tons per acre having been applied to date. The trees were planted in 1913, and each plot consists of two trees of Wagener with two trees of either Gravenstein or McIntosh. Fertilizers as stated below were applied in the spring of 1913, 1914, 1916, 1917, 1919, 1920, 1922, and annually since that time. Where manure was used it was applied at the rate of 15 tons per acre in 1913, 1916, 1919, 1922, and 1925. In 1927 and since that time spring applications of five tons of manure per acre have been made to the manured plots.

The results obtained with the intermediate crops, those produced outside the area occupied by the trees, show the red clover crop to have been very much greater on the limed plots, and were it possible to work in this clover as a cover crop no doubt much gain would result to the apple tree. Red clover, however, seeded early in July (when cover crops should be seeded) does not make a very great growth by fall, when orchard ploughing takes place. The intermediate crops, on the other hand, were carried through a full clover year, which does not appear to be practical in general orchard work where summer cultivation to July 1 is practised. The growth of vetches and other quick-growing legumes is improved where lime has been used.

From the results obtained there is no apparent great direct gain from the use of lime for apple tree growth or fruit production. On the other hand, there should be an indirect benefit, because of the better growth possible if leguminous plants which respond to lime are used as a cover crop. The results as tabulated give the total production in pecks per tree since planting, and the growth of the tree as determined by the diameter ten inches from the ground.

INFLUENCE OF SOIL ACIDITY ON TREE GROWTH AND FRUIT PRODUCTION, 1913 TO 1928

Plot	How fertilized per acre	Diameter of tree			Total yield per tree since planting		
		First tree	Second tree	Average	First tree	Second tree	Average
		in.	in.	in.	pk.	pk.	pk.
	Gravensteins			Without	Limestone		
30	Manure, 15 tons; slag, 500 pounds	9·03	8·56	8·79	74·00	63·00	68·50
27	Manure, 15 tons; superphosphate, 250 pounds; slag, 250 pounds..	8·64	9·66	9·15	62·25	116·00	89·13
25	Manure, 15 tons.....	9·27	8·50	8·88	86·50	56·75	71·63
31	Manure, 15 tons; superphosphate, 500 pounds.....	8·94	8·40	8·60	80·00	78·25	79·13
	Averages.....	8·90	8·78	8·85	75·69	78·50	77·10
				With	Limestone		
28	Manure, 15 tons; slag, 500 pounds	.....	9·20	9·20	.....	111·75	111·75
29	Manure, 15 tons; superphosphate, 250 pounds; slag, 250 pounds..	.....	9·90	9·90	.....	125·75	125·75
32	Manure, 15 tons.....	9·31	8·17	8·74	91·75	56·25	74·00
33	Manure, 15 tons; superphosphate, 500 pounds.....	9·90	10·53	10·21	72·25	74·75	73·50
	Averages.....	9·60	9·45	9·51	82·00	92·12	96·25

INFLUENCE OF SOIL ACIDITY ON TREE GROWTH AND FRUIT PRODUCTION, 1913 TO 1928—*Concluded*

Plot	How fertilized per acre	Diameter of tree			Total yield per tree since planting		
		First tree	Second tree	Average	First tree	Second tree	Average
		in.	in.	in.	pk.	pk.	pk.
	McIntosh Red			Without	Limestone		
51	Superphosphate, 500 pounds	7·11	6·05	6·58	131·75	74·25	103·00
49	Nitrate of soda, 150 pounds; superphosphate, 500 pounds	6·83	6·01	6·42	101·00	58·50	79·75
44	Check, no fertilizer	7·43	6·13	6·78	165·75	80·50	123·13
	Averages	7·12	6·06	6·59	132·83	71·08	101·96
				With	Limestone		
43	Superphosphate, 500 pounds	7·15	7·58	7·36	108·25	108·50	108·37
41	Nitrate of soda, 150 pounds; superphosphate, 500 pounds	6·75	6·60	6·67	70·00	37·50	53·75
48	Check, no fertilizer	7·78	5·66	6·72	155·25	139·75	147·50
	Averages	7·23	6·61	6·92	111·16	95·25	103·22
	Wagener			Without	Limestone		
30	Manure, 15 tons; slag, 500 pounds	6·05	6·76	6·41	53·50	42·75	48·13
31	Manure, 15 tons; superphosphate, 500 pounds	5·03	6·72	5·88	36·00	95·00	65·50
25	Manure, 15 tons	6·76	5·93	6·35	55·25	39·25	47·25
27	Manure, 15 tons; slag, 250 pounds; superphosphate, 250 pounds	6·05	6·01	6·03	85·25	75·25	80·25
51	Superphosphate, 500 pounds	6·67	7·30	6·99	64·25	88·25	76·25
21	Basic slag, 500 pounds	7·54	6·44	6·99	101·75	97·00	99·38
22	Nitrate of soda, 150 pounds; slag, 500 pounds	7·27	7·30	7·29	105·50	119·50	112·50
10	Nitrate of soda, 150 pounds	5·49	6·28	5·89	50·25	59·50	54·88
49	Nitrate of soda, 150 pounds; superphosphate, 500 pounds	5·62	6·52	6·07	48·00	75·75	61·88
50	Nitrate of soda, 150 pounds; slag, 500 pounds; muriate of potash, 150 pounds	5·97	6·32	6·15	82·25	77·75	80·00
34	Check, no fertilizer	6·83	6·60	6·72	21·75	73·50	47·63
	Averages	6·30	6·56	6·43	63·98	76·68	70·33
				With	Limestone		
28	Manure, 15 tons; slag, 500 pounds	6·92	5·97	6·45	67·25	43·00	55·13
33	Manure, 15 tons, superphosphate, 500 pounds	6·60	6·56	6·58	55·75	81·00	68·38
32	Manure, 15 tons	7·46	.....	7·46	74·75	.....	74·75
29	Manure, 15 tons; slag, 250 pounds; superphosphate, 250 pounds	7·27	6·28	6·78	121·75	67·50	94·63
43	Superphosphate, 500 pounds	6·76	6·67	6·72	55·00	68·50	61·75
38	Basic slag, 500 pounds	6·40	6·83	6·62	57·25	40·25	48·75
36	Nitrate of soda, 150 pounds; slag, 500 pounds	5·26	4·83	5·05	35·50	14·25	24·88
42	Nitrate of soda, 150 pounds	6·95	5·82	6·39	99·16	77·50	88·33
41	Nitrate of soda, 150 pounds; superphosphate, 500 pounds	5·69	6·60	6·15	47·50	57·00	52·25
39	Nitrate of soda, 150 pounds; slag, 500 pounds, muriate of potash, 150 pounds	7·58	6·78	7·18	40·75	57·50	49·13
48	Check, no fertilizer	5·66	.....	5·66	61·50	.....	61·50
	Averages	6·59	6·26	6·45	65·11	56·28	61·77

ORCHARD FERTILIZER EXPERIMENT

The object of this experiment is to gain information as to the best fertilizers for apple production. The experiment embraces a series of forty-two plots fertilized in different ways, and nine unfertilized or check plots located in different parts of the area.

Records have been kept from the time of planting the trees in 1913. The ground not occupied by the growing trees has been in rotation with potatoes, grain, and hay, and summaries of the yields of these crops have been published in the Station reports for 1923 (p. 59) and 1925 (p. 69). The apple trees are in rows, forty feet apart, of Gravenstein and McIntosh, with Wagener as fillers in each row, the trees in the row being 20 feet apart, making 54 trees to the acre. Each plot consists of four trees fully separated from adjacent plots. These four trees consist of two Gravenstein or two McIntosh alternated with two Wagener, and the yields tabulated are of these four trees in each plot. Plots 1 to 24 were started in 1913, and the others in 1916.

From 1913 to 1922, while the trees were still small, the fertilizers were applied only the first and second years of the rotation; consequently there were no fertilizer applications in 1915, 1918, or 1921. From 1922 onwards annual applications have been made. Ground limestone at the rate of two tons per acre was applied to the plots indicated in 1916, 1919, 1923, and 1926.

The fertilizers have been charged at the average market prices prevailing during the period, which were, per ton, approximately: nitrate of soda, $67; sulphate of ammonia, $72; superphosphate, $21; slag, $23; muriate of potash, $42; bone meal, $45; ground limestone, $4.25. The value of the apples is calculated on an average tree-run valuation for the period of $3 for Gravenstein and McIntosh and $2.50 for Wagener, per barrel.

The table records for each plot the present diameter of the trees, the total production to date, the total cost of the fertilizers, and the value of the apples above the cost of fertilizers.

ORCHARD FERTILIZER EXPERIMENT: TOTAL FRUIT YIELDS, ETC., SINCE PLANTING

Plot	How fertilized, pounds per acre	Variety	Average diameter of trees at present	Average yield per tree since planting	Average yield per acre since planting	Value of apples per acre since planting	Cost of fertilizer per acre since planting	Value of apples above cost of fertilizer
			in.	bbl.	bbl.	$	$	$
1	Nitrate of soda, 150; superphosphate, 350; muriate of potash, 150.	Gravenstein	7·94	3·11	83·97	251 91	154 05	174 88
		Wagener	6·15	2·91	78·57	196 43		119 41
2	Nitrate of soda, 150; slag, 500; muriate of potash, 150.	Gravenstein	8·98	6·90	186·30	558 90	187 85	464 97
		Wagener	6·42	5·25	141·75	354 37		260 45
3	Nitrate of soda, 150; bonemeal, 500; muriate of potash, 150.	Gravenstein	9·18	5·12	138·24	414 72	252 53	288 45
		Wagener	6·84	3·66	98·82	247 05		120 79
4	Sulphate of ammonia, 150; superphosphate, 350; muriate of potash, 150.	Gravenstein	9·54	4·11	110·97	332 91	158 92	253 45
		Wagener	6·77	6·09	164·43	411 07		331 61
5	Nitrate of soda, 150; superphosphate, 350; muriate of potash, 100.	Gravenstein	9·47	6·23	168·21	504 63	140 40	434 43
		Wagener	6·89	6·86	185·22	463 05		392 85
6	Check	Gravenstein	8·75	4·69	126·63	379 89	.....	379 89
		Wagener	6·22	2·27	61·29	153 22		153 22
7	Nitrate of soda, 92·3; superphosphate, 215·4; muriate of potash, 92·3.	Gravenstein	7·97	4·31	116·37	349 11	94 80	301 71
		Wagener	7·61	7·52	203·04	507 60		460 20
8	Nitrate of soda, 138·5; superphosphate, 323; muriate of potash, 138·5.	Gravenstein	8·80	6·57	177·39	532 17	142 22	461 06
		Wagener	6·83	2·21	59·67	149 18		78 07
9	Nitrate of soda, 150; superphosphate, 350; muriate of potash, 60.	Gravenstein	8·98	5·86	158·22	474 66	129 43	409 92
		Wagener	6·98	5·75	155·25	388 12		323 86
10	Nitrate of soda, 150	Gravenstein	9·90	5·98	161·46	484 38	65 33	451 71
		Wagener	6·28	4·84	130·68	326 70		294 04

ORCHARD FERTILIZER EXPERIMENT: TOTAL FRUIT YIELDS, ETC., SINCE PLANTING—*Continued*

Plot	How fertilized, pounds per acre	Variety	Average diameter of trees at present	Average yield per tree since planting	Average yield per acre since planting	Value of apples per acre since planting	Cost of fertilizer per acre since planting	Value of apples above cost of fertilizer
			in.	bbl.	bbl.	$	$	$
11	Check	Gravenstein	9·25	6·89	186·03	558 09	.....	558 09
		Wagener	5·90	2·40	64·80	162 00	.....	162 00
12	Nitrate of soda, 184·6; superphosphate, 430·8; muriate of potash, 184·6.	Gravenstein	9·35	8·52	230·04	690 12	189 60	595 32
		Wagener	6·42	6·18	166·86	417 15		322 35
13	Nitrate of soda, 150; superphosphate, 350; muriate of potash, 30.	Gravenstein	9·00	5·84	157·68	473 04	121 29	411 89
		Wagener	5·92	3·82	103·14	257 85		196 71
14	Check	Gravenstein	7·77	2·48	66·96	200 88	.....	200 88
		Wagener	6·48	3·35	90·45	226 12	.....	226 12
15	Muriate of potash, 150	Gravenstein	7·90	9·34	252·18	756 54	40 95	736 06
		Wagener	5·98	5·86	158·22	395 55		375 08
16	Nitrate of soda, 150; superphosphate, 350; muriate of potash, 150.	Gravenstein	9·17	9·76	263·52	790 56	154 05	713 53
		Wagener	6·89	7·29	196·83	492 07		415 05
17	Superphosphate, 350	Gravenstein	9·11	7·09	191·43	574 29	47 77	550 40
		Wagener*	5·34	3·19	86·13	215 32		191 44
18	Bonemeal, 500	Gravenstein	8·75	8·09	218·43	655 29	146 25	582 16
		Wagener	7·37	7·52	203·04	507 60		434 48
19	Check	Garvenstein	9·22	9·98	269·46	808 38	.....	808 38
		Wagener	6·26	5·90	159·30	398 25	.....	398 25
20	Superphosphate, 350; muriate of potash, 150.	Gravenstein	9·03	10·18	274·86	824 58	88 72	780 22
		Wagener	7·07	5·40	145·80	364 50		320 14
21	Sydney slag, 500	Gravenstein*	9·50	9·70	261·90	785 70	74 75	748 32
		Wagener	6·99	9·08	243·81	609 52		572 15
22	Nitrate of soda, 150; slag, 500	Gravenstein	10·21	9·47	255·69	767 07	140 08	697 03
		Wagener	7·28	10·23	276·21	690 52		620 48
23	Nitrate of soda, 150; muriate of potash, 150.	Gravenstein	8·99	8·68	234·36	703 08	106 28	649 94
		Wagener	7·31	8·28	223·56	558 90		505 76
24	Nitrate of soda, 150; superphosphate, 350.	Gravenstein	9·11	8·93	241·11	723 33	113 10	666 78
		Wagener	6·67	2·82	76·14	190 35		133 80
25	Manure (5 tons)	Gravenstein	8·83	6·52	176·04	528 12	130 00	463 12
		Wagener	6·34	4·32	116·64	291 60		226 60
26	Check	Gravenstein	8·88	2·43	65·61	196 83	.....	196 83
		Wagener	5·38	3·08	83·16	207 90	.....	207 90
27	Manure (5 tons); superphosphate, 250; slag, 250.	Gravenstein	9·15	8·10	218·70	656 10	201 50	555 35
		Wagener	6·03	7·30	197·10	492 75		392 00
28	Manure (5 tons); slag, 500; limestone, (2 tons).	Gravenstein	9·20	10·16	274·32	822 96	238 75	708 58
		Wagener	6·44	5·01	135·27	338 17		318 80
29	Manure (5 tons); superphosphate, 250; slag, 250; limestone, (2 tons).	Garvenstein*	9·90	11·32	305·64	916 92	235 50	799 17
		Wagener	6·77	8·60	232·20	580 50		462 75
30	Manure (5 tons); slag, 500	Gravenstein	8·79	6·23	168·21	504 63	204 75	402 25
		Wagener	6·40	4·37	117·99	294 97		192 59
31	Manure (5 tons); superphosphate, 500.	Gravenstein	8·60	7·59	204·93	614 79	198 24	515 67
		Wagener	5·87	5·94	160·38	400 95		301 83
32	Manure (5 tons), limestone; (2 tons).	Gravenstein	8·74	6·73	181·71	545 13	164 00	463 13
		Wagener	7·39	6·21	167·67	419 17		337 17
33	Manure, (5 tons); superphosphate, 500; limestone, (2 tons).	Gravenstein	10·21	7·61	205·47	616 41	232 24	500 29
		Wagener	6·58	6·19	167·13	417 82		301 70
34	Check	Gravenstein	8·33	7·45	201·15	603 45	.....	603 45
		Wagener	6·71	4·19	113·13	282 82	.....	282 82
35	Manure, (5 tons); slag, 500	McIntosh	5·87	4·52	122·04	366 12	204 75	263 74
		Wagener	6·20	4·97	134·19	335 47		233 10
36	Nitrate of soda, 150; slag, 500; limestone, (2 tons).	McIntosh	7·02	5·73	154·71	464 13	174 08	377 09
		Wagener	5·04	2·27	61·29	153 22		66 18
37	Nitrate of soda, 150; slag, 250; superphosphate, 250; limestone, (2 tons).	McIntosh	6·62	8·82	238·14	714 42	170 83	629 00
		Wagener	6·68	4·58	123·66	309 15		223 74
38	Slag, 500; limestone, (2 tons)	McIntosh	8·60	11·40	307·80	923 40	108 75	869 02
		Wagener	6·65	4·43	119·61	299 02		244 65

ORCHARD FERTILIZER EXPERIMENT: TOTAL FRUIT YIELDS, ETC., SINCE PLANTING—*Concluded*

Plot	How fertilized, pounds per acre	Variety	Average diameter of trees at present	Average yield per tree since planting	Average yield per acre since planting	Value of apples per acre since planting	Cost of fertilizer per acre since planting	Value of apples above cost of fertilizer
			in.	bbl.	bbl.	$	$	$
39	Nitrate of soda, 150; slag, 500; muriate of potash, 150; limestone, (2 tons).	McIntosh	7·56	16·95	457·65	1,372 95	215 03	1,265 43
		Wagener	7·18	4·48	120·96	302 40		194 89
40	Check	McIntosh	6·71	7·20	194·40	583 20	.....	583 20
		Wagener*	5·90	3·11	83·97	209 92		209 92
41	Nitrate of soda, 150; superphosphate, 500; limestone, (2 tons).	McIntosh	6·67	4·89	132·03	396 09	167 57	312 30
		Wagener	6·64	4·76	128·52	321 30		237 52
42	Nitrate of soda, 150; limestone, (2 tons).	McIntosh	8·52	11·92	322·11	966 33	99 33	916 66
		Wagener	6·42	8·03	216·81	542 02		492 36
43	Superphosphate, 500; limestone, (2 tons).	McIntosh	7·36	9·85	265·95	797 85	102 24	746 73
		Wagener	6·71	5·62	151·74	379 35		328 23
44	Check	McIntosh	6·79	11·25	303·75	911 25	.....	911 25
		Wagener	5·50	2·92	78·84	197 10		197 10
45	Nitrate of soda, 150; slag, 500	McIntosh	6·85	6·75	182·25	546 75	140 08	476 71
		Wagener	5·79	3·16	85·32	213 30		143 26
46	Check	McIntosh	6·48	7·89	213·03	639 09	.....	639 09
		Wagener	9·58	2·61	70·47	176 17		176 17
47	Nitrate of soda, 150; superphosphate, 500; muriate of potash, 150	McIntosh	7·03	12·65	341·55	1,024 65	174 52	937 39
		Wagener	6·91	3·40	91·80	229 50		142 24
48	Limestone, (2 tons)	McIntosh	7·85	13·54	365·58	1,096 74	34 00	1,079 74
		Wagener*	5·66	5·60	151·20	378 00		361 00
49	Nitrate of soda, 150; superphosphate, 500.	McIntosh	6·42	7·26	196·02	588 06	133 57	521 27
		Wagener	6·07	5·62	151·74	379 35		312 57
50	Nitrate of soda, 150; slag, 500; muriate of potash, 150.	McIntosh	7·09	13·20	356·40	1,069 20	181 03	978 68
		Wagener	6·09	7·18	193·86	484 65		394 14
51	Superphosphate, 500	McIntosh	6·58	9·36	252·72	758 16	68 24	724 04
		Wagener	6·95	6·94	187·38	468 45		434 33

*Records obtained from one tree only.

ORCHARD FERTILIZER EXPERIMENT (1924)

This test was started in 1924 on an orchard set in 1915, composed of Gravenstein apple trees, with Wagener as fillers, the trees set 40 feet by 20 feet. The purpose of the experiment is to ascertain the influence of the different fertilizing elements, nitrogen, phosphoric acid and potash, applied separately and in combination. Each plot contains two Gravenstein and two Wagener trees, and there are 27 trees of each variety per acre. The fertilizer is applied broadcast annually in the spring, immediately after the first cultivation, usually about May 20. The sod-belt method of culture has been practised since 1921.

The following table records the data obtained for the years 1924 to 1928. The apples are valued at $3.50 for Gravenstein and $3 for Wagener, per barrel. The fertilizers are valued as follows: nitrate of soda, $58; superphosphate, $18, and muriate of potash, $40, per ton. The record of the keeping qualities of the fruit was taken for the Wageners only, and on March 1 each year.

ORCHARD FERTILIZER EXPERIMENT (1924): TOTAL FRUIT YIELDS, ETC., FOR THE FIVE YEARS, 1924–1928

Plot	How fertilized, pounds per acre	Variety	Average increase in diameter of trees during the five years	Average yield per tree over the 5-year period	Average yield per acre over the 5-year period	Value of apples per acre over the 5-year period	Cost of fertilizer for the period	Value of apples above cost of fertilizer	Record of keeping qualities (average of three years)		
									Sound	Scald	Rot
			in.	bbl.	bbl.	$	$	$	%	%	%
80	Nitrate of soda, 100; superphosphate, 300; muriate of potash, 100.	Gravenstein	0·26	4·25	114·75	401 62	19 00	382 62	.....	.....	.....
		Wagener	0·44	3·59	96·93	290 79	19 00	271 79	52·8	37·9	9·3
81	Nitrate of soda, 200; superphosphate, 300; muriate of potash, 100.	Gravenstein	0·43	5·39	145·53	509 35	26 25	483 10	.....	.....	.....
		Wagener	0·15	1·99	53·73	161 19	26 25	134 94	41·4	54·2	4·3
82	Superphosphate, 300; muriate of potash, 100.	Gravenstein	0·63	3·52	95·04	332 64	11 75	320 89	.....	.....	.....
		Wagener	0·21	4·48	120·96	362 88	11 75	351 13	50·8	42·7	6·4
83	Nitrate of soda, 400; superphosphate, 300; muriate of potash, 100.	Gravenstein	0·23	6·00	162·00	567 00	40 75	526 25	.....	.....	.....
		Wagener	0·48	3·87	104·49	313 47	40 75	272 72	33·0	60·8	6·1
84	Nitrate of soda, 100; superphosphate, 300.	Gravenstein	0·46	5·91	159·57	558 49	14 00	544 49	.....	.....	.....
		Wagener	0·45	3·84	103·68	311 04	14 00	297 04	47·5	46·3	6·1
85	Nitrate of soda, 200; superphosphate, 300.	Gravenstein	0·22	3·94	106·38	372 33	21 25	351 08	.....	.....	.....
		Wagener	0·20	2·39	64·53	193 59	21 25	172 34	15·5	77·6	6·8
86	Superphosphate, 300	Gravenstein	0·25	4·25	114·75	401 62	6 75	394 87	.....	.....	.....
		Wagener	0·46	2·65	71·55	214 65	6 75	207 90	40·3	57·1	2·5
87	Nitrate of soda, 400; superphosphate, 300.	Gravenstein	0·39	6·50	175·50	614 25	35 75	578 50	.....	.....	.....
		Wagener	0·20	2·42	65·34	196 02	35 75	160 27	14·1	76·5	9·3
88	Nitrate of soda, 100; muriate of potash, 100	Gravenstein	0·10	3·72	100·44	351 54	12 25	339 29	.....	.....	.....
		Wagener	0·40	3·31	89·37	268 11	12 25	255 86	36·0	57·8	6·1
89	Check, not fertilized	Gravenstein	0·37	5·37	144·99	507 46	.....	507 46	.....	.....	.....
		Wagener	0·17	2·68	72·36	217 08	.....	217 08	27·1	62·1	10·7
90	Nitrate of soda, 200; muriate of potash, 100	Gravenstein	0·48	2·37	63·99	223 96	19 50	204 46	.....	.....	.....
		Wagener	0·98	2·89	78·03	234 09	19 50	214 59	42·8	52·8	4·3
91	Muriate of potash, 100	Gravenstein	0·49	5·91	159·57	558 49	5 00	553 49	.....	.....	.....
		Wagener	0·42	3·06	82·62	247 86	5 00	242 86	54·1	43·4	2·4
92	Nitrate of soda, 400; muriate of potash, 100	Gravenstein	0·23	5·32	143·64	502 74	34 00	468 74	.....	.....	.....
		Wagener	0·14	3·70	99·90	299 70	34 00	265 70	31·4	64·0	4·7
93	Nitrate of soda, 100	Gravenstein	0·54	5·27	142·29	498 01	7 25	490 76	.....	.....	.....
		Wagener	0·20	3·07	82·89	248 67	7 25	241 42	47·8	50·3	1·9
94	Nitrate of soda, 200	Gravenstein	0·16	5·52	149·04	521 64	14 50	507 14	.....	.....	.....
		Wagener	0·46	3·77	101·79	305 37	14 50	290 87	38·3	43·8	17·9
95	Nitrate of soda, 400	Gravenstein	0·58	3·34	90·18	315 63	29 00	286 63	.....	.....	.....
		Wagener	0·30	2·39	64·53	193 59	29 00	164 59	31·4	64·3	4·3

VEGETABLES

BUSH BEANS

TEST OF VARIETIES.—Twenty-five varieties and strains were compared for their yields of green beans. These were sown May 30 in rows 2½ feet apart, a 33-foot row of each. The yields of the ten highest-yielding varieties are given below.

BUSH BEANS, TEST OF VARIETIES FOR GREEN PODS

Variety and source of seed	Ready for use	Total yield of green pods		Pods infected with anthracnose	Yield up to July 31	
		lb.	oz.	%	lb.	oz.
Stringless Green Pod (Ott. 11402)	July 25	35	0	35	6	6
Masterpiece (Ott.—General Run)	July 26	33	4	0	4	6
Plentiful French (Ott. 935)	July 26	30	8	10	6	12
Round Pod Kidney Wax (McDonald)	July 26	26	10	5	5	4
Bountiful (Ott. 9363)	July 27	25	0	0	3	12
Interloper Challenge Black Wax (Ott.—General Run)	July 23	24	12	10	5	8
Pencil Pod Black Wax (Ott.—General Run)	July 27	23	12	15	2	8
Hodson Long Pod Wax (Rennie)	Aug. 10	23	8	0	.....	
Yellow Eye Yellow Pod (Ott.—General Run)	July 27	23	8	0	1	12
Dwarf French or Bountiful (Andrewes, Mountain)	July 25	21	8	10	7	4

The same varieties and strains were similarly grown in other 33-foot rows for their yields of seed. The ten highest-yielding varieties or strains are given in the table.

BUSH BEANS, TEST OF VARIETIES FOR SEED

Variety and source of seed	Weight of seed beans		Per cent anthracnose on seed
	lb.	oz.	%
Bountiful (Ott. 9363)	4	0	5
Dwarf French Bountiful (Andrewes, Mountain)	3	10	5
Plentiful French (Ott. 935)	3	8	5
Hodson Long Pod (Rennie)	3	6	0
Interloper Challenge Black Wax (Ott.—General Run)	3	4	12
Yellow Eye Yellow Pod (Ott.—General Run)	2	12	0
Hodson Long Pod (Ott. 9325)	2	8	0
Masterpiece (Ott.—General Run)	2	8	0
Round Pod Kidney Wax (C.E.F.)	2	4	35
Pencil Pod Black Wax (Ott.—General Run)	2	2	10

CULTURAL TESTS.—(1) Successional sowing. Two varieties were sown at intervals from May 30 to June 16, in rows 2½ feet apart, the seed sown by hand 2 inches apart in the row. The yields of green beans and also of seed, each from 16½-foot rows, are given in the table below. It would appear that early in June is on the whole a better time to sow than late in May.

SUCCESSIONAL SOWING OF BUSH BEANS

Variety and source of seed	Date of sowing	Ready for use	Yield of green pods from 16½-foot row		Per cent anthracnose on pods	Yield of seed from 16½-foot row		Per cent anthracnose on seed
			lb.	oz.	%	lb.	oz.	%
Round Pod Kidney Wax (Ott.—General Run)	May 30	July 28	12	12	15	0	12	18
Round Pod Kidney Wax (Ott.—General Run)	June 5	Aug. 2	14	14	40	1	8	6
Round Pod Kidney Wax (Ott.—General Run)	June 16	Aug. 8	14	0	45	2	2	20
Stringless Green Pod (Ott. 11402)	May 30	July 23	12	14	75	1	8	6
Stringless Green Pod (Ott. 11402)	June 5	July 25	13	14	40	0	10	8
Stringless Green Pod (Ott. 11402)	June 16	Aug. 5	14	8	25	0	12	14

(2) Thinning to different distances between plants. The same two varieties were sown thickly in rows 2½ feet apart, the plants later being thinned to 2, 4, and 6 inches apart in the row. The greatest yields of both green pods and seeds, were in all but one case from the plants thinned to 2 inches, and the lowest yields in all cases from those thinned to 6 inches.

BUSH BEANS THINNED TO DIFFERENT DISTANCES APART

Variety and source of seed	Distance between plants	Ready for use	Yield of green pods from 16½-foot row		Per cent anthracnose on pods	Yield of seed from 16½-foot row		Per cent anthracnose on seed
	in.		lb.	oz.	%	lb.	oz.	%
Round Pod Kidney Wax (Ott.—General Run)	2	July 27	10	4	60	1	4	16
Round Pod Kidney Wax (Ott.—General Run)	4	July 27	9	8	40	1	6	14
Round Pod Kidney Wax (Ott.—General Run)	6	July 27	8	0	25	0	14	10
Stringless Green Pod (Ott. 11402)	2	July 23	10	4	10	1	2	8
Stringless Green Pod (Ott. 11402)	4	July 26	6	4	65	0	8	12
Stringless Green Pod (Ott. 11402)	6	July 26	5	0	75	0	6	20

POLE BEANS

Five varieties and strains of pole beans were grown. The variety Ideal, a green-pod variety, grown for the first time, gave the largest yield of green pods. Kentucky Wonder Wax is the best wax bean of the pole varieties.

BEETS

TEST OF VARIETIES AND STRAINS.—Sixteen varieties and strains of beets were sown May 5 and again June 16. As in former years the variety Detroit Dark Red is easily the best.

SUCCESSIONAL SOWING.—Five successional sowings were made, beginning May 5, at intervals of about ten days. For winter use a sowing made the middle of June is most satisfactory. The table gives the yields from single rows, 8¼ feet long.

BEETS—RESULTS OF SUCCESSIONAL SOWING TEST

Variety and source of seed	Date of sowing	Weight of marketable roots	Number of roots not marketable	Weight of six large roots, Aug. 3	Weight of six large roots, Oct. 15
		lb. oz.		lb. oz.	lb. oz.
Detroit Dark Red (McDonald)	July 25	July 25	July 25		
	May 5	9 4	0	3 0	16 0
	May 18	5 12	1	2 6	13 0
	May 26	4 0	1	1 14	16 0
	Sept. 5	Sept. 5			
	June 5	7 0	0	1 0	9 0
	June 16	9 8	0	.. ..	9 0

CABBAGE

TEST OF VARIETIES.—Twenty-eight varieties and strains were tested. Of these Golden Acre was the earliest, followed by Copenhagen Market. Jersey Wakefield is a good early, but not so firm as Golden Acre. Winningstadt is a good second early, but, like Jersey Wakefield, is a pointed variety and not liked by the trade. The following table gives data secured from a sowing inside March 30, the plants set to the field May 9.

CABBAGE—RESULTS OF VARIETY TEST

Variety and source of seed	Ready for use	Days to maturity	Percentage of heads ready	Weight of three average heads
			%	lb. oz.
			Aug. 4	July 26
Golden Acre (Stokes)	July 19	111	87	4 8
Charleston Wakefield (Stokes)	July 19	111	100	6 4
Select Jersey Wakefield (McDonald)	July 19	111	87	5 0
Extra Early Jersey Wakefield (Stokes)	July 19	111	73	5 8
Copenhagen Market (James)	July 26	118	53	4 8
Copenhagen Market (Strandholm)	July 24	116	87	6 0
Copenhagen Market (Graham)	July 24	116	62	7 0
			Aug. 9	Aug. 9
Glory of Enkhuizen (Rennie)	Aug. 9	132	71	10 8
			Aug. 20	
Winnigstadt (Steele, Briggs)	Aug. 9	132	80	5 0
Winnigstadt (Madsen)	Aug. 9	132	93	9 8
Early Summer (Bruce)	Aug. 9	132	53	8 0
All Head Early (Steele, Briggs)	Aug. 9	132	53	12 8
				Aug. 20
Extra Early Flat Dutch (Sharpe)	Aug. 20	143	71	8 4
Extra Amager Danish Ballhead (Ott. 8620)	Aug. 25	148	13	14 0
Danish Roundhead (Burpee)	Aug. 20	143	20	7 0
Danish Hollander (Strandholm)	Aug. 20	143	33	10 0
Hollander (Harris)	Aug. 20	143	33	14 0
Danish Ballhead S.E. (Harris)	Aug. 20	143	33	15 8
Danish Ballhead S.S. (Harris)	Aug. 20	143	53	12 0
Danish Roundhead (Strandholm)	Aug. 20	143	47	9 0
Brunswick S.S. (Madsen)	Aug. 9	132	87	8 8
				Sept. 5
Danish Ballhead (Strandholm)	Aug. 20	143	13	5 0

SUCCESSIONAL SOWING.—Sowings were made of early and late varieties at intervals from March 10 to June 9. The two June sowings were too late for the late variety, the heads not forming before frost.

CABBAGE—RESULTS OF SUCCESSIONAL SOWING TEST

Variety and source of seed	Sown	Planted in field	Ready for use	Days to maturity	Weight of three average heads
					lb. oz.
Golden Acre (D. & F.)	Mar. 10	May 5	July 4	116	July 19 6 4
Golden Acre (Stokes)	Mar. 22	May 7	July 10	110	6 0
	Mar. 30	May 9	July 19	111	3 10
	May 5	June 15	Aug. 9	96	Aug. 9 8 4
Copenhagen Market (Graham)	Mar. 10	May 5	July 12	124	July 26 11 0
	Mar. 22	May 7	July 19	119	7 8
	Mar. 30	May 9	July 26	118	7 0
	May 5	June 15	Aug. 17	104	Aug. 20 10 8
	May 26	June 29	Sept. 10	107	Oct. 10 12 0
	June 1	June 29	Oct. 5	126	8 0
	June 9	July 3	Oct. 7	120	6 8
Extra Amager Danish Ballhead (Ott. 8620)	Mar. 22	May 7	Aug. 18	149	12 8
	Mar. 30	May 7	Aug. 25	148	14 0
	April 4	May 9	Aug. 25	144	14 0
	May 5	June 18	Sept. 16	134	8 0
	May 26	June 29	Oct. 8	135	12 0
	June 1	June 29	.....	.....	.....
	June 9	July 3	.....	.....	.....

SAVOY AND RED CABBAGES.—The weather was not very satisfactory for these sorts. Best of All is a good Savoy, and Red Danish Stonehead and Red Delicatesse are good red varieties.

CARROTS

TESTS OF VARIETIES.—Thirteen varieties and strains were tested. Sowings early in May are usually badly injured by the carrot rust fly. Very few roots of a mid-June sowing show injury from this source, and this is a good date to sow for winter use when fine young roots are desired. The land must be in good condition for this sowing. Chantenay is a good, reliable variety to grow. Coreless seems a valuable new sort. Under good storage conditions the roots from the mid-June sowing keep well into spring. The table gives the yield from single rows 16½ feet long, sown June 16, and the plants thinned to 3 inches apart in the row.

CARROTS—RESULTS OF VARIETY TEST

Variety and source of seed	Weight of marketable roots	Number of roots marketable	Average length of roots
	lb. oz.		in.
Chantenay (McDonald)	24 8	5	5½
Coreless (Rice)	22 8	4	7½
Chantenay (Ott. 8932)	21 8	5	5½
Long Orange (Vaughan)	19 8	9	9½
St. Valery (D. & F.)	18 0	13	11
Half Long Scarlet Nantes (Steele, Briggs)	17 0	11	5½
St. Valery (Graham)	17 0	12	10
Suttons Favourite (Patmore)	16 0	16	6½
New Scarlet Intermediate (Patmore)	16 0	8	12
Half Long Danvers (Rennie)	13 8	14	5½
Henderson Intermediate (Rennie)	13 0	18	8½
Scarlet Horn (D. & F.)	12 8	12	4½
Champion Scarlet Horn (Sutton)	12 8	6	6½

CAULIFLOWER

TEST OF VARIETIES.—Ten varieties and strains were sown May 5, with results as given in the table. Early Snowball and Early Erfurt are good early varieties; Danish Perfection and Danish Dryweather, good mid-season varieties; and Large Late Algerian, a good late sort.

CAULIFLOWER—RESULTS OF VARIETY TEST

Variety and source of seed	Ready for use	Percentage heads ready	Days to maturity	Weight of six average heads
		Sept. 5		lb. oz. *Sept. 5*
Extra Early Dwarf Erfurt (McDonald)	Sept. 1	38	119	6 0
Early Dwarf Erfurt (Strandholm)	Sept. 1	25	119	5 4
Early Snowball (Madsen)	Aug. 28	55	115	6 4
Early Snowball (Strandholm)	Aug. 28	30	115	3 4
Early Snowball (Graham)	Aug. 25	80	112	6 4
Danish Perfection (Madsen)	Sept. 5	30	123	4 0
Danish Dryweather (McDonald)	Aug. 28	47	115	3 12
		Oct. 5		*Oct. 6*
Large Late Algiers (D. & F.)	Sept. 27	50	145	2 2
Autumn Giant (Sutton)	Oct. 5	30	153	2 0
Autumn Giant (McDonald)	Oct. 5	30	153	3 0

CORN

TEST OF VARIETIES.—Thirty-four varieties and strains were sown May 30 in rows 3 feet apart, and the plants thinned finally to 8 inches apart in the row. For early use Banting seems the best variety, and for yield and quality, Golden Bantam. The following varieties are all good, and if sown at the same time will give a succession throughout the season in the order given: Banting, Golden Sunshine or Early Malcolm or Extra Early Cory, Golden Bantam, Burbank, and Evergreen Bantam. These varieties, sown the last of May, will give ears fit for use from the middle of August to the end of September.

SUCKERING TEST.—Early Malcolm and Golden Bantam were used. Removing the suckers seemed to make little or no difference either in earliness or yield. The ears on the plants from which the suckers were removed appeared to be very slightly larger, while the yield of marketable ears was slightly less.

SOWING INSIDE.—Five varieties were sown May 3 in the greenhouse, and transplanted to the field May 30. Three varieties, second earlies, gave a fair crop about two weeks earlier than the same varieties sown outside, while the two first-early varieties gave an unsatisfactory crop.

CUCUMBERS

Twelve varieties and strains were grown. Of these Early Frame gave the best yield, followed by XXX Table and Improved Long Green. The yields of the highest-yielding five from single rows of each variety 16½ feet long, the plants 1½ feet apart in the row, are given in the table.

The squash or cucumber bug and the black flea-beetle were very troublesome, but were controlled by frequent dustings with a mixture of one part of arsenate of lead and eight parts of hydrated lime.

CUCUMBERS—RESULTS OF VARIETY TEST

Variety and source of seed	Ready for use	Yield of fruit to Aug. 22	Total yield
		lb. oz.	lb. oz.
Early Frame (McKenzie)	Aug. 9	14 4	62 10
XXX Table (Rennie)	Aug. 15	9 6	56 8
Improved Long Green (Rice)	Aug. 15	9 14	55 4
Early Fortune (Bruce)	Aug. 15	9 12	44 8
Improved Long Green (McDonald)	Aug. 17	3 0	26 10

LETTUCE

TEST OF VARIETIES AND STRAINS.—Twenty varieties and strains were tested. One sowing was made inside March 30, and planted to the field May 9. This gave a crop ready for use from the 10th of June onwards. Field sowings were made May 7, June 1, and June 26, and from these a succession was available throughout the season until the end of September. Some plants of each of the field sowings were transplanted, thus retarding the date of maturity about two weeks.

Some of the best varieties are: open-headed, Grand Rapids; cabbage-headed, All Heart, Crisp as Ice, Iceberg, and New York Market. The Cos type is of distinctive shape and excellent quality.

The table gives the weights of three average heads of each variety, from a field sowing on May 7, the plants being thinned to 8 to 10 inches apart in the row.

LETTUCE—RESULTS OF VARIETY TEST

Variety and source of seed	Ready for use	Number of days to maturity	Weight of three average heads
			lb. oz.
			July 12
Tom Thumb (Sharpe)	July 6	60	0 9
Early Paris Market (Ott. 380)	.....	.....	*
			July 6
Grand Rapids (Rice)	July 6	60	1 0
Grand Rapids (Burpee)	July 6	60	1 0
Black Seeded Simpson (Vaughan)	July 6	60	0 14
Black Seeded Simpson (Dreer)	July 6	60	1 2
Black Seeded Simpson (Harris)	July 6	60	0 10
Curled Simpson Black Seeded (Ewing)	July 6	60	0 13
Early Curled Simpson (Harris)	July 6	60	0 14
Denvers Market (Vaughan)	July 6	60	0 14
			July 19
Salamander (McDonald)	July 19	73	1 0
All Heart (Dreer)	July 19	73	1 6
All Heart (Rice)	July 19	73	1 0
Crisp As Ice (Wills)	July 19	73	2 0
New York Market (Graham)	July 19	73	3 6
Wonderful (Webb)	July 19	73	3 0
All Seasons (Vaughan)	July 19	73	2 4
			July 31
Iceberg (Ewing)	July 21	75	3 12
Iceberg (D. & F.)	July 21	75	3 12
Cos (Graham)	July 19	73	5 8

*Seeded prematurely.

ONIONS

TEST OF VARIETIES.—Owing to the fact that field sowings early in May are very much depleted by the onion root maggot, and that from field sowings the bulbs do not have time to ripen properly for winter storage, the main test of varieties is made from a sowing in the greenhouse about the 21st of March. Twenty-nine varieties and strains were sown this year on March 23, and planted to the field May 15, in rows 1 foot apart, and the plants 3 inches apart. Cranston Excelsior is the earliest variety. For winter storage Southport Red Globe and Red Wethersfield are the best reds, and Danvers Yellow Globe the best yellow. Yields of the best sixteen varieties, from single rows 16½ feet long, are given in the table.

ONIONS—RESULTS OF TEST OF VARIETIES

Variety and source of seed	Number of marketable bulbs	Weight of marketable bulbs		Number of bulbs not marketable
		lb.	oz.	
Southport Red Globe (Steele, Briggs)	50	16	8	3
Danvers Yellow Globe (Graham)	51	16	0	4
Ailsa Craig (Graham)	43	15	8	0
Cranston Excelsior, Wilson Strain (D. & F.)	32	15	0	3
Yellow Globe Danvers (James)	51	15	0	3
Extra Select Large Red Wethersfield (McDonald)	45	15	0	3
Cranston Excelsior (Ewing)	24	13	8	1
Danvers Yellow Globe (Steele, Briggs)	45	13	8	5
Selected Danvers Yellow Globe (D. & F.)	30	13	8	6
Extra Select Large Red Wethersfield (D. & F.)	43	13	0	3
Denia (D. & F.)	30	12	8	3
Ailsa Craig (D. & F.)	43	12	8	4
White Portugal (McDonald)	42	12	8	2
Giant Yellow Prizetaker (Steele, Briggs)	24	12	0	6
Large Red Wethersfield (Graham)	34	12	0	5
Prizetaker Red Globe (Graham)	43	12	0	3

STORAGE TEST.—Eleven varieties and strains were stored October 13 in a cellar with a temperature of 38 to 40 degrees, twenty-five bulbs of a kind. The table gives the number of good, fair, and poor bulbs when examined March 19.

ONIONS—RESULTS OF STORAGE TEST

Variety and source of seed	Good	Fair	Poor
Danvers Yellow Globe (James)	25	0	0
Danvers Yellow Globe (Steele, Briggs)	24	0	1
Danvers Yellow Globe (Rice)	24	0	1
Danvers Yellow Globe (Ott. 8692)	24	0	1
Prizetaker (D. & F. (23 bulbs)	22	0	1
Ailsa Craig (D. & F.)	22	1	2
Prizetaker Red Globe (Graham)	19	3	3
Southport Red Globe (D. & F.)	19	3	3
Flat Red Wethersfield (Graham)	18	0	7
Ailsa Craig (Graham)	14	5	6
Denia (D. & F.)	14	2	9

ONION SETS.—The seed for onion sets is sown thickly, so that the onions cannot grow large, and the bulbs are stored for spring planting. Large onion sets are liable to go to seed, so that the aim in producing sets is to get a well-matured small onion; this is possible only by thick seeding. The tendency is to store onion sets of large size, that are liable to shoot up into seed plants, thus materially interfering with the development of a marketable onion. The table below shows this quite clearly.

TEST OF ONION SETS

Variety and source of seed	Size of bulb planted	Number of marketable bulbs	Weight of marketable bulbs	Number of bulbs not marketable	Weight of bulbs not marketable	Per cent of bulbs seeding
			lb. oz.		lb. oz.	%
Red Onion Sets (Ottawa)...	Medium....	35	4 8	17	1 2	60
	Small.....	48	6 0	8	0 8	50
Yellow Onion Sets (Ottawa)	Small.....	46	7 4	5	0 6	10
	Medium....	44	7 0	9	0 10	35
	Large.....	31	5 10	17	1 4	69

MULTIPLIER ONION.—The multiplier onion is a small, firm, late-keeping onion well suited for the home garden. It has little value as a market onion because of its size, but for general use it should be more extensively grown. It is propagated by division into sections which form within the onion. Although these sections vary in size, it will be noted that the yield is practically the same from each section, whether large or small. These onions were planted in rows 1 foot apart, and 3 inches apart in the row. The larger the onion planted the greater the tendency to form seed, and seed-forming, of course, makes for lessened bulb growth. The small divisions should be used for planting, being put aside for that purpose as the onions are used.

MULTIPLIER ONION TEST

Variety and source of seed	Size of bulbs planted	Number of large bulbs produced	Weight of large bulbs	Per cent of bulbs seeding
			lb. oz.	%
Multipliers (Kentville).....	Small.....	122	5 4	26
	Medium....	146	4 10	29
	Large.....	130	4 8	100

PARSNIPS

TEST OF VARIETIES.—Four varieties and strains were grown in rows 2½ feet apart, and the plants about 3 inches apart in the row. The yields were as follows, from single rows 16½ feet long:—

PARSNIPS—RESULTS OF TEST OF VARIETIES

Variety and source of seed	Number of marketable roots	Weight of marketable roots	Number of roots not marketable	Rust
		lb. oz.		
Elcombes Improved Hollow Crown (Graham).....	36	19 8	4	Slight
Coopers Champion Hollow Crown (D. & F.).....	39	19 0	2	Medium
Hollow Crown (Ott. 298A).....	46	19 0	3	Slight
Dobbies Selected (Ewing).....	40	15 0	4	Very slight.

SUCCESSIONAL SOWING.—Five sowings of Hollow Crown were made in rows 33 feet long. It would seem from the yields that early May is the best time to sow this vegetable.

PARSNIPS—RESULTS OF SUCCESSIONAL SOWING TEST

Variety and source of seed	Date of sowing	Number of marketable roots	Weight of marketable roots	Number of roots not marketable
			lb.	
Hollow Crown (Graham)	May 5	74	35	8
	May 18	76	21	9
	May 26	70	26	2
	June 5	72	20	12
	June 16	40	10	28

PEAS

TEST OF VARIETIES.—Eighteen varieties and strains were grown in rows 33 feet long and 3½ feet apart, one row of each variety for green peas and one row for seed. The table gives the yields of green pods to July 13, and the total yields of both green pods and seed for each variety.

PEAS—RESULTS OF TEST OF VARIETIES

Variety and source of seed	Height	Weight of green pods to July 13	Total weight of green pods	Yield of seed	Percentage of pea moth injury
	ft.	lb. oz.	lb. oz.	lb. oz.	%
Gregory Surprise x American Wonder (Ott. 8624)	5½	4 12	28 0	3 2	24
Gregory Surprise x English Wonder (Ott. 8623)	6	4 0	27 0	3 6	34
Gradus x English Wonder (Ott. 2330)	5	9 4	25 10	2 0	48
Telephone (McDonald)	6	.....	25 2	2 0	50
Lincoln (Sharpe)	3	.....	23 12	2 4	38
McLean Advancer (Ferry)	3	1 0	22 8	3 0	46
Stratagem (Rennie)	3	.....	19 12	1 14	46
Gradus (Andrewes, Mountain)	5	6 0	19 8	3 0	50
Marchioness (Rice)	4	9 6	18 6	1 10	48
Blue Bantam (Graham)	2	4 12	16 14	2 10	46
Seedling No. 3 (Kentville)	5	.....	15 14	2 0	33
Laxtonian (Graham)	2	5 0	15 2	2 0	48
Daisy or Dwarf Telephone (Sharpe)	4	.....	14 0	2 6	30
Laxton Superb (McKenzie)	2	4 8	13 8	2 2	48
Thomas Laxton (McDonald)	4	9 8	13 6	2 10	40
Pioneer (Gregory)	2	6 10	12 7	2 4	54
Gregory Surprise (Gregory)	3½	6 12	11 4	1 14	30
Market Gardener (Andrewes, Mountain)	4½	3 0	10 2	1 10	46

THINNING TO DIFFERENT DISTANCES.—Three varieties were each thinned to 1, 2, and 3 inches apart in rows 33 feet long. In all cases the plants thinned to 1 inch apart gave the highest yields.

PEAS—RESULTS OF THINNING TO DIFFERENT DISTANCES

Variety and source of seed	Distance apart in rows	Weight of green pods to July 13	Total weight of green pods
	in.	lb. oz.	lb. oz.
Thomas Laxton (McDonald)	1	14 2	20 10
	2	9 10	14 4
	3	7 14	12 6
English Wonder (Ottawa)	1	5 8	20 6
	2	5 10	19 6
	3	5 6	19 2
Stratagem (Graham)	1	.....	24 6
	2	.....	18 6
	3	.....	17 0

POTATOES

SPROUTED VS. NOT SPROUTED.—The variety Irish Cobbler, put in the greenhouse April 8 and allowed to sprout in full light, and planted in the field May 12, was compared with tubers of the same variety planted direct from the cellar on April 25. Seven hills from each lot were dug at various dates, but no advantage was noted from the sprouting.

RESULTS FROM SPROUTED AND UNSPROUTED POTATOES

Date of digging	Number of marketable tubers	Weight of marketable tubers		Weight of tubers not marketable	
From cellar direct		lb.	oz.	lb.	oz.
July 19	48	5	12	0	10
July 26	41	7	0	1	0
August 1	51	10	0	0	8
August 9	39	7	4	1	0
August 16	46	9	0	0	12
August 22	36	8	0	1	8
August 28	45	10	8	1	6
Totals	306	57	8	6	12
Sprouted in Greenhouse					
July 19	42	5	0	0	12
July 26	43	7	8	0	8
August 1	48	8	8	1	2
August 9	47	8	0	1	4
August 16	50	10	0	0	10
August 22	39	8	8	1	6
August 28	41	10	0	1	2
Totals	310	57	8	6	12

PUMPKIN, SQUASH, AND VEGETABLE MARROW

Four varieties and strains of pumpkin, nine of squash, and four of vegetable marrow were sown June 1 in hills 10 feet apart, three plants being allowed to remain to a hill. Small Sugar is the earliest pumpkin, and Connecticut Field a good main-crop variety. Golden Hubbard and Green Hubbard are excellent squashes; Kitchenette is a good variety of medium size. Long White Bush is one of the best vegetable marrows. The yields from the different varieties are given in the following table.

VARIETY TEST OF SQUASH, VEGETABLE MARROW AND PUMPKIN

Variety and source of seed	Number of plants	Weight of three average fruit		Total number of fruit on plants
Squash		lb.	oz.	
Blue Hubbard (Rice)	6	40	0	5
Boston Marrow (McDonald)	6	34	0	7
Green Hubbard (McDonald)	6	27	8	7
Green Hubbard (Graham)	6	22	8	10
Golden Hubbard (McDonald)	6	21	0	7
Golden Hubbard (Ott. 11348)	6	20	8	10
Kitchenette (Vaughan)	3	17	0	7
Des Moines (Stokes)	2	4	0	11
Acorn (Buckbee)	3	4	0	4
Vegetable Marrows				
English Trailing (Steele, Briggs)	6	24	0	12
Long White Bush (McDonald)	6	16	8	7
Cocozelle (Vaughan)	3	16	0	15
White Bush Scallop (Graham)	6	9	0	23
Pumpkin				
Connecticut Field (McDonald)	3	42	0	8
Pie Pumpkin (Brand)	6	20	8	17
Small Sugar (Graham)	6	17	0	13
Small Sugar (Ott. 8290)	6	15	8	20

SPINACH

Fourteen varieties and strains were grown. Of these Bloomsdale has been the most satisfactory for some years, giving a good crop of large, rich green leaves. Big Crop has fine, large leaves of a lighter colour. King of Denmark, while not so bulky as these, does not seed so readily. A sowing of these varieties May 7 gave plants ready for use June 23. A second sowing on June 16 was ready for use July 15. The table gives the yields from an 8¼-foot row of each variety sown May 7.

SPINACH—RESULTS OF VARIETY TEST

Variety and source of seed	Weight of twelve average plants, June 19		Weight from an 8¼-foot row, June 23		Number of plants seeding, June 23
	lb.	oz.	lb.	oz.	
Bloomsdale (McDonald)	1	1	2	0	4
Broad Flanders (McDonald)	0	11	1	7	3
King of Denmark (Rice)	0	10½	1	1	0
Noble Gaudy (Stokes)	0	10½	1	12	0
Long Standing (McDonald)	0	10	1	1	11
Bloomsdale or Long Standing (Rice)	0	9½	1	2	0
Big Crop (Madsen)	0	9½	1	14	2
Viroflay (Graham)	0	9½	1	0	7
King of Denmark (Graham)	0	9	1	0	0
Juliana (Madsen)	0	9	1	1	0
Victoria (McDonald)	0	9	1	0	0
Princess Juliana (Rice)	0	8	0	13	0
Winter Ebenezer (Madsen)	0	8	1	0	3
King of Denmark (Madsen)	0	7½	0	10	0

TOMATOES

TEST OF VARIETIES.—Forty-six varieties and strains were sown inside April 4, and planted to the field May 28 in rows 5 feet apart, the plants 4 feet apart in the row, 6 plants of each variety to a plot. The six varieties giving the largest yields of ripe fruit to August 31 were: Alacrity x Bonny Best (Ott. 11390), 27 pounds; Alacrity x Earlibell (Ott. 9723), 19 pounds; Earliana, Grade 2 (Langdon), 18 pounds; Fargo (N.D.A.C.), 16 pounds; Sparks Earliana (Burpee), 15 pounds 10 ounces; Canadian (Rice), 15 pounds.

The total yields of both ripe and green fruit of the highest-yielding fourteen varieties are given in the table.

TOMATOES—RESULTS OF VARIETY TEST

Variety and source of seed	Ready for use	Weight of marketable fruit		Weight of fruit not marketable		Weight of green fruit		Total weight of ripe and green fruit	
		lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.
Selected Earliana (Rice)	Aug. 25	145	4	14	4	33	0	178	4
Earliana Grade 2 (Langdon)	" 21	137	0	21	8	36	0	173	0
Sparks Earliana (Burpee)	" 20	136	2	6	0	39	0	175	2
Prosperity (Bolgiano)	" 26	130	6	11	2	37	0	167	6
Avon Early (Dreer)	" 20	124	8	10	14	33	0	157	8
Sparks Earliana (Ewing)	" 20	121	8	14	0	43	0	164	8
Earliana (Ferry)	" 18	119	10	18	4	51	0	170	10
Herald (Ott. 9725)	" 25	119	4	20	2	40	0	159	4
First of All (McKenzie)	" 20	118	0	7	14	38	0	156	0
Atlantic Prize (McKenzie) (five plants only)	" 25	106	6	8	0	52	0	158	6
Bolgiano (Bolgiano)	" 23	104	6	18	12	14	0	118	6
Alacrity x Bonny Best (Ott. 11390)	" 20	101	10	8	8	23	0	124	10
Penn. State Earliana (Stokes)	" 23	100	10	8	0	76	0	176	10
Fifty Day (Buckbee)	" 25	100	6	19	8	33	0	133	6

TRAINING TO SINGLE STEMS AND STAKING.—Two varieties were planted in rows 2½ feet apart, the plants one foot apart in the row and tied to stakes, all laterals being kept removed. Certain plants were cut off above the second, third, and fourth trusses of fruit, respectively, and others were allowed to grow full length, twenty plants of each, and these are compared in the table with three bush plants, which occupied approximately the same space as twenty plants trained to single stems. It will be noted that, as might be expected, the pruned and trained plants gave at least twice the yield of the bush plants. Of the former, the plants stopped above the fourth truss gave the highest yield of ripe fruit in the case of Bonny Best, while the Sparks Earliana allowed to grow full length gave the most ripe fruit. As the pruning and staking take considerable time this practice is probably of value only in the home garden.

TOMATOES—RESULTS OF DIFFERENT TREATMENTS

Variety and how trained	Ready for use	Weight of ripe fruit to Aug. 31		Weight of marketable fruit		Weight of fruit not marketable		Weight of green fruit		Total weight of ripe and green fruit	
		lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.
Sparks Earliana (Ewing)											
Single stem, two trusses....	Aug. 17	28	12	82	10	17	10	1	0	83	10
Single stem three trusses....	" 17	36	8	84	12	13	2	3	0	87	12
Single stem, four trusses....	" 17	26	12	83	12	14	6	5	0	88	12
Single stem, full grown.....	" 17	36	8	100	8	22	8	8	0	109	8
Bush plants.....	" 20	5	14	60	12	7	0	22	0	82	12
Bonny Best (Stokes)											
Single stem, two trusses....	" 17	49	12	74	0	4	6	2	0	76	0
Single stem, three trusses...	" 17	41	8	99	2	2	4	3	0	102	2
Single stem, four trusses....	" 17	34	12	101	6	8	2	10	0	111	6
Single stem. full grown.....	" 17	36	6	96	4	4	4	40	0	136	4
Bush plants.....	" 22	3	3	27	8	0	12	38	0	65	8

PRUNING TEST.—Six plants of each of two varieties were pruned to five or six stems to a plant, and compared with the same number of plants not pruned. In each case the individual plants were allowed to cover a space of 4 by 5 feet. The results show with each variety a heavier yield of ripe fruit to August 31 on the pruned plants. The total yield of ripe fruit, however, was greater in one case (John Baer) on the pruned plants, and in the other (Seedling) on the unpruned plants.

PAPER MULCH TEST.—Six plants of one variety grown on bushes and nine plants of another variety trained to a single stem were grown with and without a mulch of roofing paper. The bush plants were spaced 4 to 5 feet, and the single-stem plants 1 foot apart in rows 2½ feet apart. During the first part of the season, when the weather was dry, the mulched plants looked better than those not mulched, but later, after some rains, it was very noticeable that the plants not mulched gained on the others and eventually looked the better. It will be noted that in this test the plants not mulched, both the bush plants and those trained to a single stem, gave the larger yields of both ripe and green fruit.

An additional test with roofing paper, and also with feed bags (single-ply burlap) was conducted on very sandy soil, and in all cases the plants not mulched gave a larger number of ripe fruits to September 8 than the mulched plants.

TOMATOES—RESULTS OF PAPER MULCH TEST

Variety and how grown	Ready for use	Weight of ripe fruit to Aug 31		Weight of ripe fruit marketable		Weight of ripe fruit not marketable		Weight of green fruit		Total Weight of marketable green and ripe fruit	
		lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.
Alacrity, bush plants—											
Not mulched	Aug. 23	11	0	70	10	14	0	74	0	144	10
Paper mulch	Aug. 23	10	6	64	6	9	4	48	0	112	6
Pink No. 1, single stem—											
Not mulched	Aug. 18	20	4	46	4	3	4	10	0	64	4
Paper mulch	Aug. 20	16	14	43	8	3	12	16	0	59	8

CEREALS

The spring, while not so early as that of 1927, was not late. Seeding of grain was begun May 9, and the larger cereal plots were sown May 16. The rainfall during June was 1·18 inches below the average, being only 1·88 inches for the month, as compared with the fourteen-year average of 3·06 inches. This low rainfall, however, was well distributed over the whole month, making conditions favourable for grain. The rainfall for July was 3·32 inches, which is slightly above the average, but this practically all fell after the 14th of the month. August was very dry, there being only 1·02 inches of rain during the month, which is 2·51 inches less than usual. Sunshine for this month was considerably less than normal. September was about normal as to temperature and rain, but below normal in sunshine. Further information as to temperature, rainfall, etc., is given in the table at the beginning of the report.

TEST OF VARIETIES

Corn was grown in 1927 on the land used for this test of cereal varieties in 1928. The land was manured for the corn crop at the rate of 15 tons per acre. The area was ploughed in the fall of 1927, and ground limestone at the rate of one and one-half tons per acre was applied in the spring of 1928. The land was then well worked up with the tractor disk harrows, and 400 pounds of basic slag and 100 pounds of nitrate of soda applied per acre. This was well worked into the soil with the wheel spring-tooth cultivator. The smoothing harrow was then passed over the land to level it for seeding and to provide a blanket mulch over the whole surface. Grass seed was sown with the grain, the mixture per acre being 8 pounds of red clover, 8 pounds of timothy and 2 pounds of alsike clover. The grain and grass seeds were seeded with the grain drill, and the Breed weeder was drawn over the land after seeding to ensure sufficient covering for the timothy and clover seeds.

The test included four varieties of barley, three of oats, including one hulless variety, and one variety of wheat. All grain except the hulless oats received the dry formalin treatment for smut. It having been found that this treatment quite seriously affects the germination of the hulless oat, this variety was treated with Bayer's dust. This has been found very satisfactory on the hulless oat, but is apparently of very little value when used on other varieties. Considerable loose smut developed on one variety of barley, as this kind of smut can only be controlled by the hot water treatment, but the oat smuts and the covered smut of barley were apparently well controlled by the formalin treatment. The plots were seeded May 16. Victory and Alaska oats were seeded at the rate of 3 bushels, Liberty hulless oats, 2½ bushels, and barley, other than Duckbill, at 2 bushels per acre. Duckbill was seeded at the rate of

2¼ bushels. Wheat was seeded at the rate of 1½ bushels per acre. Alaska and Liberty oats and Gold Swedish and Chinese barley were cut August 13; Victory oats, August 20, and Huron wheat, August 25. In the tables below will be found the yields per acre for 1928, and the relative yields for the years 1914 to 1928.

CEREALS—TEST OF VARIETIES

Variety and source of seed	When ripe	Number of days to maturity	Height	Per cent yield	Yield per acre	
			in.		lb.	bush.
Oats—						
Victory	Aug. 20	96	45	100	2,073	61·0
Alaska (10307)	Aug. 13	89	39	100	1,560	45·9
Liberty (Ott. 480)	Aug. 13	89	36	100	1,386	40·8
Barley—						
Chinese (Ott. 60)	Aug. 13	89	37	100	1,036	21·6
Gold Swedish	Aug. 13	89	35	98	926	19·3
Charlottetown No. 80	Aug. 17	93	38	100	1,740	36·2
Wheat—						
Huron (Ott. 3)	Aug. 25	101	42	100	1,727	28·8

RELATIVE YIELDS OF VARIETIES OF OATS, 1914–1928

Year	Yield of Banner per acre	Percentage of yield of Banner			
		Victory	Daubeney (Ott. 47)	Liberty (Ott. 480)	Alaska
	lb.				
1914	1,981	.....	90·6	.....	.....
1915	1,872	108·8	63·5	.....	.....
1916	1,474	120·2	98·3	59·7	.....
1917	1,487	95·8	87·4	57·3	.....
1918	2,595	95·6	89·0	58·9	.....
1919	2,423	117·2	.....	47·5	.....
1920	2,539	102·1	.....	61·9	.....
1921	1,776	118·0	.....	108·5	.....
1922	2,052	108·2	.....	72·1	.....
1923	1,788	123·3	.....	66·1	.....
1924	2,594	105·1	.....	68·6	.....
1925	2,065	99·4	.....	69·4	70·8
1926	1,528	121·4	.....	105·2	90·1
1927	1,848	108·6	.....	40·2	66·6
1928	2,001	103·6	.....	69·3	78·0

RELATIVE YIELDS OF VARIETIES OF BARLEY, 1916–1928

Year	Yield of Charlottetown No. 80 (two-row) per acre	Percentage of yield of Charlottetown No. 80				
		Duckbill Ottawa 57 (two-row)	Gold Swedish (two-row)	Manchurian Ottawa 50 (six-row)	Canadian Thorpe (six-row)	Chinese Ottawa 60 (six-row)
	lb.					
1916	1,408	.....	.....	72·7	66·6	.....
1917	1,060	.....	.....	70·5	81·1	.....
1918	1,623	.....	.....	88·7	73·6	.....
1919	1,873	93·9	.....	84·8	.....	.....
1920	1,797	69·4	.....	62·3	.....	.....
1921	1,912	61·7	.....	.....	.....	.....
1922	2,171	68·2	.....	.....	.....	52·5
1923	1,122	62·8	.....	.....	.....	87·1
1924	1,789	100·7	.....	.....	.....	103·8
1925	1,575	61·1	.....	.....	.....	90·6
1926	1,936	73·1	52·8	.....	.....	68·1
1927	784	88·7	103·1	.....	.....	136·7
1928	1,740	.....	53·2	.....	.....	59·5

RELATIVE YIELDS OF VARIETIES OF WHEAT, 1914–1928

Year	Yield of Marquis per acre	Percentage of yield of Marquis		
		Huron (Ottawa 3)	Red Fife (Ottawa 17)	Charlottetown No. 123
	lb.			
1914	1,575	.....	87·9	.....
1915	994	.....	102·4	.....
1916	1,107	.....	95·3	.....
1917	899	.....	96·6	.....
1918	1,273	130·4	115·3	.....
1919	1,489	97·3	107·4	.....
1920	1,245	99·9	111·8	.....
1921	1,294	110·6	105·2	.....
1922	947	99·2	84·2	.....
1923	606	95·0	82·1	.....
1924	1,780	60·4	82·1	81·9
1925	1,199	90·6	94·1	90·0
1926	748	176·4	144·3	.....
1927	432	261·1	.....	.....
1928	1,150	150·1	.....	.....

FORAGE PLANTS

MANGELS, TEST OF VARIETIES AND STRAINS

The land on which this test was conducted had grown hay in 1926 and 1927. It was ploughed about 7 inches deep in the fall of 1927. In the spring of 1928 it was disked with the heavy tractor disk, and manured at the rate of 15 tons per acre. This manure was worked into the soil with the tractor disk heavily weighted with bags of sand, and a fairly good seed bed was secured. Six hundred pounds per acre of 10-4-7 fertilizer was then applied broadcast over the whole area. This was well worked into the soil with the wheel spring-tooth cultivator. Rows were run with the horse hoe, and the two-row turnip drill, with seed spouts detached, passed over these before seeding with the garden drill. The seeding was done May 8. The plants were thinned to 10 inches apart June 18. Cultivation sufficient to keep down weeds and supply a light soil mulch was kept up throughout the season, and the crop was harvested October 8. The yields of the different varieties and strains together with the dry matter per acre are given in the table following.

MANGELS, TEST OF VARIETIES AND STRAINS

Variety and source of seed	Average yield per acre				
	Green weight			Dry matter	
	tons	lb.	bush.	tons	lb.
Danish Sludstrup (Ewing)	23	380	927·6	2	1,880
Yellow Globe (Rennie)	21	1,280	865·6	2	1,400
Stryno Barres (Hartman)	24	1,140	982·8	2	1,060
Half Sugar Giant Rose (Trifolium)	21	1,560	871·2	2	1,060
Golden Giant Intermediate (D. & F.)	18	480	729·6	2	800
Giant Yellow Intermediate (Bruce)	17	980	699·6	2	560
Fjerritslev Barres (Hartman)	23	780	935·6	2	420
Sludstrup Barres (Hartman)	26	1,320	1,066·4	2	360
Rosted Barres (Hartman)	24	1,140	982·8	2	360
Yellow Intermediate (C.E.F.)	17	100	682·0	2	300
Danish Sludstrup (D. & F.)	23	860	937·2	2	160
Mammoth Long Red (Sutton)	23	1,520	950·4	2	40
Gate Post (Halifax Seed Co.)	16	1,520	670·4	1	1,960
Yellow Leviathan (Bruce)	21	800	856·0	1	1,840
Giant White Sugar (Rennie)	24	1,940	998·8	1	1,820
Golden Tankard (D. & F.)	14	500	570·0	1	1,720
Mammoth Long Red (D. & F.)	16	1,000	660·0	1	1,680
Jumbo Sugar Beet (Rennie)	24	360	967·2	1	1,300
Eclipse (McKenzie)	22	1,920	918·4	1	1,300
Eckendorfer Red (Hartman)	22	1,660	913·2	1	1,300
Giant White Feeding (Steele, Briggs)	20	1,440	828·8	1	1,300
Mammoth Red Intermediate (Bruce)	20	380	807·6	1	1,020
Eckendorfer Yellow (Hartman)	24	1,380	987·2	1	940
Elvethan Long Red (Sutton)	16	1,000	660·0	1	920
Gate Post Long Red (Bruce)	12	20	480·4	1	800
Yellow Intermediate (Sutton)	13	1,720	554·4	1	740
Red Tankard (McDonald)	17	1,900	718·0	1	160
Giant Half Sugar (Rennie)	17	1,360	707·2	.....	

TURNIPS, TEST OF VARIETIES AND STRAINS

The land on which these roots were grown was in hemp in 1927. It is low land, and after a heavy rain the latter part of May was covered with water for several days. This evidently had an adverse influence on the crop, as the yield of turnips was light. After the hemp was harvested in 1927 the land was ploughed. In the spring 15 tons of manure per acre was applied, and the land again ploughed. It was then disked, and 5-9-6 fertilizer applied at the rate of 600 pounds per acre. The land was then cultivated with the spring-tooth cultivator, and rows run with the horse hoe. These were smoothed down, and the seed sown May 17 and 18. After the heavy rainfall late in May the weather was very dry for some time, and unfavourable for turnips. The crop was harvested October 25. The yields per acre of green and dry matter will be found in the table below.

TURNIPS, TEST OF VARIETIES AND STRAINS

Variety and source of seed	Average yield per acre				
	Green weight			Dry matter	
	tons	lb.	bush.	tons	lb.
Bangholm (Kentville)	15	880	617·6	2	180
Bangholm (Nappan)	14	1,040	580·8	1	1,920
Invicta Bronze Top (Ewing)	17	280	685·6	1	1,800
Hartley's Bronze Top (Rennie)	14	380	567·6	1	1,620
Up-to-date (Suttons)	15	1,540	630·8	1	1,420
Best of All (Rennie)	13	520	530·4	1	1,380
Magnum Bonum (Rennie)	14	1,440	588·8	1	1,220
Ditmars (McNutt)	14	380	567·6	1	1,220
Canadian Gem (Steele, Briggs)	13	1,720	554·4	1,	1,220
Bangholm (D. & F.)	13	1,320	546·4	1	1,080

TURNIPS, TEST OF VARIETIES AND STRAINS—*Concluded*

Variety and source of seed	Average yield per acre				
	Green weight			Dry matter	
	lb.	tons	bush.	tons	lb.
Good Luck (Steele, Briggs)	13	780	535·6	1	1,020
Crimson King (Suttons)	12	1,200	504·0	1	940
Hartley's Bronze Top (McDonald)	12	880	497·6	1	920
Hall's Westbury (Rennie)	14	240	564·8	1	900
Bangholm Klank (Trifolium)	10	1,120	422·4	1	860
Ne Plus Ultra (D. & F.)	13	920	538·4	1	840
Wilhelmsburger (Hartman)	11	700	454·0	1	780
Bangholm Studsgaard (D.L.F.)	10	580	411·6	1	780
Favourite (D. & F.)	14	1,560	591·2	1	740
Corning (Yarmouth Produce Co.)	12	880	497·6	1	740
Giant King (Bruce)	13	0	520·0	1	720
Durham (Steele, Briggs)	11	300	446·0	1	720
New Universal (D. & F.)	10	1,240	424·8	1	680
Selected Westbury (Steele, Briggs)	11	300	446·0	1	640
Hall's Westbury (Bruce)	12	420	488·4	1	620
Bangholm Purple Top (Rennie)	11	1,220	464·4	1	620
Canadian Gem (Rennie)	13	520	530·4	1	560
Derby Bronze Green Top (Rennie)	16	860	657·2	1	500
Improved Jumbo or Elephant (Rennie)	11	560	451·2	1	460
New Century (Rennie)	11	1,100	462·0	1	420
Jumbo Crimson Top (H.S. Co.)	11	1,880	477·6	1	220
Champion Purple Top (Graham)	10	1,500	430·0	1	220
Yellow Butter (Hartman)	9	1,660	393·2	1	200
Yellow Wilhelmsburger (Hartman)	11	1,360	467·2	1	180
Bangholm Lyngby (D.L.F.)	8	1,820	356·4	1	0
Kangaroo (Rennie)	11	1,520	470·4	0	1,900
Best of All (Graham)	10	1,380	427·6	0	1,860
Shepherd (Trifolium)	9	480	369·6	0	1,860
Bangholm Pajbjerg (Trifolium)	7	520	290·4	0	1,820
Kangaroo (Steele, Briggs)	10	600	412·0	0	1,440
Purple Top (C.E.F.)	8	1,280	345·6	0	1,360
Marianlyst (D.L.F.)	4	300	166·0	0	780
Long White Ostersundun (Hartman)	4	1,360	187·2	0	620
Bangholm Studsgaard (Trifolium)	9	1,140	382·8	.....	

CARROTS, TEST OF VARIETIES AND STRAINS

Sixteen varieties and strains of carrots were tested in 1928. The previous history and treatment of the land was the same as that of the area used for the mangel test on sod land. The seeding was done May 8, and the crop harvested October 8. The yields per acre are given in the table.

CARROTS, TEST OF VARIETIES AND STRAINS

Variety and source of seed	Average yield per acre				
	Green weight			Dry matter	
	tons	lb.	bush.	tons	lb.
Improved Intermediate White (Ewing)	15	1,940	638·8	1	1,480
Improved White Vosges (McDonald)	14	1,160	583·2	1	1,200
Long Orange Belgian (McKenzie)	11	440	448·8	1	1,180
Danish Champion (C.E.F.)	11	440	448·8	1	900
Yellow Intermediate (Ewing)	13	1,840	556·8	1	860
White Belgian (D. & F.)	12	1,200	504·0	1	780
Ontario Champion (Graham)	11	1,100	462·0	1	660
Long Red Surrey (Steele, Briggs)	10	1,380	427·6	1	640
Giant Green Top White (D. & F.)	10	1,700	434·0	1	560
Improved Short White (McDonald)	15	360	607·2	1	500
Large White Vosges (Graham)	15	1,040	620·8	1	480
White Half Long (McFayden)	16	1,260	665·2	1	400
Mammoth White Intermediate (Rennie)	10	320	406·4	0	1,980
Improved Danvers (Graham)	7	1,300	306·0	0	1,900
Orange Giant (Carter)	11	1,760	475·2	0	1,620
White Intermediate (Summerland)	6	1,720	274·4	0	1,460

SUGAR BEETS, TEST OF VARIETIES AND STRAINS

The land on which these were grown had produced a crop of turnip seed in 1927. It was ploughed in the fall of 1927, manured at the rate of 15 tons per acre in the spring of 1928, ploughed again and disked. A 10-4-7 fertilizer was applied at the rate of 600 pounds per acre, the land was well cultivated, and rows were run with the horse hoe 30 inches apart. These rows were lightly levelled off with the weeder, and the seed was sown with the garden drill May 9. The plants were thinned to 10 inches apart, and well cultivated throughout the season. The crop was harvested October 8. The yields per acre are given in the following table.

SUGAR BEETS, TEST OF VARIETIES AND STRAINS

Variety and source of seed	Average yield per acre			
	Green weight		Dry matter	
	tons lb.	bush.	tons	lb.
Buszczynski (Chemistry Division)	10 1,120	422·4	2	1,180
Fredericksen (Chemistry Division)	10 1,900	438·0	2	780
Dippe (Chemistry Division)	8 880	337·6	1	1,660
No. 28 (Amtorg Trading Corporation)	7 1,040	300·8	1	1,440
E 4 (Amtorg Trading Corporation)	5 560	211·2	1	260
No. 3 (Amtorg Trading Corporation)	4 1,080	181·6	1	200
E. 10 (Amtorg Trading Corporation)	4 1,760	195·2	1	0

CORN FOR ENSILAGE, TEST OF VARIETIES AND STRAINS

Eighteen varieties and strains of corn were tested in 1928. The land selected for this test had been in hay for two years. It was manured on the sod in the spring at the rate of 15 tons per acre, ploughed, and disked with the heavy tractor disk, after which 600 pounds of 5-9-6 fertilizer was applied per acre. This was well cultivated into the soil with the spring-tooth cultivator and a good seed bed secured. The corn was planted May 23 with the grain drill, in rows three feet apart. The crop was harvested September 18. The yield of green corn and also the dry matter are given in the table herewith.

CORN FOR ENSILAGE, TEST OF VARIETIES AND STRAINS

Variety and source of seed	Average height	Stage of maturity when harvested	Average yield per acre	
			Green weight	Dry matter
	ft.		tons lb.	tons lb.
Lancaster County Sure Crop (U.S.D.A.)	9½	Early silk	29 1,560	4 1,200
Silver King (U.S.D.A.)	8½	Late milk	25 880	3 1,500
Burr Leaming (Carter)	8½	Early milk	23 1,400	3 760
Wisconsin No. 7 (Duke)	8½	Milk	19 1,580	3 640
Ninety Day White Dent (Disco)	8½	Early milk	22 1,240	3 320
Comptons Early (Duke)	9	Late silk	22 1,600	3 300
Northwestern Dent (Disco)	8½	Early dough	22 480	3 300
Yellow Dent (Whimple)	8½	Late milk	20 700	3 20
Golden Glow (Duke)	9	Late silk to early milk.	19 820	2 1,660
Leaming (Duke)	8½	Early milk	19 1,580	2 1,480
Longfellow (Popp and Lang)	8	Late silk	16 1,160	2 1,300
Bailey (Duke)	7½	Late milk	17 300	2 1,220
Hybrid (Whimple)	8½	Late milk	18 560	2 1,180
Longfellow (Duke)	7	Late silk	15 1,660	2 980
Amber Flint (Whimple)	5½	Early dough	16 1,540	2 360
Northwestern Dent (McKenzie)	7	Late dough	13 280	2 140
Pride Yellow Dent (Disco)	6½	Early dough	11 620	1 1,860
Northwestern Dent (Brandon)	5½	Dough	8 1,700	1 1,100

SUNFLOWERS, TEST OF VARIETIES AND STRAINS

The land on which this test was carried out had the same previous history and received the same treatment as the land used for the corn test. The seeding was done May 23, and the varieties were harvested before seed started to ripen on any variety. The yields, etc., will be found in the table below.

SUNFLOWERS, TEST OF VARIETIES AND STRAINS

Variety and source of seed	Date of harvest	Average height	Stage of maturity when harvested	Average yield per acre	
				Green weight	Dry matter
		ft. in.		tons lb.	tons lb.
Mammoth Russian (Disco)	Sept. 6	8 0	One-third in bloom	23 1,860	4 1,780
Mammoth Russian (McDonald)	Sept. 6	8 2	Two-fifths in bloom	22 860	4 60
Manchurian (McKenzie)	Sept. 6	6 4	All in bloom; thin stand	16 1,160	2 760
Ottawa 76 (Ottawa)	Aug. 21	7 10	All in bloom	16 1,800	2 80
Mennonite (Rosthern)	Aug. 21	5 0	All in bloom	14 1,100	1 1,280

SOY BEANS, TEST OF VARIETIES

These were planted on land which had been used since 1924 for testing grain in rod rows. It was manured at the rate of 20 tons per acre, ploughed, cultivated, and the seed sown June 1. The yields are given in the table below.

SOY BEANS, TEST OF VARIETIES

Variety and source of seed	Average yield per acre		Remarks
	Green weight	Dry matter	
	tons lb.	tons lb.	
Wilsons (Disco)	5 880	1 500	Not podded.
Mammoth Yellow (Disco)	4 1,460	1 180	Not podded.
O.A.C. No. 211 (O.A.C)	4 900	1 100	Fully podded, some seed ripe.
Manchu (Disco)	3 1,800	0 1,820	Pods formed and filled; no seed ripe.
Summerland (Exp. Station)	2 1,940	0 1,360	Fully podded; tall; seed ripe.
Ito San (J. N. Harrow)	2 60	0 960	Fully podded; some seed ripe.

ALFALFA

The first cutting from the area seeded in 1926 was made July 5, and the second cutting, August 21. Considerable couch grass had developed on this area. The yield of cured hay from the first cutting was 18,720 pounds, and from the second cutting, 3,300 pounds, a total of 22,020 pounds, or at the rate of 3·14 tons per acre. From the area seeded in 1921 there was a yield, from one cutting only, of 2·10 tons of cured hay per acre. From the area seeded in 1922, one cutting only, 3·08 tons of cured hay per acre. From the area seeded in 1927, 1·20 tons of cured hay per acre.

HUBAM ANNUAL SWEET CLOVER

This annual sweet clover, seeded in the spring, was cut August 31, and yielded 3·88 tons of cured hay per acre.

GRASSES AND CLOVERS SEEDED IN 1927. YIELDS, 1928

Strain or source of seed	Average yield per acre, green weight	Remarks
	tons	
Red Clovers		
St. Clet	3·44	Fair stand; some killed out.
Medium Late Swedish	3·36	Very little killed out.
Early Swedish	1·52	Winter-killed, 65 per cent.
Late Swedish	3·44	Killed out, 30 per cent.
Chateauguay	2·80	Killed out, 20 per cent.
Alta Swede	6·48	Very little injury.
Red (C.E.F.)	.....	Killed out, 95 per cent.
Welsh (Sutton)	.....	All killed out.
English Broad (Sutton)	.....	All killed out.
Dauphine (South East France)	.....	All killed out.
White Clovers		
Stryno	4·20	Perfect stand.
Morso	4·48	Perfect stand.
Mammoth (Sutton)	1·72	Killed out, 50 per cent.
Wild White English	2·44	Perfect stand.
Timothy		
Primus (G.S.S.Co.)	5·52	
Huron (Ohio)	3·68	
Gloria (G. S.S.Co.)	5·12	
Boon (C.E.F.)	4·64	
Other Grasses		
Red Top	5·36	
Kentucky Blue	2·24	
Orchard Grass	1·64	
Meadow Fescue	4·56	
Alfalfa, Cossack	3·68	
Sweet Clover, Common White	9·52	

TURNIP SEED PRODUCTION

The stecklings grown in 1927 for the production of seed in 1928 were stored in a pit and came through the winter in good condition.

The land used for this work had produced a crop of mangels and carrots in 1927, and was ploughed in the fall of 1927. It was manured in the spring of 1928 at the rate of 15 tons per acre, again ploughed, and received a 9-4-7 fertilizer at the rate of 600 pounds per acre. It was then disked and well worked up with the spring-tooth cultivator. Rows were run with the potato planter 3 feet apart, and the stecklings set 2 feet apart in the row May 5. Cultivation sufficient to keep down weeds was continued so long as a horse could pass through the rows without injuring the plants. The majority of the stecklings rooted well and sent up strong shoots. The crop was harvested August 20, and the total yield was 656 pounds, which was at the rate of 540 pounds per acre.

EXPERIMENTS WITH FERTILIZERS

FERTILIZERS AND GROUND LIMESTONE EXPERIMENT (REVISED, 1926)

Previous to 1926 a test was conducted (starting in 1914) on this area, using the same fertilizers per plot as after the revision, but using in each rotation period only one-third the amount of nitrogenous and phosphatic fertilizers and one-half the amount of muriate of potash as were applied in 1926 according to

FERTILIZERS AND GROUND LIMESTONE EXPERIMENT (REVISED, 1926): YIELDS PER ACRE DURING FIRST ROTATION PERIOD, 1926–1928 inclusive

Plot	How treated, 1926, pounds per acre	Section of plot, and whether limed	Mangels, 1926	Wheat, 1927		Clover 1928	Value of product per acre	Cost of fertilizers per acre	Value of product above cost of fertilizers	Profit above unlimed check plots
				Grain	Straw					
			bush.	bush.	tons	tons	$	$	$	$
1	Nitrate of soda, 420; superphosphate, 450; Bessemer slag, 450; muriate of potash, 202·4.	a. Formerly limed..	570·0	25·8	0·675	1·920	94 65	25 64	69 01	51 96
		b. Never limed.....	373·2	17·5	0·395	0·815	57 87	25 64	32 23	15 18
		Gain from lime..	196·8	8·3	0·280	1·105	36 78	.....	36 78	36 78
2	Sulphate of ammonia, 315; superphosphate, 450; Bessemer slag, 450; muriate of potash, 202·4.	a. Formerly limed..	340·8	29·3	0·665	1·760	78 15	23 12	55 03	37 98
		b. Never limed.....	201·4	17·2	0·347	0·580	41 19	23 12	18 07	1 02
		Gain from lime...	139·4	12·1	0·318	1·180	36 96	.....	36 96	36 96
3	Nitrate of soda, 210; superphosphate, 900; sulphate of ammonia, 157·5; muriate of potash, 202·4.	a. Formerly limed..	445·0	27·7	0·650	1·780	85 00	24 38	60 62	43 57
		b. Never limed....	251·8	17·3	0·340	0·480	44 28	24 38	19 90	2 85
		Gain from lime...	193·2	10·4	0·310	1·300	40 72	.....	40 72	40 72
4	Nitrate of soda, 210; sulphate of ammonia, 157·5; Bessemer slag, 900; muriate of potash, 202·4.	a. Formerly limed..	511·0	28·0	0·630	2·040	93 06	24 38	68 68	51·63
		b. Never limed.....	417·8	17·8	0·380	0·755	61 11	24 38	36 73	19 68
		Gain from lime...	93·2	10·2	0·240	1·285	31 95	.....	31 95	31 95
5	Nitrate of soda, 150; sulphate of ammonia, 112·5; bone meal, 720; muriate of potash, 202·4.	a. Formerly limed..	421·2	22·7	0·635	1·800	79 10	24 38	54 72	37 67
		b. Never limed.....	117·2	17·8	0·340	0·550	34 71	24 38	10 33	−6 72
		Gain from lime...	304·0	4·9	0·295	1·340	44 39	.....	44 39	44 39
6	Check, not fertilized.....	a. Formerly limed..	101·2	19·5	0·385	0·975	39 65	.....	39 65	22 60
		b. Never limed.....	1·0	11·2	0·245	0·430	17 05	.....	17 05	.....
		Gain from lime...	100·2	8·3	0·140	0·545	22 60	.....	22 60	.....

the revised plan. Limestone was applied on the limed areas in 1914, 1917, 1920, and 1924, at the rate of 2 tons per acre, a total of 8 tons having been used. In the revised plan no limestone is being used. The fertilizers now being used in each rotation period were applied at the start of the rotation in 1926, in the quantities stated in the table below. A three-year rotation is being followed: mangels, wheat, and clover. The yields are the average of duplicate plots of one-twentieth acre each, and the table below gives the results of the first rotation under the revised plan.

In arriving at the value of the product, mangels were valued at 8 cents and wheat at $1, per bushel, straw at $6 and hay at $10 per ton. The fertilizers are charged at 3 cents for nitrate of soda, 3·2 cents for sulphate of ammonia, 1 cent for slag and for superphosphate, 1·7 cents for bonemeal and 2 cents for muriate of potash, per pound.

The value of limestone for increasing crop yields is well set forth in this photograph.

CALCITIC VS. MAGNESIAN LIMESTONE, 1924

This experiment was undertaken to ascertain whether applications of magnesian limestone are as effective in crop production as calcitic limestone, and to learn if continued applications of ground magnesian limestone had a depressing effect on subsequent crop yields. These materials were also compared with gypsum and hydrated lime. The test was to have covered a four-year rotation of turnips, grain, clover hay, and timothy hay, but at the end of the four-year period it was decided to extend it one year, taking off another crop of timothy hay. The land was manured at the start in 1924 with 16 tons of stable manure per acre, which was ploughed under and the land disked. The limestone and gypsum were then applied and worked into the plots. Nitrate of soda at the rate of 150 pounds, and superphosphate at the rate of 300 pounds per acre were then applied to all the plots, including the check plots, and lightly harrowed in.

Turnips were seeded in 1924, and in 1925 grain, with clover and timothy. In 1926 two cuttings of clover were made. The hay crop in 1927 was largely timothy. The yields as given are calculated from the average of four plots located at different places in the field. In calculating the total value of the product turnips are valued at 5 cents and oats at 70 cents per bushel, straw at $6 and hay at $10 per ton.

In 1916 the whole area on which this test was made received 2 tons of ground limestone and 1,000 pounds of Sydney slag per acre. The subsequent treatment and crops were the same until 1924, with no intervening applications of limestone or slag. It will be noticed that the yields from the plots not limed in 1924 compare favourably with those from the limed plots; this would indicate an influence from the 1916 application of lime and slag.

CALCITIC VS. MAGNESIAN LIMESTONE, 1924

Plot	How treated, 1924, tons per acre	Average yield per acre						Total value of product, 1924–1928, incl.
		Turnips, 1924	Oats, 1925		Clover hay, 1926, two cuttings	Timothy hay, 1927	Timothy hay, 1928	
			Grain	Straw				
		bush.	bush.	tons	tons	tons	tons	$
1	Magnesian limestone, 2	500·4	58·8	1·90	3·33	1·76	1·95	147 98
2	Magnesian limestone, 4	554·8	64·9	1·88	3·37	1·92	2·24	159 75
3	Magnesian limestone, 6	567·6	63·0	2·09	3·59	1·92	2·32	163 32
4	Magnesian limestone, 8	528·0	62·1	1·94	3·33	1·84	2·24	155 68
5	Check, not treated	551·6	52·7	1·64	3·54	1·72	2·16	148 51
6	Calcitic limestone, 2	602·9	61·4	1·90	3·18	1·45	2·24	153 22
7	Calcitic limestone, 4	582·4	59·2	1·75	8·40	1·57	2·00	150 76
8	Calcitic limestone, 6	568·6	61·6	1·86	3·30	1·69	2·08	153 41
9	Calcitic limestone, 8	595·2	66·8	2·04	3·22	1·48	2·35	159 26
10	Check, not treated	570·8	64·3	1·32	3·61	1·37	2·16	155 87
11	Gypsum, 2	567·6	57·6	1·72	2·82	1·12	2·19	140 32
12	Gypsum, 4	572·8	58·3	1·63	2·47	0·96	1·92	132 73
13	Check, not treated	532·4	61·2	1·72	2·78	1·32	1·76	138 38
14	Hydrated lime, 1	529·2	63·0	1·74	2·76	1·40	2·08	143 40
15	Hydrated lime, 2	542·0	67·5	2·22	3·47	1·84	2·24	163 17
16	Hydrated lime, 3	532·5	64·9	2·20	3·70	1·88	2·40	165 05
17	Hydrated lime, 4	503·6	62·1	2·20	3·35	1·64	2·24	154 15
18	Check, not treated	497·2	61·4	1·78	3·03	1·28	2·08	142 42

Average value of crops where magnesian limestone was used	156 68
Average value of crops where calcitic limestone was used	154 16
Average value of crops where hydrated lime was used	156 44
Average value of crops where gypsum was used	136 52
Average value of crops where no lime was used	146 29

GYPSUM AND SULPHUR EXPERIMENT, 1924

This test was undertaken in 1924, when the materials as stated below were applied. The test covered a four-year rotation: potatoes, grain, clover, and timothy hay. The object of the experiment was (1) to ascertain the effect of gypsum and sulphur on crop yields; and (2) to ascertain the effect of gypsum, sulphur, and superphosphate on the suppression of potato scab. There are approximately 100 pounds of sulphur in 550 pounds of gypsum, and the same amount in 890 pounds of superphosphate. Sulphur has been advised for use on soils infested with scab, and as this land had been limed twice at the rate of two tons per acre when seeding down in two three-year rotations, and had been in potatoes in 1923 with a slight scab infection noticeable in the crop, it was thought suitable for the experiment. Sulphur was applied to plots 5, 6 and 7 at the rate of 100, 200 and 400 pounds per acre. The gypsum applied to plots 1, 2 and 3 furnished approximately 100, 200 and 400 pounds of sulphur per acre, respectively, while the superphosphate applied to plots 8 and 9 supplied approximately 100 and 200 pounds of sulphur per acre, respectively. The land was in good fertility at the start of the experiment, and no plant food was supplied except to plots 8, 9 and 11. Plots 8 and 9 received 150 and 300 pounds of phosphoric acid, respectively, in the form of superphosphate. Plot 11 received 150 pounds of phosphoric acid as ground rock phosphate. Plots 15 and 16 each received 10 tons of manure per acre.

The land was well worked and the materials applied broadcast over the plots and worked in before planting, so that they were well mixed with the soil. The crop yields as tabulated are calculated from the average yield of four plots treated alike but located at different points in the field. The 1927 and 1928 hay crops were practically all timothy. The data covering potato scab are conflicting and from them no conclusions can be arrived at. The intention is to repeat this experiment with potatoes in 1929, making a small blanket application of a complete fertilizer over all the plots. In calculating the total value of the product potatoes have been valued at 60 cents and oats at 70 cents per bushel, straw at $6 and hay at $10 per ton.

GYPSUM AND SULPHUR EXPERIMENT, 1924

Plot	How treated, 1924, pounds per acre	Potatoes, 1924		Oats, 1925		Clover hay, 1926	Timothy hay, 1927	Timothy hay, 1928	Total value of product, 1924–1928, incl.
		Average per cent of scab	Average yield per acre	Grain	Straw				
		p.c.	bush.	bush.	tons	tons	tons	tons	$
1	Gypsum, 550	6·2	153·8	50·0	1·38	2·73	1·12	1·76	191 66
2	Gypsum, 1,100	6·7	144·6	50·3	1·39	2·69	0·96	1·66	183 41
3	Gypsum, 2,200	9·2	179·9	54·1	1·45	2·69	0·96	2·08	211 81
4	Check, not treated	7·0	130·6	50·3	1·21	2·23	0·72	1·47	165 03
5	Sulphur, 100	16·7	159·8	50·1	1·44	2·87	1·12	1·71	196 59
6	Sulphur, 200	9·7	171·9	56·0	1·45	2·73	1·12	1·76	207 14
7	Sulphur, 400	10·5	164·5	48·9	1·44	2·42	1·04	2·11	197 27
8	Superphosphate, 890	3·2	171·9	50·3	1·55	2·63	0·96	1·71	200 65
9	Superphosphate, 1780	12·2	169·2	58·8	1·66	3·20	1·20	1·95	216 14
10	Check, not treated	3·7	144·5	54·8	1·48	3·06	1·12	2·08	196 54
11	Ground natural rock phosphate, 500	7·5	183·2	60·2	1·63	3·02	1·28	2·40	228 84
12	Ground limestone, 4,000	9·5	152·6	59·3	1·63	3·25	1·32	2·24	210 95
13	Sulphur, 200; ground limestone, 4,000	6·7	147·2	48·9	1·01	2·69	0·96	1·63	181 42
14	Check, not treated	12·7	163·9	53·1	1·52	2·94	0·97	1·95	203 23
15	Gypsum, 500; manure, (10 tons)	9·5	198·5	55·3	1·69	3·06	1·08	1·79	227 25
16	Manure (10 tons)	6·5	176·4	54·1	1·65	3·05	1·00	2·08	214 91
17	Check, not treated	3·2	149·2	49·8	1·45	2·88	0·89	1·66	187 38
	Average of all check plots	6·6	147·0	52·0	1·41	2·78	0·92	1·79	187 96

YIELDS OF CROPS FOLLOWING HEMP FERTILIZED IN DIFFERENT WAYS

In 1924 a fertilizer test was undertaken with hemp, and a record has been kept of the yields of crops from these plots, fertilized in different ways at that time. Below will be found a table showing the yields of the different crops harvested from 1924 to 1928, inclusive. The results given are the average of four plots, each of 1/80 acre, located at different points on the area devoted to this test.

YIELDS OF CROPS FOLLOWING HEMP FERTILIZED IN DIFFERENT WAYS IN 1924—AVERAGE YIELDS PER ACRE, 1924–1928

Plot	How treated, 1924, pounds per acre	Hemp, 1924		Oats, 1925		Cured hay, three years, 1926–1928, inclusive
		Tow	Line fibre	Grain	Straw	
		lb.	lb.	bush.	tons	tons
1	Nitrate of soda, 200	640·0	583·2	50·9	1·40	1·80
2	Superphosphate, 500	715·2	542·0	51·2	1·35	2·07
3	Muriate of potash, 100	589·6	408·0	46·2	1·32	2·03
4	Check, not fertilized	689·6	319·2	48·8	1·33	1·75
5	Nitrate of soda, 200; superphosphate, 500	789·6	791·2	55·3	1·48	2·10
6	Nitrate of soda, 200; superphosphate, 500; muriate of potash, 100	875·2	684·0	53·5	1·43	1·99
7	Check, not fertilized	620·0	372·8	50·6	1·38	1·86
8	Nitrate of soda, 100	709·6	445·6	51·2	1·32	1·73
9	Nitrate of soda, 300	664·0	696·0	50·0	1·37	1·66
10	Nitrate of soda, 400	689·6	608·0	57·4	1·56	1·81

EPHOS BASIC PHOSPHATE EXPERIMENT

In 1925 an experiment, covering a three-year rotation of roots, grain and clover, was undertaken to determine the value of Ephos, an Egyptian rock phosphate containing 27½ per cent of phosphoric acid, as compared with Bessemer imported slag and superphosphate. The phosphatic materials supplied to each plot were the equivalent of 80 pounds of phosphoric acid per acre. The land on which this test was conducted was of low fertility, and no fertilizers other than those stated in the table below were used. These were applied at the beginning of the rotation after the land had been worked, and were well worked into the soil before seeding to roots in 1925. In the spring of 1926 the area covered by this test was seeded to oats, with clover and timothy.

It will be seen from the table below that the yields have been low, and that the mangels were not so good as the turnips. Under poor soil conditions the turnip plant will make much better growth than the mangel, and is able to make better use of a phosphate not readily soluble than is the mangel.

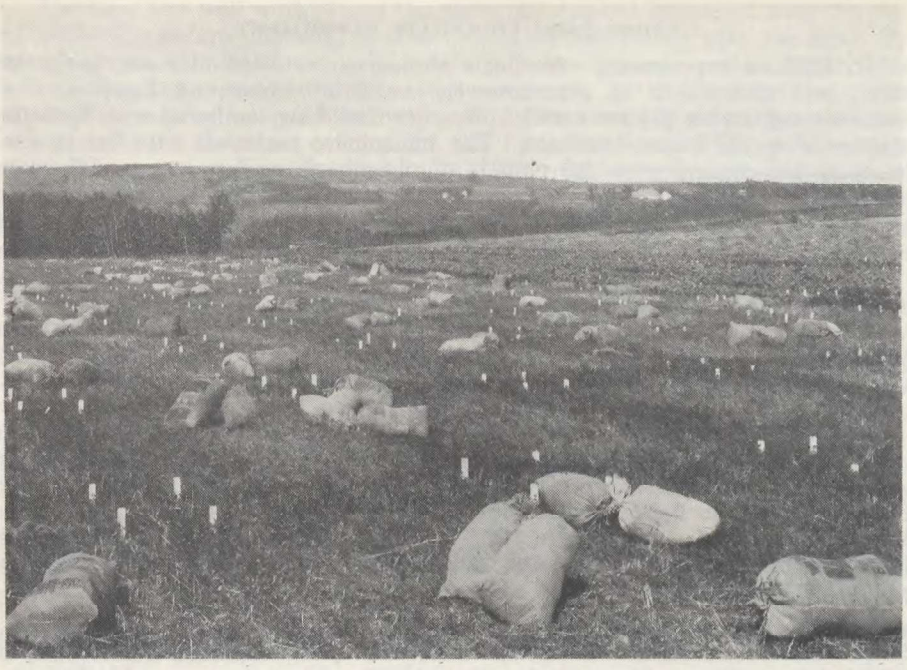
The yields during the rotation are given in the table below, and are calculated from the average of four plots treated alike at different places in the range used for this test. There were two series of check plots, making eight checks altogether, and the figures given for the check are the average of these eight plots. The yield of clover hay in 1927 was light because of injury to the clover plants due to alternate freezing and thawing in spring. The yield in 1928 was practically all timothy.

EPHOS BASIC PHOSPHATE EXPERIMENT—YIELDS PER ACRE DURING ROTATION PERIOD—1925-1928

Plot	How treated, 1925, pounds per acre	Roots, 1925		Oats, 1926		Clover hay, 1927	Timothy hay, 1928
		Mangels	Turnips	Grain	Straw		
		tons	tons	bush.	tons	tons	tons
1	Ephos, 292	1·68	7·72	32·9	1·38	0·65	2·17
2	Superphosphate, 500	4·12	7·68	34·7	1·50	0·51	2·25
3	Bessemer slag, 500	4·56	7·04	34·1	1·48	0·73	2·73
4	Ephos, 292; nitrate of soda, 150; muriate of potash, 100	2·76	8·16	31·2	1·36	0·60	2·32
5	Superphosphate, 500; nitrate of soda, 150; muriate of potash, 100	6·35	9·48	33·5	1·46	0·84	2·27
6	Bessemer slag, 500; nitrate of soda, 150; muriate of potash, 100	6·96	9·72	34·1	1·52	0·79	2·40
7	Nitrate of soda, 150; muriate of potash, 100	3·08	7·84	32·3	1·36	0·79	2·40
8	Check, not fertilized	2·00	6·34	32·0	1·43	0·64	2·08

BASIC SLAG EXPERIMENT, 1926

This test was started in 1926 further to compare Bessemer (Belgian) slag with Sydney slag, throughout a three-year rotation of grain, clover hay, and timothy hay. In 1924 corn was grown in this area, which was manured for that crop at the rate of 15 tons per acre. In 1925 turnips were grown, and the land fertilized with 150 pounds of nitrate of soda, 300 pounds of superphosphate, and 50 pounds of muriate of potash per acre. The land was ploughed in the fall of 1925, well worked up in the spring of 1926, and divided into 1/320-acre plots. The slag and other fertilizers were applied broadcast to the different plots and well worked into the soil before seeding. Oats, with clover and timothy, were then seeded. The plots were replicated four times, and the yields given below are the average of four plots treated alike but located in different parts of the field. It will be noted that the clover crop in 1927 was very light, due to the lifting of the clover plants by repeated freezing and thawing in spring. It is quite apparent, however, that the first crop of hay was much better on the Belgian slag than on the Sydney slag plots. The clover plants on the Sydney slag plots were not so vigorous, following the removal of the grain in 1926, and suffered much more from the spring freezing and thawing. The difference in these plots was not so apparent in the 1928 hay crop which was practically all



Plots devoted to experiments with fertilizers. All tests replicated 4 times. Grain gathered in bags and threshed later by hand.

timothy. The total value of the crops for the three-year period under each fertilizer treatment is also given. Oats are valued at 70 cents per bushel, straw at $6, and hay at $10 per ton. Sydney slag is charged at $17, Belgian slag and superphosphate at $20, nitrate of soda at $60, and muriate of potash at $40 per ton. It will be noted that these tests favour the use of Belgian slag, that the greater profit has resulted from the heavier application, and that in every case a profit above the cost of the fertilizers used has resulted.

BASIC SLAG EXPERIMENT, 1926

Plot	How treated, 1926 pounds per acre	Average yield per acre				Total Value of product per acre	Value of fertilizers	Value above cost of fertilizers	Value of increase over check plot
		Oats, 1926		Clover hay, 1927	Timothy hay, 1928				
		Grain	Straw						
		bush.	tons	tons	tons	$ cts.	$ cts.	$ cts.	$ cts.
1	Sydney slag, 14 per cent, 1,000	52·94	1·44	1·08	2·46	81 10	8 50	72 60	13 70
2	Sydney slag, 14 per cent. 500	50·59	1·36	1·06	2·16	75 77	4 25	71 52	12 62
3	Belgian slag, 14 per cent, 875	54·11	1·42	1·94	2·99	95 70	8 75	86 95	28 05
4	Belgian slag, 16 per cent, 437·5	47·18	1·36	1·45	2·51	80 79	4 38	76 41	17 51
5	Sydney slag, 1,000; nitrate of soda, 100; muriate of potash, 50	54·11	1·58	0·99	2·48	82 06	12 50	69 56	10 66
6	Sydney slag, 500; nitrate of soda, 100; muriate of potash, 50	56·47	1·67	0·80	2·11	78 65	8 25	70 40	11 50
7	Belgian slag, 875; nitrate of soda, 100; muriate of potash, 50	60·59	1·82	1·90	3·37	106 03	12 75	93 28	34 38
8	Belgian slag, 437·5; nitrate of soda, 100; muriate of potash, 50	58·23	1·74	1·32	2·24	86 80	8 38	78 42	19 52
9	Sydney slag, 1,000; muriate of potash, 100	42·94	1·28	0·97	2·48	72 24	10 50	61 74	2 84
10	Belgian slag, 875; muriate of potash, 100	54·71	1·55	1·50	2·91	91 70	10 75	80 95	22 05
11	Superphosphate, 16 per cent, 875	46·47	1·37	1·30	2·73	81 05	8 75	72 30	13 40
12	Superphosphate, 875; muriate of potash, 100	46·47	1·54	1·30	2·64	81 17	10 75	70 42	11 52
C1-C6	Checks, not fertilized	45·49	1·16	0·46	1·55	58 90	.....	.....	.....

MALAGASH SALT, 1926

The test of this material was carried on through another three-year rotation of roots, oats, and clover hay, to secure further information as to the value of Malagash salt in the production of farm crops. The whole area received an application of 500 pounds per acre of 4-8-8 fertilizer previous to the application of the Malagash salt. The table below gives the average yields per acre of roots, grain, straw, and clover hay obtained from the plots treated with different quantities of Malagash salt. In the 1927 report, pp. 38-40, will be found tables giving results from the use of this material during 1924, 1925, 1926 and 1927.

MALAGASH SALT, 1926—YIELDS PER ACRE

Plot	How treated, 1926, pounds per acre	Roots, 1926		Victory oats, 1927		Clover hay, 1928	
		Turnips	Mangels	Grain	Straw	Green weight	Cured weight
		bush.	bush.	bush.	tons	tons	tons
1	Malagash salt, 200	704·0	627·2	34·7	0·82	7·04	2·60
2	Malagash salt, 400	660·5	627·2	32·0	0·97	7·04	2·60
3	Malagash salt, 600	629·7	563·2	29·6	0·98	6·92	2·56
Check	No Malagash salt	678·4	610·5	33·0	1·20	7·56	2·79

COMPARISON OF NITROGENOUS FERTILIZERS, 1927

This experiment was begun in 1927 to secure further information as to the value of various nitrogenous fertilizers now on the market. Ammo-phos, a material containing both nitrogen and phosphorus, was also used in this test. Ammo-phos is being offered to the trade in two grades: 13-48, containing 13 per cent ammonia (10·7 per cent nitrogen) and 48 per cent phosphoric acid; and 20-20, containing 20 per cent ammonia (16·45 per cent nitrogen) and 20 per cent phosphoric acid. The claim of the manufacturers of highly concentrated fertilizers is that much money can be saved in bags, freight, hauling, applying, etc., and it seems well to test these fertilizers in comparison with the less concentrated materials. In the tests so far conducted these concentrated materials are showing up fairly well, but more work is necessary before a definite opinion can be formed.

The test is to continue through a four-year rotation of potatoes, oats, clover, and timothy hay, no further fertilizers being supplied after 1927. The land at the start of this experiment was in a low state of fertility but fairly uniform throughout. The land was well prepared. Cyanamide was applied ten days previous to planting. Twelve plots were left untreated for checks. The yields for the first two years are given below. The oats yield of 1928 is extremely low, owing to unfavourable weather conditions.

COMPARISON OF NITROGENOUS FERTILIZERS, 1927

Plot	How treated, 1927, pounds per acre	Plant food supplied per acre			Average yield per acre				
					Potatoes, 1927			Oats, 1928	
		Nitrogen	Phosphoric acid	Potash	Marketable	Not marketable	Total	Grain	Straw
		lb.	lb.	lb.	bush.	bush.	bush.	bush.	tons
1	Nitrate of soda, 520; superphosphate, 1000; muriate of potash, 240	79	160	120	257·5	17·6	275·2	17·3	0·34
2	Sulphate of ammonia, 380; superphosphate, 1000; muriate of potash, 240	79	160	120	259·2	9·6	268·8	15·06	0·36
3	Cyanamide, 380; superphosphate, 1000; muriate of potash, 240	79	160	120	220·2	11·7	231·9	17·9	0·33
4	Urea, 174; superphosphate, 1000; muriate of potash, 240	79	160	120	238·4	12·2	250·6	10·3	0·20
5	Nitrate of lime, 520; superphosphate, 1000; muriate of potash, 240	79	160	120	189·3	9·6	198·9	9·4	0·16
6	Ammo-phos (20-20), 370; Ammo-phos (13-48), 180; muriate of potash, 240	79	160	120	162·6	24·4	187·0	14·1	0·33
7	Superphosphate, 1000; muriate of potash, 240	.....	160	120	121·0	10·6	131·6	14·1	0·27
8	Nitrate of soda, 260; superphosphate, 500; muriate of potash, 120	39·5	80	60	155·7	17·0	172·7	12·2	0·28
9	Sulphate of ammonia, 190; superphosphate, 500; muriate of potash, 120	39·5	80	60	157·3	14·9	172·2	11·3	0·20
10	Cyanamide, 190; superphosphate, 500; muriate of potash, 120	39·5	80	60	168·0	14·9	182·9	17·3	0·46
11	Urea, 87; superphosphate, 500; muriate of potash, 120	39·5	80	60	118·9	14·4	133·3	16·0	0·35
12	Nitrate of lime, 260; superphosphate, 500; muriate of potash, 120	39·5	80	60	186·6	11·7	198·3	19·08	0·35
13	Ammo-phos, (20-20), 185; Ammo-phos (13-48), 90; muriate of potash, 120	39·5	80	60	134·4	9·6	144·0	12·2	0·30
14	Superphosphate, 500; muriate of potash, 120	.....	80	60	68·2	11·7	79·9	12·2	0·27
15	Nitrate of soda, 520	79	.....	.....	73·2	14·4	87·6	9·4	0·33
16	Sulphate of ammonia, 380	79	.....	.....	75·7	9·6	85·3	7·5	0·16
17	Urea, 174	79	.....	.....	109·3	11·7	121·0	12·2	0·22
18	Cyanamide, 380	79	.....	.....	97·6	14·9	112·5	11·3	0·27
19	Nitrate of lime, 520	79	.....	.....	190·4	10·6	201·0	15·0	0·33
20	Ammo-phos, (20-20), 475	79	95	.....	182·9	17·6	200·5	15·06	0·32
C 1 to C 12	Checks, not fertilized	.....	.....	.....	82·1	9·6	91·7	11·3	0·22

NITROGENOUS FERTILIZERS ON TURNIPS, 1927

This experiment was started in 1927 to obtain further data with respect to the value of some of the nitrogenous fertilizers, and also of Ammo-phos, in the production of farm crops. The test is to cover a four-year rotation of turnips, grain, clover hay and timothy hay.

The table below gives the average yields per acre of turnips and grain for the first two years of the rotation. The yields given are the average of four plots treated alike but located at different points in the area devoted to the test.

NITROGENOUS FERTILIZERS ON TURNIPS, 1927

Plot	How treated, 1927, pounds per acre	Approximate plant food supplied per acre			Yields per acre		
		Nitrogen	Phosphoric acid	Potash	Turnips, 1927	Oats, 1928	
						Grain	Straw
		lb.	lb.	lb.	bush.	bush.	ton
1	Cyanamide, 236·3; superphosphate, 850	52	136	.....	454·4	23·5	0·42
2	Nitrate of soda, 346·7; superphosphate, 850	52	136	.....	522·8	24·4	0·48
3	Sulphate of ammonia, 247·6; superphosphate, 850	52	136	.....	526·4	23·5	0·48
4	Nitrate of lime, 346·7; superphosphate, 850	52	136	.....	484·4	25·4	0·46
5	Ammo-phos, 400	52	136	.....	518·4	26·6	0·38
6	Cyanamide, 236·3; superphosphate, 850; muriate of potash, 120	52	136	60	526·8	25·4	0·51
7	Nitrate of soda, 346·7; superphosphate, 850; muriate of potash, 120	52	136	60	512·0	20·7	0·46
8	Sulphate of ammonia, 247.6; superphosphate, 850; muriate of potash, 120	52	136	60	516·4	17·9	0·38
9	Nitrate of lime, 346·7; superphosphate, 850; muriate of potash, 120	52	136	60	507·2	20·7	0·40
10	Ammo-phos, 400; muriate of potash, 120	52	136	60	494·4	17·8	0·32
11	Ammo-phos, 400 (1927 stock)	52	136	.....	499·2	21·6	0·51
11a	Ammo-phos, 400 (1926 stock)	52	136	.....	473·6	16·8	0·60
	Checks, not fertilized	.....	.....	.....	228·4	19·7	0·41

NITROPHOSKA

This is a material recently put on the market by the Synthetic Nitrogen Products Corporation, New York. It is said to contain 15 per cent of nitrogen, 30 per cent of phosphoric acid, and 15 per cent of potash, or to be, in other words, a 15-30-15 mixture. The chief argument in favour of its use is that it contains its plant food in a concentrated yet readily available form, it being pointed out that 100 pounds of this mixture contains nearly as much plant food as 400 pounds of a 4-8-4 mixture, thus saving bagging, freight and handling charges on 300 pounds of material.

The test here this season was very limited, Nitrophoska being used on turnips seeded for stecklings July 25, and harvested October 26. The land was ploughed immediately after the hay was cut, and well worked with disk and spring-tooth cultivators. The fertilizers as indicated were then applied by hand as evenly as possible and well worked into the soil, and seed was sown on the level with a garden drill. It is interesting to note that where no fertilizers were applied the seedlings did not reach a size sufficiently large to permit of thinning; there is, therefore, no record of yield from the unfertilized area.

While very satisfactory results were obtained from the use of Nitrophoska, further field trials are necessary before any definite statement is warranted with respect to the efficiency of this fertilizer.

NITROPHOSKA

Plot	How treated, pounds per acre	Plant food supplied per acre			Average yield of turnips per acre
		Nitrogen	Phosphoric acid	Potash	
		lbs.	lbs.	lbs.	bush.
1	Sulphate of ammonia, 190; superphosphate, 500; muriate of potash, 80	38·0	80·0	40·0	171·6
2	Calcium nitrate, 252; superphospahte, 500; muriate of potash, 80	37·8	80·0	40·0	168·9
3	Nitrophoska, 256	38·4	76·8	38·4	158·4
4	Not treated	.....	.....	.....	0·0

POULTRY

BREEDING STOCK

Twenty-five Barred Plymouth Rock hens and twenty-nine S.C. White Leghorn hens were carried over for breeding purposes. The best Barred Plymouth Rock pullets were also used in the breeding pens. The average pullet-year egg production of the hens was: Barred Rocks, 194; White Leghorns, 196. The corresponding figures for 1927 were 172 and 168, respectively. These figures show a considerable average increase in egg production, which has been obtained by means of pedigree breeding and trap-nesting, using only cockerels from dams with a production of 200 eggs or over.

FEEDING EXPERIMENTS

Sprouted Oats vs. Roots vs. Clover vs. Apples vs. Epsom Salts

The purpose of this experiment is to determine the value of the different forms of green feed, and to see if Epsom salts is a satisfactory substitute for green feed. Five pens of twenty-five S.C. White Leghorn pullets each were used in this experiment. These pens were fed alike except for the green feed. The experiment commenced November 1, 1927, and continued for six months. The mash, grit, shell, and meat scrap were self-fed in hoppers. The table gives for each pen the cost of the different feeds consumed, and the value of the eggs laid during the period.

Results of Green Feed and Epsom Salts Experiment

——	Fed sprouted oats	Fed roots	Fed clover	Fed apples	Fed Epsom salts
	$	$	$	$	$
Scratch grain	16 67	16 61	16 74	16 61	16 64
Mash	10 22	12 01	13 36	13 69	12 40
Sprouted oats	2 73	.....	.....	.....	.....
Roots	.....	2 02	.....	.....	.....
Clover	.....	.....	1 97	.....	.....
Apples	.....	.....	.....	2 58	.....
Epsom salts	.....	.....	.....	.....	0 86
Grit	0 15	0 15	0 14	0 20	0 13
Oyster shell	0 45	0 40	0 43	0 40	0 38
Meat scrap	0 60	0 46	0 83	0 60	0 55
Total cost of feed	30 82	31 65	33 47	34 08	30 96
Value of eggs	64 54	60 44	63 12	62 03	53 05
Profit over feed	33 72	28 79	29 65	27 95	22 09

The results of this year's test show sprouted oats to be the best form of green feed, with clover, roots, and apples following in the order named. The pen on Epsom salts did not lay so heavily as the other pens, and was the only pen with any mortality, two birds dying in this pen.

The profit over the cost of feed for each of three years, in a comparison of sprouted oats, roots, and Epsom salts, was as follows:—

Year	Sprouted oats	Roots	Epsom salts
	$	$	$
1926	32 61	30 80	23 04
1927	33 56	32 04	28 96
1928	33 72	28 79	22 09
Total profit (three years)	99 89	91 63	74 09

Similarly, in a two-years' comparison of sprouted oats, roots, clover, and Epsom salts, the profit over the cost of feed was:—

Year	Sprouted oats	Clover	Roots	Epsom salts
	$	$	$	$
1927	33 56	36 92	32 04	28 96
1928	33 72	29 65	28 79	22 09
Total profit (two years)	67 28	66 57	60 83	51 05

In the two years' results clover shows up very favourably as a form of green feed. It is also a very convenient form of feed, requiring no preparation, as is the case with sprouted oats. One ton of good clover hay would solve the problem of green feed for a flock of 200 hens during the six winter months.

NOVA SCOTIA SOUTHERN EGG LAYING CONTEST, YEAR 4

This contest commenced November 1, 1927, and closed at the end of the 51st week, October 22, 1928. The contest was made up of ten pens of S.C.W. Leghorns, eight pens of B.P. Rocks, one pen of W. Wyandottes and one pen of S.C.R.I. Reds.

The total number of eggs for the period was 33,066, or an average for the year of 165·3 eggs per bird, an increase of ·9 eggs per bird over the previous contest. The number of birds qualifying for registration was 34.

The leading pen this year was a pen of S.C.W. Leghorns entered by the Experimental Station, Kentville, with totals of 1,943·2 points and 1,857 eggs. A pen of S.C.W. Leghorns belonging to W. Rose, Brussels, Ont., was second with 1,915·6 points and 1,872 eggs, and a pen of B.P. Rocks belonging to M. P. Neily, Middleton, N.S., was third, with 1,910·8 points and 1,824 eggs.

The leading birds were: Bird 10, Pen 5; W. Leghorn; 277·5 points, 231 eggs; owner, W. Rose, Brussels, Ont.; Bird 7, Pen 20; B.P. Rock; 267·6 points, 223 eggs; owner, J. Fairservice, Byth, Ont.; Bird 5, Pen 8; W. Leghorn; 226·3 points, 233 eggs; owner, Harris Bros., Bear River, N.S.

APIARY

The winter of 1927-28 was most favourable for the satisfactory wintering of bees. The fall of 1927 was very open, making it possible to prepare the bees for winter at an early date.

On January 1 the bees had a good cleansing flight. The fifty-eight colonies prepared in the fall came through the winter in good condition. On examining the colonies May 10 and May 11 it was found that the consumption of stores was light during the months of confinement, and that the average number of combs covered was 7·37. Cold weather continued from the first of January until the first week in April, when the bees had several good cleansing flights and were able to gather pollen.

BEES USED IN POLLINATION EXPERIMENTS

In order to have sufficient colonies to carry on the pollination experiments conducted by a special committee and directed from Ottawa thirty 2-pound packages of bees were purchased from Alabama, and thirty colonies in old hives were obtained locally. In addition to these the colonies in the Station apiary were used.

Seventeen packages of bees were placed in tents covering apple trees, to determine the toxicity to bees of the different dusts and sprays used to control insect pests and fungous diseases. The thirty colonies in the old hives were placed in a number of orchards at different points in the Valley for the blooming period only. Fourteen colonies were moved to an orchard at Blomidon in connection with the experiment, and fifty-two colonies were placed in the Station orchards just before the trees came in bloom and left until the bloom fell. These were placed out one colony to the acre, in order to insure complete pollination of the blossoms.

The moving of the bees a short distance weakened the colonies considerably as a number of bees went back to their old stands when moved to and from the orchard. The colonies placed in the orchard did not show such extensive poisoning as in previous years, and the strength of fourteen colonies at this Station is compared in the table below with fourteen colonies at Blomidon where considerable poison dust is used on orchard trees, prior to bloom and after the trees are out of bloom.

COMPARISON OF COLONIES EXPOSED TO ORCHARD DUST WITH COLONIES NOT SO EXPOSED

Affected by posion dust: at Blomidon					Not affected by poison dust; at Kentville				
Colony number	Number of combs covered		Number of frames of brood		Colony number	Number of combs covered		Number of frames of brood	
	May 10	June 22	May 10	June 22		May 10	June 22	May 10	June 22
17	6·5	7	3·5	4·5	1	7	12	4·5	7
18	5	9	3	5	2	5	8	3	6
77	8	6	5	3	3	8·5	16	5	10
75	7	14	5·5	8	4	8	11	5·5	7·5
71	7	13	5	7	6	8	9	5·5	5
37	6	7	3	3·5	7	10	9	7	7
84	6	8	3·5	6	8	7·5	11	3	8
62	7	4	3·5	1·5	9	5	17	3	10
81	5·5	5	3·5	3	10	5	9	4	6
69	5	4·5	3	2·5	11	10	16	7	11
87	7	7	4	5	12	4·5	4	2	2
78	7	8·5	5	5	14	8·5	13	4·5	7·5
72	9	5	7	2·5	15	9	15	6	12
25	5·5	8·5	4	4·5	16	10	16	7	11
Averages	6·5	7·6	4·2	4·4		7·6	11·9	4·8	7·9

COLONIES IN KOOTENAY CASES

In the fall of 1927 a comparison of colonies in Kootenay cases was made with those in quadruple cases. In the former the brood chambers are protected from extremes of heat and cold the entire year, while the quadruple cases are packed with shavings only from late fall to early spring.

During the year the Kootenay cases have been in use at this Station they have not shown any advantage over the quadruple cases, nor did these colonies build up sooner in the spring than those in the quadruple cases.

PACKAGE BEES AS A MEANS OF ESTABLISHING AN APIARY

For this project three 2-pound and three 3-pound packages were imported from Alabama. These arrived May 10 in good condition, and were immediately put on drawn combs in ten-frame hives. Each package was given a ten-pound tin of sugar syrup. Two of the three-pound packages stored a small surplus of honey. The three-pound packages built up to strong colonies by October, covering an average of ten combs, while the two-pound packages covered an average of seven combs.

PRODUCTION

The production of honey for 1928 was below the average, due to lack of rain previous to the blooming of the clover and the goldenrod; also to the killing out of many clover plants during the winter of 1927-28.

The total rainfall for the month of June was 1·88 inches, and for August, 1·02 inches. There was, consequently, not an abundance of clover and goldenrod, and the periods they were in bloom were much shorter than in a normal year.

WINTERING TWO QUEENS IN A HIVE

Nine hives divided in the centre by a thin division board, each thus containing two colonies, are being wintered in the warehouse cellar. In this way it is possible to winter weak colonies. The advantage of putting two weak colonies in one hive over that of uniting them is the saving of a queen in each double hive. The extra queens are used in the spring to replace those in full colonies that have either died, lost their prolificacy, or are drone-laying. When a queen is removed from a double colony the division board is also removed, thereby making the double colony into a single strong colony.

COMPARISON OF DIFFERENT TYPES OF HIVES

The three different types of hives in use at this Station are eleven-frame Modified Dadant, ten-frame Jumbo, and ten-frame Langstroth. The table below gives a comparison of the strength of the colonies in the spring and the yields per colony, the figures in each case being those from the highest-yielding colony in each type of hive, respectively.

RESULTS OF COMPARISON OF DIFFERENT TYPES OF HIVES

Type of hive	Number of combs covered in spring	Weight of honey produced
		lb.
Eleven-frame Modified Dadant	5·0	55
Ten-frame Jumbo	9·0	48
Ten-frame Langstroth	8·5	68

QUEEN REARING

Queen rearing was continued at this Station along the same lines as in previous years. A queen that had proven satisfactory as a breeder for the last three years was used this year. Sufficient pure Italian queens were raised to replace those in colonies that had old and worn-out queens.

WINTERING, 1928-1929

Seventy-six colonies were prepared for the winter of 1928-29. Of these fifty-six are wintering in quadruple cases, two in Kootenay cases, the eighteen in a room partitioned off in the basement of the warehouse cellar. Twenty-nine other colonies used for orchard experimental work, were prepared early in the fall for winter, and were put in the warehouse November 22. The colonies in quadruple cases were weighed and packed by October 12, and finished feeding by October 18. The colonies were fed sufficient sugar syrup to carry them through the winter and early spring.

FIBRE PLANTS

FLAX

The work with flax in 1928 consisted of seeding three half-acre plots on uniform land, all treated alike as to fertilization and cultivation. One half-acre was pulled by hand, and another cut and bound with the binder. Both of these were dried and de-seeded. The third half-acre was cut with the mower and allowed to ret with the seed on. The three lots were made into tossed flax. The object of these different treatments was to secure information as to the most profitable way to handle this crop.

The land used for this test had grown a crop of O.P.V. in 1927, and had been lightly manured at the rate of 12 tons per acre for that crop. Limestone at the rate of 1½ tons per acre was applied in the spring of 1928, but no other fertilizer was used. The seed was sown May 19, the weather was favourable for germination, and a uniform stand was obtained. July and August were very dry, so that while the stand was uniform the crop attained an average height of only 25 inches. The crop was harvested August 10 in the manner indicated above. No part of the limestone is charged to the flax crop, as the limestone was used to correct soil acidity and make conditions more favourable for the clover plant, seed of which, with timothy, was sown with the flax. The limestone is consequently charged to the succeeding hay crops.

The tables below give the itemized production costs and yields of the three half-acre plots, calculated on a per acre basis.

PRODUCTION COSTS AND YIELDS OF FLAX UNDER DIFFERENT METHODS OF HARVESTING

One Acre Pulled by Hand

Rental of land	$ 3 00
Share of manure: 30 per cent of 12 tons at $2	7 20
Plowing in fall, 2 hours at $1.25	2 50
Disking with tractor, ½ hour at $1.25	0 63
Cultivating, 1 hour at 50 cents	0 50
Seeding and smoothing, 2 hours at 50 cents	1 00
Seed, 84 pounds at 5 cents	4 20
Pulling, 40 hours at 30 cents	12 00
Tying and stooking, 17½ hours at 30 cents	5 25
Deseeding: labour, 10 hours at 30 cents, $3; team, 3 hours at 50 cents, $1.50; gasoline and oil, 50 cents	5 00
Spreading for retting, 11 hours at 30 cents	3 30
Raking, ¼ hour at 40 cents	0 30
Hauling to shed and storing, 2½ hours at 50 cents	1 25
Breaking and cleaning, 56 hours at 30 cents	16 80
Use of machinery, $2.85; gasoline and oil, $3	5 85
Total cost per acre	$ 68 78

Product from one acre: tossed flax, 294 pounds; seed, 430 pounds. Weight of retted straw, 1,640 pounds. Tossed flax from 100 pounds of retted straw, 17·9 pounds.

Rental of land	$ 3 00
Plowing in fall, 2 hours at $1.25	2 50
Share of manure, 30 per cent of 12 tons at $2	7 20
Disking with tractor, ½ hour at $1.25	0 63
Cultivating, 1 hour at 50 cents	0 50
Seeding and smoothing, 2 hours at 50 cents	1 00
Seed, 84 pounds at 5 cents	4 20
Cutting and binding, 2 hours at 80 cents	1 60
Stooking, 3½ hours at 30 cents	1 05
Deseeding: labour, 11 hours at 30 cents, $3.30; team, 3 hours at 50 cents, $1.50; gasoline and oil, 50 cents	5 30
Spreading for retting, 13 hours at 30 cents	3 90
Raking, ¼ hour at 40 cents	0 30
Hauling and storing, 2½ hours at 50 cents	1 25
Breaking and cleaning, 33 hours at 30 cents	9 90
Use of machinery, $2.85; gasoline and oil, $3	5 85
Total cost per acre	$ 48 18

Product from one acre: tossed flax, 284 pounds; seed, 320 pounds. Weight of retted straw, 1,200 pounds. Tossed flax from 100 pounds of retted straw, 23·6 pounds.

PRODUCTION COSTS AND YIELDS OF FLAX UNDER DIFFERENT METHODS OF HARVESTING—*Continued*

One Acre Cut with Mowing Machine and Allowed to Lie and Ret with Seed on

Rental of land	$ 3 00
Ploughing in fall, 2 hours at $1.25	2 50
Disking with tractor, ½ hour at $1.25	0 63
Share of manure, 30 per cent of 12 tons at $2	7 20
Cultivating, one hour at 50 cents	0 50
Seeding and smoothing, 2 hours at 50 cents	1 00
Seed, 84 pounds at 5 cents	4 20
Cutting with mower, 1 hour at 50 cents	0 50
Raking, ¾ hour at 40 cents	0 30
Hauling and storing, 2½ hours at 50 cents	1 25
Breaking and cleaning, 48 hours at 30 cents	14 40
Use of machinery, $2.85; gasoline and oil, $3	5 85
Total cost per acre	$ 41 33

Product from one acre: tossed flax, 294 pounds; seed, 207 pounds. Weight of retted straw, 2,200 pounds with seed on. It would seem possible to secure a fair yield of seed even with this method of harvesting, as the seed remaining in the straw is deposited around the breaker when the straw is passed through.

ONE ACRE OF HEMP GROWN FOR FIBRE

The land on which the hemp was grown in 1928 had produced a crop of Liberty oats in 1927. It was manured in the spring of 1928 at the rate of 20 tons per acre. This was ploughed under, and the land well worked up with the disk harrow and two-wheel cultivator. The seeding was done with the grain drill June 5. Germination was uniform, but growth was seriously retarded by the dry weather of July and August, and the crop harvested was very light. The yield and the cost of production are given in the following table:—

COST OF ONE ACRE OF HEMP GROWN FOR FIBRE

Rental of land	$ 3 00
Share of manure, 50 per cent of 20 tons at $2	20 00
Ploughing with tractor, 2 hours at $1	2 00
Preparing land for seeding, 1½ hours at 50 cents	0 75
Seeding, 1 hour at 50 cents	0 50
Seed, 55 pounds at 18 cents	9 90
Cutting with binder (two men and team), 2½ hours at 80 cents	2 00
Spreading, 6½ hours at 30 cents	1 95
Lifting and tying, 8 hours at 30 cents	2 40
Hauling and storing, 1 hour at 80 cents	0 80
Breaking and cleaning, 89 hours at 30 cents	26 70
Use of machinery	2 85
Gasoline and oil	3 00
Total cost	75 85

Product from one acre, 2,668 pounds when rettsd. Weight of tow from one acre, 128 pounds; of fibre, 220 pounds.

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