DOMINION OF CANADA

DEPARTMENT OF AGRICULTURE

DOMINION EXPERIMENTAL FARMS

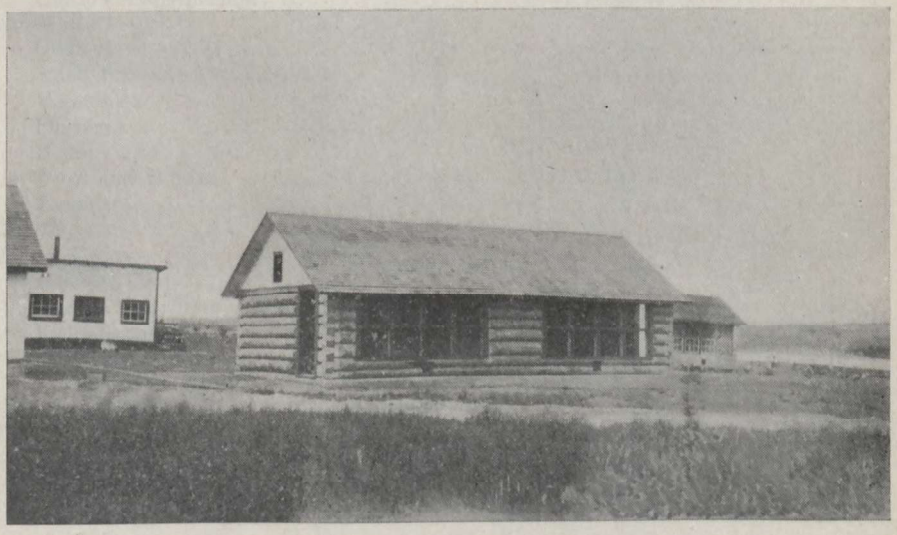
EXPERIMENTAL STATION

KAPUSKASING, ONT.

REPORT OF THE SUPERINTENDENT

SMITH BALLANTYNE

FOR THE YEAR 1922



Pioneer Log Poultry House

Printed by Authority of the Hon. W. R. Motherwell, Minister of Agriculture, Ottawa, 1923

OTTAWA
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PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1923

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EXPERIMENTAL STATION, KAPUSKASING, ONT.

Report of the Superintendent, SMITH BALLANTYNE

SEASONAL NOTES

The total precipitation recorded at this Station during the calendar year of 1922 was 19·07 inches, which is 4·57 inches less than the average recorded for the past five years 1918 to 1922 inclusive, which was 23·64 inches. For the five growing months, May 1 to September 30, the total precipitation was 8·0 inches, which is 3·65 inches below the average for the past five years covering the same period.

The snow received during January and February was quite normal with a total fall of 22 inches, but March was abnormally free from snowstorms with only one half inch falling. In April 16 inches of snow fell, and owing to the fact that the snow was not melted away until well on in April, it was impossible to commence seeding operations as early as usual, it being the 10th of May when the first seeding was done.

Commencing on May 7, a period of extremely dry weather prevailed, which lasted until July 7, or covered sixty-one days, during which time only 1·46 inches of precipitation fell. These being sixty-one of the most important days during the growing season, it is easy to see what a detrimental effect such a dry period would have on the crops. The seed of most crops germinated slowly and unevenly, which cause an uneven ripening of the harvest. The hay crops were light, root crops were almost a complete failure, cereals were short in head and straw, and pastures were getting badly dried up.

The first rain of any account came on July 7, when 1·28 inches fell; but this soon disappeared into the dry, cracked soil, and as the showers were very light from this on until winter, the late summer and autumn was anything but favourable for growth of any kind.

Fall ploughing was a difficult task owing to the dryness and hardness of the soil. Ground fires, which got a hold in the summer, were still burning when the land was covered with a blanket of snow this fall.

There was particularly good weather for curing the crops, both in haying and harvest, and it is doubtful if the total crop of northern Ontario was ever cured in a better condition than it was this year. This will, in part, compensate for the lack of quantity; because the quality is particularly good and live stock will winter just as well on a fair ration of really good quality feeds as they would on a larger ration of partly spoiled and musty fodders.

Frosts, while not frequent, did considerable damage to some crops. Fall wheat and fall rye were both prevented from producing very much grain by three frosts in June, on the nights of the 11th, 20th and 23rd. These also were hard on the tender garden vegetables and the field corn. Timothy heads on muck were damaged and some late barley was touched on low lying areas later on in the season. The other cereals seemed to escape injury remarkably well.

METEOROLOGY

The town of Kaspuskasing is situated 548 miles nearly straight north from Toronto, about 175 miles nearly straight south of Moose Factory at James bay, and about 706·6 miles nearly straight east of Winnipeg. The main line of the

C.N.R. runs through the town and the station is on ground which is 49° 23′ N. latitude and 82° 29′ W. longitude with an elevation of 720 feet.

The Dominion Experimental Station occupies that area of land immediately south of the railway and west of the Kapuskasing river. It comprises some 1,270 acres and consists of lots 23, 24, 25, 26, 27, and 28, in both the twelfth and thirteenth concessions of the township of O'Brien. It is situated about as far north as any farming is at present being done in northern Ontario, and consequently any success which is met with at this location, should be within easy reach of most settlers in any part of this new and extensive section of country.

It is with field crops like it is with varieties of timber growth in this part of Ontario; the climate and not the soil is the limiting factor, or the deciding factor, between what can and what can not be grown. The soil here is as well able to grow an oak or a maple tree as in any part of Ontario; but the other conditions are not so favourable. For this reason it is important that a careful study be made of what it is possible to grow and the whole agricultural organization of the country should be adapted to the conditions as regards these factors. Particularly is this true of new settlers who come from all parts of the globe, and attempt to carry on by the same methods that they practised elsewhere. These people should first ascertain what the experience of their Experimental Station has been, and also that of farmers who have been in the district for a number of years; and then they will be in a position to adapt their operations to the limitations of the country.

Meteorological observations have been taken at this Station since 1918. It is true the period covered is not long; but it is felt that a series of tables showing the averages for these five years could be taken as a considerable guide as to what might be expected in future years.

The tables which follow show the daily precipitation, minimum temperatures, maximum temperatures, and hours of sunshine for the year 1922, together with a number of averages for the past five years.

It is of very great importance that the people should know something of the climate of a new country in which they are establishing themselves; because to a very large extent, the kinds, quantity and quality of field crops produced depend upon the weather, particularly during the five growing months, May, June, July, August and September.

DAILY PRECIPITATION FOR THE YEAR 1922 AT THE DOMINION EXPERIMENTAL STATION, KAPUSKASING, ONTARIO, GIVEN IN INCHES

Date	Jan.	Feb.	March		April		May	June	July	Aug.	Sept.	Oct.		Nov.		Dec.
	Snow	Snow	Snow	Rain	Snow	Rain	Rain	Rain	Rain	Rain	Rain	Snow	Rain	Snow	Rain	Snow
1	...	3	...	...	...	...	...	...	0·17	...	...	...	...	...	...	...
2	3·0	3	...	...	...	...	...	...	0·22	0·12	...	...	...	...	...	...
3	3·0	...	...	...	...	...	...	...	...	...	0·03	...	...	...	0·43	...
4	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	5
5	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	6
6	...	...	...	0·5	...	0·75	1·35	...	...	...	...	...	...	...	0·21	...
7	...	...	...	...	...	...	...	...	1·28	...	...	...	...	...	0·04	...
8	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4
9	2·0	...	...	...	4	...	...	0·20	0·25	...	0·33	...	...	...	...	...
10	0·5	...	...	...	...	...	0·03	...	...	...	...	...	...	...	0·26	...
11	0·5	...	...	...	6	...	...	0·20	0·05	...	...	...	0·47	...	...	...
12	...	...	...	...	6	...	...	...	...	...	...	...	...	...	...	2
13	...	...	...	0·08	...	...	...	...	...	...	0·32	...	0·22	...	...	...
14	2·0	...	...	...	...	...	...	...	...	...	...	...	...	...	0·16	...

DAILY PRECIPITATION FOR THE YEAR 1922 AT THE DOMINION EXPERIMENTAL STATION, KAPUSKASING, ONTARIO, GIVEN IN INCHES—*Concluded*

Date	Jan.	Feb.	March		April		May	June	July	Aug.	Sept.	Oct.		Nov.		Dec.
	Snow	Snow	Snow	Rain	Snow	Rain	Rain	Rain	Rain	Rain	Rain	Snow	Rain	Snow	Rain	Snow
15	....	1	0·5	....	....	....	....	....	0·06	0·17	....	2·0	0·30	2·0	....	....
16	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
17	....	1	....	....	....	....	....	....	0·33	·32	....	0·5	....	....	....	....
18	....	....	....	....	....	....	....	....	....	....	....	3·0	....	....	....	....
19	0·5	1	....	....	....	....	0·44	0·18	....	....	....	....	....	....	....	....
20	0·5	....	....	....	....	....	....	....	....	....	....	0·5	....	....	....	....
21	....	....	....	....	....	....	....	....	0·12	0·20	....	....	....	....	....	1
22	....	....	....	....	....	....	....	....	0·10	....	....	....	....	....	....	....
23	....	....	....	....	....	....	....	0·02	....	....	0·13	....	....	....	....	1
24	....	....	....	....	....	....	....	....	....	....	....	....	....	6	....	....
25	....	....	....	....	....	....	....	....	....	0·11	....	....	....	....	....	1
26	....	....	....	....	....	....	....	....	0·27	0·18	....	....	....	....	....	....
27	....	....	....	....	....	....	....	....	0·19	....	....	....	....	....	....	....
28	....	....	....	....	....	....	....	....	....	0·63	....	....	....	2	....	....
29	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
30	....	....	....	....	....	....	....	....	....	....	....	....	....	2	....	....
31	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Total	12	10	0·5	0·58	16	0·75	1·82	0·60	3·04	1·73	0·81	6	0·99	12	1·1	20
Total precipitation	1·2	1·0	0·63		2·35		1·82	0·60	3·04	1·73	0·81	1·59		2·3		2·0

DAILY MINIMUM TEMPERATURES FOR THE YEAR 1922 AT THE DOMINION EXPERIMENTAL STATION, KAPUSKASING, ONTARIO

Date	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	−40	25	2	8	40	43	46	39	50	52	25	− 6
2	−13	0	6	10	40	50	39	54	50	29	25	− 1
3	−15	−14	18	28	40	46	38	47	53	41	32	−14
4	−15	− 9	15	30	40	60	55	30	50	29	33	−13
5	−35	− 2	5	20	40	55	54	32	34	30	32	−13
6	−34	−25	10	33	30	60	37	43	41	25	34	−12
7	3	−20	−12	32	25	43	32	32	55	25	29	−13
8	10	− 8	0	29	36	36	40	42	60	21	20	− 5
9	2	−10	15	23	44	33	59	50	46	27	20	−27
10	− 7	−12	14	23	38	45	50	48	30	27	30	−10
11	−33	−28	0	22	26	34	48	60	26	25	12	− 5
12	−15	−18	33	13	35	28	43	53	37	21	20	−26
13	−33	−34	28	15	35	46	50	49	29	34	25	−32
14	−18	−18	20	24	38	32	59	68	26	25	21	−30
15	−11	−40	− 3	20	29	46	60	47	35	29	20	−12
16	−29	−41	− 6	38	45	42	56	47	25	19	23	−37
17	−36	−25	−15	15	50	36	53	50	32	9	16	−35
18	−35	−16	0	15	48	47	45	39	35	12	15	−42
19	−17	− 8	10	9	50	45	38	29	37	6	9	−37
20	−14	−10	− 3	9	32	33	47	37	38	17	11	−28
21	−25	−19	−10	15	28	24	53	52	49	25	8	−12
22	−34	−15	− 2	10	40	53	49	49	50	23	18	−11
23	−30	−21	5	29	47	39	36	60	35	7	9	−10
24	−25	−17	7	30	39	27	39	50	31	15	9	−10
25	0	−10	10	18	31	35	48	43	27	22	8	− 3
26	12	− 5	13	10	28	47	55	57	33	20	4	−31
27	−12	−25	7	13	38	42	42	49	43	18	1	−29
28	−18	−21	−10	29	46	47	40	35	44	17	9	−29
29	−18	.....	−13	20	27	40	47	41	52	4	−15	−19
30	−15	.....	0	35	33	43	50	43	52	10	−11	−20
31	10	.....	24	.....	41	.....	45	41	.....	24	.....	− 2
Total	−552	−446	168	625	1,159	1,257	1,453	1,416	1,205	688	492	−554
Average	−17·8	−16	5·42	20·83	37·4	41·9	46·87	45·67	40·16	22·2	16·4	−17·87

DAILY MAXIMUM TEMPERATURES FOR THE YEAR 1922 AT THE DOMINION EXPERIMENTAL STATION, KAPUSKASING, ONTARIO

Date	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	−10	30	32	35	65	70	60	77	78	77	40	30
2	18	30	28	50	62	82	63	81	73	79	45	20
3	22	8	43	47	62	69	60	65	65	65	44	13
4	− 5	12	48	40	65	84	74	62	79	70	41	15
5	− 3	28	48	42	62	87	77	63	60	39	39	14
6	6	3	42	43	63	84	80	69	58	50	38	1
7	28	5	14	40	55	86	46	57	75	41	42	8
8	30	15	33	56	68	53	75	66	81	50	31	17
9	22	8	33	41	50	51	66	62	71	59	32	4
10	7	32	40	33	59	64	76	76	53	61	35	15
11	− 3	0	41	34	56	69	77	79	61	43	35	32
12	5	− 8	43	21	64	55	68	77	64	36	31	− 1
13	0	− 3	41	27	68	65	77	72	55	47	49	− 6
14	8	8	40	38	72	65	76	88	55	48	40	− 8
15	14	− 3	26	44	64	62	84	88	55	34	26	10
16	9	− 8	8	48	76	63	78	67	53	32	36	0
17	− 2	15	18	43	72	76	75	80	58	31	43	− 6
18	− 5	15	33	34	62	85	70	55	62	22	24	−21
19	− 5	28	28	29	60	79	72	64	64	25	22	0
20	20	12	22	30	62	65	83	70	51	32	20	5
21	− 2	10	12	38	58	65	79	69	72	35	20	15
22	−15	0	22	38	71	81	72	77	65	40	32	− 1
23	−10	0	35	54	85	88	68	79	77	25	32	10
24	0	21	26	55	76	53	76	78	45	33	18	25
25	15	20	30	32	78	65	82	61	47	34	19	3
26	22	28	36	33	64	71	77	35	62	26	20	2
27	25	10	28	32	78	68	68	68	65	27	15	− 3
28	24	12	12	56	84	79	65	70	80	25	32	3
29	23	.....	20	40	61	74	78	64	78	28	34	22
30	26	.....	35	56	60	71	83	67	63	34	38	32
31	30	.....	38	.....	60	.....	79	75	.....	32	.....	33
Total	294	328	955	1,209	2,052	2,129	2,264	2,161	1,925	1,280	973	313
Ave	9·5	11·8	30·8	40·3	66·2	71·0	73	69·71	64·16	41·3	32·43	10·09

DAILY HOURS OF SUNSHINE FOR THE YEAR 1922 AT THE DOMINION EXPERIMENTAL STATION, KAPUSKASING, ONTARIO

Date	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	3,5	.....	7·9	.....	8·1	10·5	3·2	13·9	12·1	10·2	2·8	.....
2	3·1	.....	1·5	10·8	10·9	11·3	1·1	8·5	2·9	9·1	2·1	.....
3	.....	2·0	3·5	4·2	2·8	3·1	.....	2·0	7·4	6·0	0·9	1·1
4	.....	2·5	8·9	.....	1·1	9·8	12·4	3·9	9·2	2·0	.....	5·2
5	1·5	.....	3·9	.....	1·5	13·4	2·1	7·2	6·3	0·2	.....	.....
6	6·8	2·6	0·8	0·6	4·0	9·8	8·9	8·0	6·0	7·3	.....	6·8
7	2·3	6·7	.....	.....	7·2	5·9	.....	5·8	8·9	.....	.....	5·8
8	.....	0·8	9·0	10·0	12·7	0·6	14·6	13·0	5·0	8·7	.....	.....
9	.....	3·6	0·6	.....	.....	0·7	8·5	3·4	9·1	8·7	1·3	5·9
10	2·5	.....	3·7	.....	0·5	3·7	1·9	7·6	0·4	8·0	.....	.....
11	.....	.....	2·5	.....	5·7	1·7	8·2	11·0	11·3	.....	.....	.....
12	2·7	4·1	7·9	.....	14·8	13·5	1·4	1·9	8·5	.....	8·3	.....
13	3·3	4·8	0·5	.....	14·6	2·8	10·6	3·1	0·2	0·6	6·6	4·2
14	.....	8·1	1·5	.....	14·5	8·5	3·9	10·3	10·9	.....	.....	5·4
15	6·3	3·1	.....	0·9	13·7	3·5	9·9	7·7	6·6	.....	1·0	2·0
16	2·9	9·6	1·9	0·5	12·7	.....	7·8	5·3	5·4	.....	.....	6·7
17	2·7	0·9	7·1	0·8	1·7	14·4	5·2	5·8	7·9	6·1	1·1	0·3
18	5·2	3·1	10·0	9·1	0·7	15·2	9·1	.....	11·4	.....	.....	5·9
19	0·6	.....	.....	0·6	.....	5·4	12·9	11·8	8·4	5·9	0·9	4·8
20	1·4	3·4	.....	8·4	2·7	1·7	13·9	10·2	0·6	1·8	.....	.....
21	4·3	3·9	7·8	9·9	7·2	10·5	11·1	2·0	6·3	0·3	3·0	.....
22	6·2	1·2	10·5	7·1	14·3	14·1	1·4	1·0	.....	.....	0·8	3·0
23	7·4	.....	0·3	11·4	13·3	9·3	7·9	4·8	8·7	.....	.....	.....
24	7·0	7·6	10·1	1·2	1·1	0·7	14·6	2·4	5·4	.....	.....	.....
25	4·2	4·8	.....	.....	14·9	12·6	14·1	0·4	1·1	.....	.....	.....
26	.....	8·5	10·7	2·1	15·6	11·3	6·5	.....	7·6	.....	.....	1·8
27	....	1·0	2·1	13·8	14·0	0·2	5·1	2·9	6·3	.....	3·6	.....
28	4·9	2·8	.....	7·4	11·7	11·0	11·4	1·3	0·6	.....	.....	4·4
29	5·0	.....	10·3	2·5	8·2	9·1	13·0	11·7	9·4	.....	.....	.....
30	3·6	.....	9·8	6·7	7·7	5·6	7·4	9·0	.....	3·0	.....	.....
31	6·5	.....	4·2	.....	2·5	.....	8·7	12·4	.....	4·3	.....	.....
Total	93·9	85·1	137·0	108·0	240·4	219·9	236·8	188·3	192·9	82·2	32·4	63·3
Daily ave.	3·029	3·039	4·419	3·6	7·754	7·33	7·639	6·074	6·43	2·65	1·08	2·042

MONTHLY PRECIPITATION AT THE DOMINION EXPERIMENTAL STATION, KAPUSKASING, ONTARIO

Month	1918	1919	1920	1921	1922
January	1·5	0·5	0·65	1·52	1·2
February	1·0	0·95	0·35	0·75	1·0
March	1·5	0·8	1·7	3·25	0·63
April	0·075	2·04	3·35	4·8	2·35
May	0·752	1·52	1·18	3·12	1·82
June	1·089	0·23	1·45	1·23	0·60
July	2·883	0·48	2·57	7·02	3·04
August	0·145	5·92	1·35	3·2	1·73
September	2·75	3·0	3·11	7·26	0·81
October	1·985	3·6	1·49	0·56	1·59
November	2·56	3·93	0·3	1·55	2·3
December	1·5	1·35	1·9	3·42	2·0
Total	17·739	24·32	19·40	37·68	19·07

COMPARISON OF THE MONTHLY PRECIPITATION IN 1922 WITH THAT RECEIVED DURING THE YEARS 1918 TO 1922, INCLUSIVE

Month	Precipitation 1922	Average precipitation 1918–22	1922 Amount above average	1922 Amount below average	Number of years above 1922	Number of years below 1922	Average precipitation expressed in per cent
January	1·2	1·074	0·126	.....	2	2	4·543
February	1·0	0·810	0·19	.....	.....	3	3·046
March	0·63	1·576	.....	0·946	.....	4	6·666
April	2·35	2·523	.....	0·173	2	2	10·677
May	1·82	1·678	0·142	.....	3	1	7·098
June	0·6	0·919	.....	0·319	1	3	3·887
July	3·04	3·198	.....	0·158	3	1	13·528
August	1·73	2·469	.....	0·739	2	2	10·444
September	0·81	3·386	.....	2·576	.....	4	14·323
October	1·59	1·845	.....	0·255	2	2	7·804
November	2·3	2·128	0·172	.....	2	2	9·255
December	2·0	2·034	.....	0·034	3	1	8·604

NUMBER OF DAYS ON WHICH PRECIPITATION OCCURRED DURING EACH MONTH AT THE DOMINION EXPERIMENTAL STATION, KAPUSKASING, ONTARIO

Month	1918	1919	1920	1921	1922	Average
January	4	3	3	8	8	5·2
February	4	8	3	4	6	5·0
March	3	6	4	7	3	4·6
April	2	9	9	7	4	6·2
May	9	6	4	10	3	6·4
June	13	4	4	5	4	6·0
July	7	3	10	10	11	8·2
August	7	15	4	9	7	8·4
September	15	15	7	9	4	10·0
October	10	11	7	3	6	7·4
November	6	11	2	10	9	7·6
December	5	9	8	12	7	8·2
Total	85	100	65	94	72	83·2

MONTHLY MINIMUM TEMPERATURES AT THE DOMINION EXPERIMENTAL STATION, KAPUSKASING, ONTARIO

Month	1918		1919		1920		1921		1922	
	Temperature	Date	Temperature	Date	Temperature	Date	Temperature	Date	Temperature	Date
January	−50	31	−33	4 & 5	−52	24	−37	16	−40	1
February	−52	5	−30	9	−38	27	−44	26	−41	16
March	−37	6	−33	13	−39	14	−30	4 & 18	−15	17
April	− 7	4	−12	1	2	4	− 7	1	8	1
May	20	4	20	8	20	2	15	3 & 10	25	7
June	26	4	30	28	33	4	20	4	24	21
July	31	20	33	7	34	19	34	31	32	7
August	30	3	36	8	27	22	25	31	30	4
September	29	27	28	26	22	30	24	8	26	11 & 14
October	20	7	12	27	10	29	8	10	6	19
November	− 2	26	−22	26	−11	21 & 22	−28	22	−15	29
December	−30	25	−43	2	−31	25	−33	23	−42	18

COMPARISON OF MONTHLY MINIMUM TEMPERATURES IN 1922 WITH THOSE REGISTERED IN YEARS 1918 TO 1922, INCLUSIVE

Month	Minimum 1922	Average minimum temperature	1922 amount above average	1922 amount below average	Number of years above 1922	Number of years below 1922
January	−40	−42·4	2·4	.....	2	2
February	−41	−41·0	.....	.....	2	2
March	−15	−30·8	15·8	.....	.....	4
April	8	3·2	4·8	.....	.....	4
May	25	20·0	5·0	.....	.....	4
June	24	26·6	.....	2·6	3	1
July	32	32·8	.....	0·8	3	1
August	30	29·6	0·4	.....	1	2
September	26	25·8	0·2	.....	2	2
October	6	11·2	.....	5·2	4	.....
November	−15	−15·6	0·6	.....	2	2
December	−42	−35·8	.....	6·2	3	1

MONTHLY MAXIMUM TEMPERATURES AT THE DOMINION EXPERIMENTAL STATION, KAPUSKASING, ONTARIO

Month	1918		1919		1920		1921		1922	
	Temperature	Date	Temperature	Date	Temperature	Date	Temperature	Date	Temperature	Date
January	23	18	33	22	30	7	47	27	30	8 & 31
February	35	5	37	22	31	8	33	27 & 28	32	10
March	43	20 & 31	59	27	62	23	57	27	48	4 & 5
April	68	21	65	22	62	23	83	25	56	30
May	80	17	84	30	82	26	92	21	85	23
June	72	27	93	1	82	14 & 28	94	30	88	23
July	82	25	94	2	84	11	99	6	84	15
August	77	5	84	18	87	8	81	25	88	14 & 15
September	73	2	85	3	87	26	84	1	80	28
October	64	30	70	5	75	13	62	28	79	2
November	56	13	47	11	40	7	56	14	49	13
December	55	27	35	23	41	14	60	1	33	25

COMPARISON OF THE MONTHLY MAXIMUM TEMPERATURES IN 1922 WITH THOSE REGISTERED DURING THE YEARS 1918 TO 1922, INCLUSIVE

Month	Maximum 1922	Average maximum temperature	1922 Amount above average	1922 Amount below average	Number of years above 1922	Number of years below 1922
January	30	32·6	.....	2·6	2	1
February	32	33·6	.....	1·6	3	1
March	48	53·8	.....	5·8	3	1
April	56	66·8	.....	10·8	4	.....
May	85	84·6	0·4	.....	1	3
June	88	85·8	2·2	.....	2	2
July	84	88·6	.....	4·6	2	1
August	88	83·4	4·6	.....	0	4
September	80	81·8	.....	1·8	3	1
October	79	70·0	9·0	.....	0	4
November	49	49·6	.....	0·6	2	2
December	33	44·8	.....	11·8	4	0

MONTHLY MEAN MINIMUM TEMPERATURES AT THE DOMINION EXPERIMENTAL STATION, KAPUSKASING, ONTARIO

Month	1918	1919	1920	1921	1922
January	−18·35	− 3·06	−21·32	−12·55	−17·8
February	−18·71	0·85	− 6·82	−11·0	−16·0
March	− 7·48	1·74	− 2·06	− 4·1	5·42
April	16·76	19·63	20·8	17·5	20·83
May	30·38	36·2	34·29	28·0	37·4
June	39·4	51·6	47·13	39·13	41·9
July	48·8	52·7	44·7	50·6	46·87
August	48·16	51·73	46·25	38·6	45·67
September	34·56	42·53	40·0	36·6	40·16
October	31·8	29·12	36·13	23·61	22·2
November	22·5	13·93	11·83	0·47	16·4
December	0·38	−14·96	4·35	− 5·0	−17·87

COMPARISON OF THE MONTHLY MEAN MINIMUM TEMPERATURES IN 1922 WITH THOSE WHICH WERE REGISTERED DURING THE YEARS 1918 TO 1922, INCLUSIVE

Month	Mean minimum 1922	Average Mean minimum	1922 Amount above average	1922 Amount below average	Number of years above 1922	Number of years below 1922
January	−17·8	−14·616	.....	3·184	2	2
February	−16·0	−10·344	.....	5·664	3	1
March	5·42	− 1·296	6·716	.....	.....	4
April	20·83	19·104	1·726	.....	.....	4
May	37·4	33·254	4·146	.....	.....	4
June	41·9	43·832	.....	1·932	2	2
July	46·87	48·734	.....	1·864	3	1
August	45·67	46·082	.....	0·412	3	1
September	40·16	38·77	1·39	.....	1	3
October	22·2	28·572	.....	6·372	4	.....
November	16·4	13·026	3·374	.....	1	3
December	−17·87	− 6·602	.....	11·268	4	.....

MONTHLY MEAN MAXIMUM TEMPERATURES AT THE DOMINION EXPERIMENTAL STATION, KAPUSKASING, ONTARIO

Month	1918	1919	1920	1921	1922
January	8·54	15·61	3·61	15·3	9·5
February	10·21	18·21	16·86	20·71	11·8
March	26·9	30·16	29·83	26·8	30·8
April	47·9	43·36	40·96	48·7	40·3
May	52·7	65·5	58·61	61·5	66·2
June	60·2	79·7	71·23	76·7	71·0
July	65·32	79·2	69·55	81·8	73·0
August	66·19	70·64	75·26	68·9	69·71
September	53·36	62·0	70·43	63·9	64·16
October	49·4	42·38	59·0	47·58	41·3
November	40·2	25·96	28·2	30·63	32·43
December	20·1	8·9	19·68	17·8	10·09

COMPARISON OF MONTHLY MEAN MAXIMUM TEMPERATURES IN 1922 WITH THOSE WHICH WERE REGISTERED DURING THE YEARS 1918 TO 1922 INCLUSIVE

Month	Mean maximum 1922	Average mean maximum	1922 Amount above average	1922 Amount below average	Number of years above 1922	Number of years below 1922
January	9·5	10·512	.....	1·012	2	2
February	11·8	15·558	.....	3·758	3	1
March	30·8	28·898	1·902	.....	0	4
April	40·3	44·244	.....	3·944	4	0
May	66·2	60·902	5·398	.....	0	4
June	71·0	71·766	.....	0·766	3	1
July	73·0	73·774	.....	0·774	2	2
August	69·71	70·14	.....	0·43	2	2
September	64·16	62·77	1·39	.....	1	3
October	41·3	47·932	.....	6·632	4	0
November	32·43	31·484	0·946	.....	1	3
December	10·09	15·314	.....	5·224	3	1

MONTHLY MEAN TEMPERATURES AT THE DOMINION EXPERIMENTAL STATION, KAPUSKASING, ONTARIO

Month	1918	1919	1920	1921	1922
January	— 4·9	6·3	— 8·85	1·37	— 4·16
February	— 4·25	9·53	5·02	4·85	— 2·1
March	9·71	15·95	13·88	11·37	18·1
April	32·35	31·5	30·88	33·06	30·56
May	41·53	50·85	46·45	44·77	51·79
June	49·81	65·65	59·2	57·9	56·43
July	57·06	65·96	57·13	66·21	59·95
August	57·17	61·19	60·75	53·75	57·69
September	43·96	52·26	55·2	50·2	52·16
October	40·6	35·75	47·56	35·6	31·74
November	31·36	19·95	20·02	15·55	24·4
December	10·2	— 3·03	12·02	6·45	— 3·88
Total	364·60	411·86	399·26	381·08	372·68
Average	30·383	34·322	33·27	31·75	31·05

COMPARISON OF THE MONTHLY MEAN TEMPERATURES OF 1922 WITH THOSE WHICH WERE ATTAINED DURING THE YEARS 1918 TO 1922 INCLUSIVE

Month	Mean temperature 1922	Average mean temperature 1918–22	1922 Amount above average	1922 Amount below average	Number of years above 1922	Number of years below 1922
January	— 4·16	— 2·048	.....	2·112	2	2
February	— 2·1	2·61	.....	4·71	3	1
March	18·1	13·8	4·3	.....	.....	4
April	30·56	31·67	.....	1·11	4	.....
May	51·79	47·278	4·512	.....	.....	4
June	56·43	57·798	.....	1·368	3	1
July	59·95	61·262	.....	1·278	2	2
August	57·69	58·11	.....	0·420	2	2
September	52·16	50·756	1·404	.....	2	2
October	31·74	38·25	.....	6·51	4	.....
November	24·4	22·256	2·144	.....	1	3
December	— 3·88	4·352	.....	8·232	4	.....
Average	31·05	32·249	.....	.....	.....	.....

MONTHLY HOURS DURATION OF SUNSHINE AT THE DOMINION EXPERIMENTAL STATION, KAPUSKASING, ONTARIO

Month	1919	1920	1921	1922	Average
January	79·9	63·5	101·8	93·9	84·775
February	93·5	113·8	122·0	85·1	103·600
March	109·4	144·6	125·1	137·0	129·025
April	169·4	73·8	187·6	108·0	134·700
May	255·6	210·8	238·6	240·4	236·35
June	317·2	250·2	302·6	219·9	272·475
July	235·6	224·5	276·2	236·8	243·275
August	152·0	278·9	220·6	188·3	209·95
September	95·6	173·4	174·7	192·9	159·15
October	67·9	151·2	80·2	82·2	95·375
November	43·8	70·0	32·9	43·9	47·525
December	74·9	46·9	16·8	63·3	50·475
Totals	1,694·8	1,801·6	1,890·1	1,680·2	1,766·675

COMPARISON OF THE MONTHLY HOURS DURATION OF SUNSHINE IN 1922 WITH THOSE REGISTERED DURING THE YEARS 1919 TO 1922 INCLUSIVE

Month	Hours sunshine 1922	Average hours sunshine 1919–22	1922 Amount above average	1922 Amount below average	Number of years above 1922	Number of years below 1922	Average daily sunshine in hours
January	93·9	84·775	9·125	.....	1	2	2·826
February	85·1	103·6	.....	18·5	3	0	3·67
March	137·0	129·025	7·975	.....	1	2	4·162
April	108·0	134·70	.....	26·7	2	1	4·49
May	240·4	236·35	4·05	.....	1	2	7·628
June	219·9	272·475	.....	52·575	3	0	9·082
July	236·8	243·275	.....	6·475	1	2	7·847
August	188·3	209·95	.....	21·65	1	2	6·77
September	192·9	159·15	33·75	.....	0	3	5·305
October	82·2	95·375	.....	13·175	1	2	3·076
November	32·4	47·525	.....	15·125	3	0	1·584
December	63·3	50·475	22·825	.....	1	2	1·628

MONTHLY AVERAGES OF PRECIPITATION AND TEMPERATURES FOR THE PERIOD 1918 TO 1922, INCLUSIVE, AND OF SUNSHINE FOR 1919 TO 1922, INCLUSIVE

Month	Precipitation			Hours Sunshine		Temperatures		
	Inches	Per cent	Number of Days on which Precipitation fell	1919 to 1922 per Month	1919 to 1922 per Day	True Mean	Average Maximum	Average Minimum
January	1·074	4·543	5·2	84·775	2·826	−2·048	32·6	−42·4
February	0·810	3·046	5·0	103·6	3·67	2·61	33·6	−41·0
March	1·576	6·666	4·6	129·025	4·162	13·8	53·8	−30·8
April	2·523	10·677	6·2	134·7	4·49	31·67	66·8	3·2
May	1·678	7·098	6·4	236·35	7·628	47·278	84·6	20·0
June	0·919	3·887	6·0	272·475	9·082	57·798	85·5	26·6
July	3·198	13·528	8·2	243·275	7·847	61·262	88·6	32·8
August	2·469	10·448	8·4	209·95	6·77	58·11	83·4	29·6
September	2·386	14·323	10·0	159·15	5·305	50·756	81·8	25·8
October	1·845	7·804	7·4	95·375	3·076	38·25	70·0	11·2
November	2·128	9·255	7·6	47·525	1·584	22·256	49·6	−15·6
December	2·034	8·604	8·2	50·475	1·628	4·352	44·8	−35·8

YEARLY TOTALS FOR THE YEARS 1918 TO 1922 IN TEMPERATURE AND FOR THE YEARS 1919 TO 1922 SUNSHIN

Year	Precipitation	Number of Days on which Precipitation fell	Sunshine Hours Duration	Average of Monthly Mean
1918	17·739	85	.....	30·383
1919	24·32	100	1,694·8	34·322
1920	19·40	65	1,801·6	33·27
1921	37·68	94	1,890·1	31·75
1922	19·07	72	1,680·2	31·05

PRECIPITATION

While all the records taken are of considerable importance, those which enter most into the success or failure of farming in new Ontario are the records of precipitation and temperatures, particularly during the growing season. If a sufficient supply of moisture does not come and the temperature drops too low, the crops are doomed; while, on the other hand, if the moisture supply is ample and the temperature suitable, a bountiful crop is almost assured.

The records taken to date show some variations and some interesting data. The greatest amount of precipitation fell during the year 1921 and equalled 37·68 inches, while the smallest amount was in 1918 and equalled 17·739 inches. This gives a variation of 19·941 inches. The average for the five-year period, 1918 to 1922 inclusive, equalled 23·64 inches.

Fortunately, almost one-half of the precipitation is received during the growing season, May 1 to September 30, when an everage of 49·28 per cent occurs, as follows: May, 7·098 per cent; June, 3·887 per cent; July, 13·528 per cent; August, 10·444 per cent, and September 14·323 per cent. The month of September receives the highest percentage during the year with 14·323 per cent, and the month of February the least during the year with 3·046 per cent.

The heaviest rainfall recorded occurred on September 22, 1921, when 3·2 inches fell, and the heaviest snowstorm on March 21, 1921, when a snowfall of 12 inches was received in one day.

In considering the number of days per month, on which precipitation occurred it is interesting to note that the same month which receives the greatest amount of precipitation also has it occur on the greatest number of days.

TEMPERATURES

January is the coldest month in the year, with an average mean temperature of —2·048 degrees; February is the second coldest month, with a mean temperature of 2·61 degrees; and December is third, with 4·352 degrees. March is the fourth coldest, with a mean of 13·8 degrees; November is fifth, with a mean of 22·256 degrees, and April is sixth, with 31·67 degrees. July is the hottest month in the year, with a mean temperature of 61·262 degrees; followed by August, with 58·11 degrees; June, 57·798 degrees; September, with 50·756 degrees; May, 47·278 degrees, and October, with 38·25 degrees.

In average monthly minimum temperatures the twelve months stand in the exact same order as in the monthly mean, that is, January has the lowest average monthly minimum followed by February, December, March, November and April, while July has the highest average monthly minimum followed by August, June, September, May and October, with the average monthly maximum there are some slight changes in the order of arrangement.

The lowest temperature ever recorded at this station was —52 degrees and this was reached on two different dates, namely, February 5, 1918, and January 24, 1920.

The following average minimum temperatures for the year 1918 to 1922 inclusive may be taken as a fair indication of the lowest temperature which may be expected during each month of the year: January, —42·4 degrees; February, —41 degrees; March, —30·8 degrees; April, 3·2 degrees; May, 20 degrees; June, 26·6 degrees; July, 32·8 degrees; August, 29·6 degrees; September, 25·8 degrees; October, 11·2 degrees; November, —15·6 degrees; and December, —35·8 degrees.

The highest temperature ever recorded at this station was 99 degrees and occurred on July 6, 1921.

The following averages give a fair idea of the maximum temperature that may be expected each month: January, 32·6 degrees; February, 33·6 degrees; March, 53·8 degrees; April 66·8 degrees; May, 84·6 degrees; June 85.8 degrees; July 88·6 degrees; August, 83·4 degrees; September, 81·8 degrees; October, 70·0 degrees; November, 49·6 degrees, and December, 44·8 degrees.

July, 1921, is the hottest month on record and January, 1920, is the coldest month on record. The year 1918 has the lowest average monthly mean temperature and the year 1919 has the highest.

In looking over the temperature data herein presented, the reader should at once conclude that the temperature is very important and in many cases the limiting factor in crop production. This applies particularly to the more tender sorts of vegetables and the late maturing field crops.

It may be noted that out of the total of sixty months covered in these records only six months were entirely free from frost. July is the month with the least frost, and even in it one frost occurred during the past five years. Four years out of the five, frosts occurred in June, and this also applies to the month of August.

SUNSHINE

The month of June has the greatest number of hours per day of sunshine with an average of 9·082 hours, while November has the least with an average of 1·584 hours. The smallest amount of sunshine recorded any one year was in 1922, when 1680·2 hours were recorded. The greatest amount was in 1921, when 1890·1 hours were registered. The average of the four years 1919 to 1922 inclusive is 1766·675 hours per year.

DATES OF FARM OPERATIONS

The dates of farm operations vary considerably from year to year. This fact has often a marked bearing on the final results. The dates upon which the more important farm operations have been commenced for the past three years are as follows:—

DATE OF FARM OPERATIONS FOR THREE YEARS, 1920-1922

Operation	Year 1920	Year 1921	Year 1922
First work on land	May 6	May 3	May 9
Seeding wheat	" 10	" 5	" 13
Seeding oats	" 10	" 5	" 13
Seeding barley	" 10	" 5	" 13
Seeding spring rye		" 5	" 13
Seeding peas		" 5	" 13
Seeding sunflowers	June 11	" 10	" 23
Seeding corn	" 7	" 10	" 23
Planting potatoes	" 4	" 31	June 3
Seeding mangels	May 24	" 28	" 2
Seeding turnips	June 14	June 8	" 3

DATES OF FARM OPERATIONS FOR THREE YEARS, 1920-1922

Operation	Year 1920	Year 1921	Year 1922
Seeding O.P.V	June 11	May 10	May 23
Seeding winter wheat	Sept. 2	Aug. 4	Aug. 18
Seeding winter rye		" 22	Sept. 5
Ploughing stopped by frost	Oct. 29	Nov. 4	Nov. 19
Cutting hay	June 30	July 4	July 11
Cutting winter wheat	Aug. 14	Aug. 5	Aug. 16
Cutting winter rye			" 16
Cutting alfalfa first cut		June 30	July 6
Cutting alfalfa, second cut		Aug. 15	Aug. 23
Cutting wheat	Aug. 16	July 27	" 16
Cutting rye		Aug. 3	" 31
Cutting oats	Aug. 27	" 15	" 21
Cutting barley	" 16	" 6	" 14
Cutting peas		" 18	Sept. 19
Cutting sunflowers	Sept. 11	Sept. 16	Sept. 19
Cutting O.P.V	" 7	" 2	" 8
Threshing	" 7	Aug. 18	Aug. 24
Silo filling	" 11	Sept. 2	Sept. 8
Harvesting roots	Oct. 6	Oct. 11	Oct. 5

ANIMAL HUSBANDRY

DAIRY CATTLE

The keeping of dairy cows is bound to become a very important and reasonably profitable branch of farming in northern Ontario. During the winter the dairy herd furnishes the farmer with a market for his field crops and the labour of himself and family right at home, when possibly it would be difficult to locate a market for all of the family labour and the coarser feeds had they not the dairy herd to look after. The fertility of the soil is also generally improving on the dairy farm.

In a new country the demand for dairy products, milk and butter in particular, far exceeds the supply. This makes a ready market at all times for the surplus which the farmer has for sale. Milk sells wholesale at ten cents per quart, and retails at fifteen cents per quart, and in many of the larger towns of the north fresh milk is difficult to get at any price, particularly during the winter.

In most years the crops necessary to feed dairy cows, such as clover hay, sunflowers, and oats, peas and vetches for silage, turnips, etc., grow remarkably well. This enables the farmer to maintain his herd without purchasing feed, unless it be some concentrates to help balance the home-grown ration.

The present dairy herd at this Station consists of one grade Holstein and thirteen grade Ayrshire cows, two grade yearling Ayrshire heifers, and eleven grade Ayrshire heifer calves. This herd is headed by the herd sire Cavalier of Elm Lane No. 46472, a good strong typey Ayrshire bull.

The whole herd, both dairy and beef, has been entered in the Accredited Herd system and has now passed the final test and been granted full accreditation. Only three animals from the herd ever reacted.

MILK RECORDS

An accurate record is kept of each cow's production during her lactation period and a test is made once per month to determine the percentage of fat which the milk contains. A record is also kept of the feed consumed by each animal. In this way information can be obtained as to the cost of milk production and the amount of feed required by each cow per year.

The table which follows shows the amount of milk produced by each cow that completed her lactation period during the calendar year 1922. There are some others in their first lactation period that are not included in the table.

The profit column shows a comparison between feed and value of milk only as the labour and calf are neglected.

The cost of feed consumed covers each cow's lactation period, plus the time while she was dry previous to that period. With heifers in their first lactation period, the two months' feed immediately previous to date of freshening is included in the charges. The cost of feed is based on the following rates:—

Ensilage, O.P.V. or sunflowers	$ 8 31 per ton.
Roots	6 84 "
Hay	8 41 "
Meal	2 08 per cwt.
Pasture	0 10 per day.

Name of Cow.	Age at beginning of lactation period.	Date of dropping calf.	Number of days in lactation period.	Total pounds of milk produced.	Daily average yield of milk.	Average per cent fat milk.	Value of whole milk at 10 cts. per quart.	Total cost of feed.	Cost per 100 pounds of milk.	Profit or loss on cow labour and calf neglected
Maud	9	April 8 1922	163·5	5,764·0	35·2	3·4	$230·50	$ 58·59	$1·01	$171·91
Julia	10	April 12 1921	313·0	6,433·0	20·5	3·9	257·30	90·65	1·40	166·65
Maggie	10	April 29 1921	301·0	9,633·0	32·0	3·6	385·30	107·26	1·11	278·04
White	10	April 21 1921	304·0	10,454·0	34·3	3·2	418·10	109·34	1·04	308·76
Dewdrop	8	April 3 1922	238·5	7,383·5	30·9	4·0	295·30	86·31	1·16	208·99
Peggie	10	Jan. 25 1922	340·0	7,554·0	22·21	3·5	302·16	94·58	1·25	207·58
Maggie B	3	May 11 1922	231·0	3,966·0	17·1	4·0	158·64	64·27	1·62	94·37
Dora A	3	June 5 1921	310·0	3,144·0	10·1	3·2	125·70	85·49	2·71	40·21
White A	4	Feb. 27 1922	277·0	4,667·0	16·8	4·3	186·60	75·12	1·60	111·48
Phoebe A	5	Mar. 12 1922	256·0	3,944·5	15·4	4·2	157·70	71·83	1·82	85·87
Maggie A	2	July 11 1921	316·0	4,286·0	13·5	3·4	171·40	87·93	2·05	83·47
Fleckie B	2	Aug. 20 1921	328·0	4,977·0	15·1	3·0	199·0	90·53	1·81	108·47
Totals	76		3,378·0	72,206·0	259·61	43·7	2,887·70	1,021·90	18·58	1865·80
Averages	6·33		281·5	6,017·16	21·63	3·64	240·64	85·16	1·55	155·48

RATIONS FOR DAIRY COWS

During the summer, pasture forms the main part of the ration, which is sometimes supplemented by grain during dry weather and short pasture.

During the winter, O.P.V. or sunflower ensilage forms the main bulk of the feed. The remainder consists of clover hay and a meal mixture as follows: Bran four parts, oats two parts, barley two parts, cotton-seed meal one part, and oilcake one part. The ensilage is fed twice daily and the grain is fed on top of it at the same time. The hay is also fed twice per day.

The rations vary considerably, according to the individuality and milk production of the cows; but the following might be taken as an average ration for a cow weighing 1,200 pounds and giving forty pounds of milk per day:—

Ensilage, O.P.V. or sunflowers	50 lbs. per day.
Clover hay	10 "
Grain composed as above noted	12 "

FEEDING EXPERIMENT WITH DAIRY CATTLE

Sunflowers vs. O.P.V. Silage for Milk Production

The objects of this experiment are to compare the effect on the milk production of the dairy cows and also on their body weight, of sunflowers vs. O.P.V. silage, when fed as the main portion of the ration, and also to note how each silage is relished by the cattle in order to judge which is the more palatable.

For this experiment, ten milking cows were selected, one grade Holstein, five grade Ayrshires and four grade milking Shorthorns. They received a uniform ration differing only in the variety of silage fed. During November they were fed sunflower silage, during December O.P.V. silage, during January they will be fed sunflowers again and O.P.V. in February. The cattle were weighed at the begining and end of each thirty-day period, and a record taken of the milk produced during the latter twenty-one days of the thirty-day period, the first seven days being used to transfer from one silage to the other. This experiment will be reported on next year.

SUNFLOWER ENSILAGE VS. O.P.V. FOR GROWING CALVES

For this experiment ten growing calves were selected, five grade Ayrshires, and five grade Shorthorns. They were weighed on November 1, and their ration was similar throughout the period, with the exception of the variety of ensilage, which was changed every thirty days from sunflowers to O.P.V. and vice versa. This experiment will last for four months; an accurate record being kept of feed consumed and gains made during each period. The results will also be included in next year's report.

BEEF CATTLE

The raising of beef cattle has also received considerable attention at this Station. The beef herd at present consists of fifteen Shorthorn cows, six three-year-old heifers, seven two-year-old heifers and eleven calves. These cattle are all well graded-up individuals and the senior herd sire, Kentville Marconi 130631, is a good type of beef bull, bred by the Experimental Farm, Kentville, N.S. The junior sire, Jubilee Prince, 151283, is a promising individual bred by F. R. Cromwell, Cookshire, Quebec.

Most of the beef cows raise their own calves, and no record is kept of their milk production. They have access to a large area of stump-land pasture in the summer, which was seeded out after it was burned over and has since been giving an excellent growth of grasses and clovers.

Unlike the dairy herd, the beef cows are fed straw and a small amount of grain with their silage. An average ration for a cow weighing 1,200 pounds would be as follows: Ensilage, fifty pounds; hay, five pounds; straw, five pounds; and grain, two pounds per day. The ensilage is fed twice daily. Hay is fed once per day and straw once per day.

WINTER FEEDING OF BEEF CALVES

The object of this experiment is to compare clover hay, oats, peas and vetch silage, and meal vs. clover hay, roots and meal. For this experiment six grade Shorthorn calves were selected and divided into two groups of three each as evenly as possible. Group number one was fed a ration of clover hay, O.P.V. silage and meal, and group number two had clover hay, roots and meal. The meal ration for each group consisted of oats two parts, barley two parts, bran two parts, and oilcake one part. The feeds used were charged at the following prices, which were the cost of production for the feeds concerned:—

Grain mixture	$ 1 90	per cwt.
Hay	0 42	"
Ensilage	0 41	"
Roots	0 34	"

WINTER FEEDING OF BEEF CALVES

Test Feed		Group 1 O.P.V. Silage	Group 2 Roots
Initial weight of each group of three on November 15, 1921	lb.	1,648·0	1,763·0
Final weight of each group of three on April 15, 1921	"	2,132·0	2,176·0
Total gain	"	484·0	413·0
Average gain per animal	"	161·3	137·6
Average gain per animal per day	"	1·07	0·91
Hay consumed by each group in 151 days	"	3,690·0	3,690·0
Silage consumed by each group	"	4,650 0	
Roots consumed by each group	"	.....	4,650·0
Grain consumed by each group of three	"	1,432·0	1,432·0
Total value of feed for five months	$	61·75	58·50
Value of feed for one heifer for five months	$	20·58	19·50
Value of feed for one heifer for one month	$	4·11	3·90
Average cost per pound gain	$	0·129	0·141

It will be noted that the group getting the silage made the greatest gains and the cheapest gains.

SUNFLOWERS VS. O.P.V. FOR WINTERING BEEF CATTLE

The object of this experiment is to compare sunflower ensilage vs. O.P.V. as a major portion of the winter ration for beef cows.

For this experiment, ten head of beef cattle were selected on November 1, 1922, seven two-year-old heifers and three three-year-old heifers. Their ration was identical over the four thirty-day periods with the exception of the variety of silage fed. In November they got sunflowers, in December they got O.P.V., in January they will receive sunflowers and in February O.P.V. Besides the ensilage, seven head were fed hay, ten pounds, each per day, and three head were fed straw, five pounds, and hay, five pounds, each per day, but no grain. Accurate records are being kept of feeds consumed and gains made in each period. The results of this experiment will be included in next year's report.

SHEEP

The present flock of sheep consists of twenty ewes, seven ewe lambs and one ram, all registered Shropshires. The lambs came strong in the spring and little trouble was experienced in getting them to nurse. This fall the lambs were weaned early, and the ewes flushed before breeding, on clover pasture and a grain mixture of oats three parts, and bran one part, fed at the rate of one and one-half pounds each per day.

During the winter the ewes are given the run of a large yard; they are fed their grain outside and their hay inside. The winter ration is as follows: Second-cut clover hay, two and one-half pounds each per day, and grain as per the above mixture, one-half pound each per day.

COST OF FEEDING LAMBS

The object of this experiment is to determine the cost of feed and the gains made by the lambs during the winter months. For this experiment eleven lambs were weighed on December 1, 1921. Their ration consisted of clover hay, fifteen pounds; O.P.V. silage, ten pounds; pulped roots, fifteen pounds; and oats, five and one-half pounds per day. Later on the O.P.V. was raised to fifteen pounds per day and the roots lowered to ten, but the hay and grain ration remained constant until May 13, when the experiment closed.

The following prices were set on the feeds used:—

Hay	0·42 cents per cwt.
O.P.V.	0·41 "
Roots	0·34 "
Oats	1·81 "

The results obtained are as follows:—

COST OF FEEDING LAMBS

Number of lambs in pen	No	11·0
Initial weight on December 1	lb.	1,086·0
Average weight on December 1	"	98·7
Total weight on May 13	"	1,222·0
Average weight on May 13	"	111·0
Total gain of eleven lambs in 163 days	"	136·0
Average gain of eleven lambs in 163 days	"	12·3
Hay consumed in whole period	"	2,445·0
O.P.V. consumed in whole period	"	2,276·0
Roots consumed in whole period	"	1,730·0
Oats consumed in whole period	"	896·5
Total cost of feed	$	41·71
Cost of feed per lamb	$	3·79
Cost of feed per lamb per day	$	0·023
Cost per pound gain	$	0·306

SUNFLOWER SILAGE VS. O.P.V. FOR WINTERING LAMBS

The object of this experiment is to compare sunflower vs. O.P.V. silage as a part of the ration in wintering lambs.

For this experiment, seven ewe lambs were weighed on December 1, 1922. Their ration was the same for the next four thirty-day periods with the exception of the variety of silage, which changed each period as follows: December O.P.V.; January sunflowers; February O.P.V. and March sunflowers. Their ration consists of clover hay two pounds, and grain one-half pound each per day, and silage one pound each per day. The results of this experiment will be included in next year's report.

SWINE

The present herd of breeding swine consists of eleven sows and one boar, all of which are registered Yorkshires. Owing to some difficulty in getting the sows in pig for the spring litters, which threw them a little late, no fall litters were raised. The spring litters did very well indeed and were a healthy lot of good, typey pigs. Ninety-eight pigs were farrowed and eighty-one raised to weaning age. Some were sold as breeding stock and the remainder were used in experimental work as reported on in this report, and also in some experiments at present under way.

The experimental work to date has largely been along the lines of comparing feeds and methods of feeding, for the most economical and satisfactory production of the bacon hog. A number of young sows are on hand at present which will be bred and sold to settlers at a nominal price.

COMPARISON OF CLOVER PASTURE VS. NO CLOVER PASTURE AND THE SELF FEEDER VS. PAIL FEEDING

This experiment was conducted with the object of determining the advantage, if any, of red clover pasture for growing pigs, and also to compare the results obtained from pail-fed pigs versus pigs fed from a self-feeder while on clover pasture.

For this test, thirty pure-bred Yorkshire pigs, twelve weeks of age and very uniform, were selected on August 1st, 1922, and divided into three groups of ten each.

Lot number one was housed in clean, dry quarters in the main hog pen, while lots two and three were turned out on clover pasture, each lot having a portable hog cabin as a shelter.

The three lots were fed rations of similar mixtures as follows; from twelve to fourteen weeks of age a mixture of finely ground oats two parts, middlings two parts, and finely ground barley one part, plus five per cent tankage. From fourteen to twenty weeks the mixture consisted of finely ground oats, finely ground barley and middlings equal parts, plus five per cent tankage. From twenty weeks to the end of the experiment on November 1, the mixture was finely ground oats one part, middlings one part and finely ground barley two parts plus five per cent tankage. Each lot received exactly the same amount of skim-milk daily, the amount varying slightly from day to day.

Fresh water to drink was kept before all three lots at all times and the numbers one and two lots were fed their grain as a slop mixed in water and milk, while lot three ate their grain dry from the self feeder and drank their milk from the trough. The results obtained are as follows:—

		Lot 1	Lot 2	Lot 3
Number of pigs in each lot	No.	10·0	10·0	10·0
Total weight of ten pigs on Aug. 1	lb.	457·0	449·0	450·0
Average weight of each pig on Aug. 1	"	45·7	44·9	45·0
Final weight of ten pigs on Nov. 1	"	822·0	1,415·0	1,475·0
Average weight of each pig	"	82·2	141·5	147·5
Total gain of each lot in 91 days	"	365·0	966·0	1,025·0
Average gain of each pig in 91 days	"	36·5	96·6	102·5
Average daily gain for each pig	"	0·4	1·06	1·12
Average daily gain for each lot of ten pigs	"	4·0	10·6	11·2
Feed Consumed				
Finely ground oats to each lot	lb.	617·7	973·6	1,070·8
Middlings to each lot	"	617·7	973·6	1,070·8
Finely ground barley to each lot	"	869·4	1,581·2	1,775·6
Tankage	"	104·8	175·5	196·5
Milk	"	1,382·0	1,382·0	1,382·0
Total grain ration per lot	"	2,209·6	3,703·9	4,113·7
Average grain ration per pig	"	220·96	370·39	411·37
Average grain ration per pig per day	"	2·4	4·06	4·5
Amount of feed per 100 pounds gain	"	605·3	383·4	401·3
Amount of feed per 1 pound gain	"	6·05	3·83	4·01
Cost of feed per lot labour neglected	$	51·96	82·73	91·19
Cost to produce 100 pounds gain labour neglected	$	14·23	8·56	8·89
Cost of labour at 35 cents per hour	$	31·85	31·85	15·93
Cost to produce 100 pounds gain labour included	$	22·9	11·86	10·45

Milk was charged at fifty cents per hundred pounds and the other feeds at actual market prices as follows:—

Oats	$	1 75 per cwt.
Middlings		1 95 "
Barley		2 10 "
Tankage		3 75 "

A perusal of the above table will disclose a marked benefit derived from clover pasture, and also cheaper gains produced by the use of a self-feeder if the cost of labour is considered.

HORSES

The horses at this Station have, up to the present time, been kept for work only. Consequently there has not been any experimental work attempted, either in breeding or feeding.

There are at present nine horses on this Farm. Eight of them are Clydesdale grades, heavy and strong and good for work. The other is a light driver, which is used singly at odd jobs as well. The horses are kept busy nearly every working day in the year. In the summer the regular farm work is urgent and in the winter, wood, pulp, manure, etc, supply work. A record is kept of the feed consumed by each horse and, while it varies slightly with the individuality of the horse, the following might be considered as an average ration for a horse weighing 1,500 pounds at reasonably heavy work. Mixed hay, eighteen pounds per day; whole oats or oats and bran, fifteen to eighteen pounds per day, depending on the severity of the work. On Saturday nights each horse is given a bran mash or some boiled barley as a conditioner. In the winter a small teaspoonful of saltpetre is also given on Saturday nights to prevent kidney trouble.

FIELD HUSBANDRY

ROTATION OF CROPS

In any new country it takes considerable time before the settlers get in a position to practise a system of rotation of crops. Nevertheless, as the country develops and larger areas are brought under cultivation, the need of such a system will become more and more apparent. In view of the fact that little or no definite information is available with regard to the most suitable rotations to use in northern Ontario, and in order to have some data accumulated on this important phase of farm management when the urgency of the practice is felt by the farmers, an extensive experiment in crop rotations was started at this Station in 1922.

The area allotted to each rotation is one acre for each year that the rotation covers, that is a three-year rotation would occupy an area of three acres and a four-year rotation an area of four acres, and so on. It is true the areas are not large; but they are as large as the available land on the Farm would permit and they are large enough to make possible the keeping of accurate records on cost of production. Each acre is arranged in a long, narrow strip which facilitates working and in this way they represent field conditions.

The soil on which all these rotations are situated is fairly uniform and might be described as a clay loam with one or two muck areas which cross all rotations in question, and therefore should affect each about the same.

The main points which it is hoped to get data on from these rotations are as follows:—

1. The value, if any, of a short rotation in building up the fertility of the soil.
2. The effect on the following crop of a sod, one, two, and three years old.
3. The yield of hay from first, second, and third year meadows.
4. The yield of sunflowers, following sod or grain and following clover or grain.
5. The yield of grain after (1) sunflowers, (2) hay, (3) grain.
6. The success of various rotations involving various proportions of the different types of crop.
7. The success of fall versus spring grain.
8. The value of a summer-fallow as compared with a cleaning crop like potatoes or sunflowers.
9. The value of potatoes as a money crop.

A record is kept of all items entering into the cost of production and a value is set on all products, These form a basis of comparison between the rotations; because from these figures may be calculated the profits or losses obtained.

DESCRIPTION OF ROTATIONS

The following are the rotations under test at this Station, together with a brief description of the object of each, and the mode of operation. This rotation work has not been conducted for a sufficient length of time to make the publication of results an indication of the comparative value of the different rotations.

ROTATION A (THREE YEARS' DURATION)

First year—Sunflowers.
Second year—Oats.
Third year—Clover hay.

The object of this rotation is to determine the value, if any, of a short rotation in building up the fertility of the soil.

The preparation of the land for sunflowers, the first crop in the rotation, consists of fall-ploughing the clover sod after it has been given an application of manure at the rate of twelve tons per acre. In the spring a good seed bed is established by thorough discing and the sunflowers are planted as soon as the soil is in a suitable condition. After the sunflowers are harvested in the autumn, the soil is again ploughed in preparation for the oat crop the following year. The next spring the land is well disced and seeded out to grass and clover, using oats as a nurse crop. Clover hay is cut in the third year of the rotation.

The summer cultivation which is given the sunflowers is of great value in cleaning the land of weeds, and the rotation would be very satisfactory if it were not for the fact that it demands a very large proportion of the farm in hoed crops and, therefore, it might not be practical on all northern Ontario farms.

ROTATION B (FOUR YEARS' DURATION)

First year—Sunflowers.
Second year—Oats.
Third year—Clover hay.
Fourth year—Timothy hay.

This rotation is practically the same as A, and consequently it is given similar treatment. The only difference is that the manure is applied at the rate of sixteen tons per acre for the sunflowers instead of twelve, and the rotation also covers one more year; the additional year being a timothy meadow. This is possibly one of the most practical rotations for mixed farming of all those tried. It gives a smaller proportion of the land in hoed crops and a larger proportion in hay than rotation A.

ROTATION C (FIVE YEARS' ROTATION)

First year—Oats.
Second year—Sunflowers.
Third year—Barley.
Fourth year—Clover hay.
Fifth year—Timothy.

This rotation makes possible the production of a greater amount of grain and it also gives a variety in the grain produced. The five crops represented have all given very satisfactory results in this district and the rotation is one which should appeal to farmers who want to produce an abundance of feed for horses, cattle, sheep and swine.

The oat crop is sown on timothy-sod land, ploughed early in the fall after the hay has been removed. After the oat crop is harvested, the land is manured at the rate of twelve tons per acre and fall-ploughed in preparation for the sunflowers the following year. The sunflower crop is supposed to be a substitute for the summer-fallow in the keeping down of weeds and the land is thoroughly cultivated throughout the season until the stalks get too large to allow passing between the rows. After the sunflowers are ensiled, the soil is again fall-ploughed and seeded out to grass and clover the next spring, using barley as a nurse crop.

Clover hay is cut the fourth year in the rotation and, after haying, the land is given an application of manure at the rate of eight tons per acre. This should have a beneficial effect on the timothy hay in the fifth year of the rotation.

ROTATION D (SIX YEARS' DURATION)

First year—Potatoes.
Second year—Wheat.
Third year—Barley.
Fourth year—Clover hay.
Fifth year—Timothy hay.
Sixth year—Timothy hay.

This is the longest rotation of all those under test at present. The crops included could, if necessary, be practically all sold as cash crops. There is no allowance made for the growing of silage crops, as the potato crop is used as a cleaning crop. It allows for one-half the total area in hay, and utilizes a three-year-old meadow.

The potatoes of the first year are planted on timothy-sod land which is manured at the rate of sixteen tons per acre and fall-ploughed after the hay crop is removed. They are well cultivated during the summer and this puts the soil in good shape for a crop of wheat the next year. In preparation for the wheat crop the land is fall-ploughed after the potatoes are dug in the autumn. After the wheat crop is harvested, the land is again fall-ploughed and seeded out the next spring to grass and clover using barley as a nurse crop. After the barley is taken off in the summer, the new seeding is given a top-dressing of manure at the rate of eight tons per acre. This should increase the yields of hay for the next three years.

ROTATION E (FIVE YEARS' DURATION)

First year—Oats seeded to clover.
Second year—Summer-fallow.
Third year—Fall wheat.
Fourth year—Clover hay.
Fifth year—Timothy hay.

This rotation is something like C, the only difference being that a summer-fallow is used in place of sunflowers, and fall wheat is used to seed out with in the third year instead of barley.

The timothy sod is fall-ploughed and sown to oats the following spring and seeded to clover. This clover is allowed to grow until a good stand has developed the next year, when it is ploughed under together with an application of twelve tons of manure to the acre. The land is afterwards cultivated frequently until the latter part of August, when the fall wheat is sown and the land seeded out to timothy. The next spring, the clover is sown just as the snow is leaving the ground. The fourth year, clover hay is cut and, after haying, the meadow is given a top dressing of manure at the rate of eight tons per acre. This should help the next two crops, timothy hay and oats. This rotation may prove rather expensive, as only four crops are obtained during the five years, while the manure is applied at the rate of four tons per acre per year. There is also the expense of seeding down with grass and clover twice during the rotation.

It will be noted throughout all the rotations, that the manure applied is equal, and is at the rate of four tons per acre per year. In some cases only one application is given during the rotation, while in others two are given.

As 1922 was the first year that the rotations were undertaken many of them are not yet completely established. For instance, all acres that were not in hoed crops or summer-fallow this year were sown to barley.

COST OF PRODUCING FARM CROPS

Records are kept of the cost of production of all crops grown at this Station. In the figuring of these costs, actual prices are used whenever possible, such as the cost of labour, twine, seed, etc. The other costs, of course, must be estimated as closely as possible, considering always the local conditions under which the work is done. Some overhead expenses are included, besides the operating costs. These figures cover areas which were not included in the rotations and experiments dealt with elsewhere in this report.

OATS

Twenty-nine and one half acres of oats were grown under field conditions in 1922. The yield was light owing to dry weather, but the oats and straw are both of good quality and no damage was done by frosts. The Banner variety was grown and seeded at the rate of two and one-half bushels per acre. The statement covering cost of production is as follows:—

STATEMENT SHOWING THE COST PER ACRE TO PRODUCE OATS, 1922

Area included		29·5 acres
Items of cost—	$ cts.	$ cts.
Rent of land		3 50
Use of machinery		1 00
Ploughing—		
Teamsters, 11 hours at 36 cents per hour	3 96	
Team work, 10 hours at 20 cents per hour	2 00	
		5 96
Discing—		
Teamsters, 5·7 hours at 36 cents per hour	2 05	
Team work, 6·4 hours at 20 cents per hour	1 28	
		3 33
Harrowing—		
Teamsters, 1·8 hours at 36 cents per hour	0 65	
Team work, 1·9 hours at 20 cents per hour	0 38	
		1 03
Seeding—		
Teamsters, 1·2 hours at 36 cents per hour	0 43	
Team work, 1·2 hours at 20 cents per hour	0 24	
Seed 2½ bushels at $1.37 per bushel	3 43	
		4 10
Harvesting—		
Teamsters, 2·9 hours at 36 cents per hour	1 04	
Team work, 3·6 hours at 20 cents per hour	0 72	
Labour, 4 hours at 35 cents per hour	1 40	
Twine	0 25	
		3 41
Threshing—		
Tractor operator, 0·5 hours at 55 cents per hour	0 28	
Labour, 5 hours at 35 cents per hour	1 75	
Gasoline, 0·5 gallons at 40 cents	0 20	
		2 23
Total cost per acre		24 56
		bush.
Yield per acre		32·34
		$ cts.
Cost per bushel		0 76

WHEAT

No wheat was produced at this Station in 1922. 12·6 acres of winter wheat were sown in the fall of 1921 at the rate of one and three-quarter bushels per acre on August 13. It developed a good stand during the autumn and came through the winter in good shape, but three frosts in June, on the nights of the 11th, 20th, and 23rd, seemed to prevent it from maturing any grain and it was afterwards cut with the mower and used as hay. No field crop spring wheat was sown this year.

In the fall of 1922, ten acres of fall wheat were sown on a night pasture which was summer-ploughed and well disced. It was seeded at the rate of two bushels per acre, on August 25; but owing to a very dry autumn, a poor stand developed before the freeze-up.

BARLEY

Twenty-three acres of barley were grown in 1922. The seed was sown early in May and the crop did fairly well and gave a reasonable yield of good quality grain. It was harvested from August 17 to September 7. Some spots on muck were slightly damaged by frost, but not seriously. The cost of production is as follows:—

STATEMENT SHOWING THE COST PER ACRE TO PRODUCE BARLEY, 1922

Total area included		acres 23
Items of cost—	$ cts.	$ cts.
Rent of land		3 50
Use of machinery		1 00
Ploughing—		
Teamsters, 7 hours at 36 cents per hour	2 52	
Team work, 0·64 hour at 20 cents per hour	1 28	
		3 80
Discing—		
Teamsters, 5·5 hours at 36 cents per hour	1 98	
Team work, 5 hours at 20 cents per hour	1 00	
		2 98
Harrowing—		
Teamsters, 1·5 hours at 36 cents per hour	0 54	
Team work, 1·4 hours at 20 cents per hour	0 28	
		0·82
Rolling—		
Teamsters, 1·3 hours at 36 cents per hour	0 47	
Team work, 1·2 hours at 20 cents per hour	0 24	
		0 71
Seeding—		
Teamsters, 1·5 hours at 36 cents per hour	0 54	
Team work, 1·4 hours at 20 cents per hour	0 28	
		0 82
Seed 1·5 bushels at $2 per bushel		3 00
Manure one quarter of 16 tons at $1 per ton		4 00
Harvesting—		
Teamsters, 3 hours at 36 cents per hour	1 08	
Team work, 3·8 hours at 20 cents per hour	0 76	
Labour, 6 hours at 35 cents per hour	2 10	
Twine	0 25	
		4 19
Threshing—		
Tractor operator 0·7 hours at 55 cents per hour	0 38	
Gasoline 0·7 gallons at 40 cents	0 28	
Labour, 6 hours at 35 cents per hour	2 10	
		2 76
Total cost per acre		27 58
		bush.
Yield per acre		26 40
	$ cts.	$ cts.
Cost per bushel		1 04

COST OF PRODUCING HAY

The hay crop was light in 1922, owing to dry weather. No second cuts worth while were obtained, as the dry weather lasted until the ground froze up in the fall. Good weather prevailed, however, for curing the hay, which was put in the barns in good condition. The standard hay mixture used in seeding out for hay is red clover eight pounds, timothy eight pounds and alsike clover two pounds. As most of the meadows last for a period of two years, only one-half the cost of grass and clover seed is charged to each crop. The first

year the clover predominates in the hay, while in the second year there is still considerable clover, but a greater percentage of timothy. In wet years the clover grows the better of the two and more or less crowds out the timothy.

One hundred and forty-one acres of hay were cut in 1922, and the statement covering cost of production is as follows:—

STATEMENT SHOWING THE COST PER ACRE TO PRODUCE HAY 1922

Total area in hay		141 acres
Items of cost		
	$ cts.	$ cts.
Rent of land		3 50
Use of machinery		1 00
Red clover, 8 pounds at 35 cents per pound	2 80	
Alsike, 2 pounds at 28 cents per pound	0 56	
Timothy, 8 pounds at 20 cents per pound	1 60	
		2 48
	(2)4 96	
Haying—		
Teamsters, 4·1 hours at 36 cents per hour	1 48	
Team work, 3·5 hours at 20 cents per hour	0 70	
Labour, 3·4 hours at 35 cents per hour	1 19	
		3 37
Cost per acre		10 35
		tons
Yield per acre		1 04
	$ cts.	$ cts.
Cost per ton		9 95

COST OF PRODUCING SUNFLOWERS

Only two acres of sunflowers were planted this year, outside of those covered in the other rotations. The seed germinated unevenly and the crop was only fair. The statement showing cost or production is as follows:—

STATEMENT SHOWING COST PER ACRE TO PRODUCE SUNFLOWERS IN 1922

Area included		2 acres
Items of Cost		
	$ cts.	$ cts.
Rent of land		3 50
Use of machinery		1 00
Ploughing—		
Teamsters, 7·78 hours at 36 cents per hour	2 80	
Team work, 7 hours at 20 cents per hour	1 40	
		4 20
Discing—		
Teamsters, 10·72 hours at 36 cents per hour	3 86	
Team work, 9·75 hours at 20 cents per hour	1 95	
		5 81
Harrowing—		
Teamsters, 2 hours at 36 cents per hour	0 72	
Team work, 2 hours at 20 cents per hour	0 40	
		1 12
Rolling—		
Teamsters, 1 hour at 36 cents per hour	0 36	
Team work, 1 hour at 20 cents per hour	0 20	
		0 56
Seeding—		
Teamsters, 1·5 hours at 36 cents per hour	0 54	
Team work, 1·5 hours at 20 cents per hour	0 30	
		0 84
Seed 10 pounds at 10 cents per pound		1 00
Manure one-half share of 16 tons at $1		8 00
Cultivating and hoeing—		
Teamsters, 11 hours at 36 cents per hour	3 96	
Team work, 8 hours at 20 cents per hour	1 60	
Labour, 10 hours at 35 cents per hour	3 50	
		9 06

STATEMENT SHOWING COST PER ACRE TO PRODUCE SUNFLOWERS IN 1922—*Concluded*

Harvesting—		
Teamsters 5·5 hours at 36 cents per hour	1 98	
Team work, 5·5 hours at 20 cents per hour	1 10	
Labour, 3·5 hours at 35 cents per hour	1 22	
		4 30
Silo filling—		
Tractor operator, 1 hour at 55 cents per hour	0·55	
Labour, 6 hours at 35 cents per hour	2·10	
Gasoline 1 gallon at 40 cents	0·40	
		$3·05
Total cost per acre		42·44
Yield per acre.....tons		5·38
Cost per ton		7·89

COST OF PRODUCING OATS, PEAS AND VETCHES FOR SILAGE

The O.P.V. silage crop did fairly well this year. It did not grow much until the rain on July 7, but after that it came along very nicely and was cut into the silo from September 8-22, and is coming out in fine shape. The statement showing the cost of production is as follows:—

STATEMENT SHOWING COST PER ACRE TO PRODUCE O.P.V. FOR SILAGE, 1922

Area included		22 acres
Items of cost—		
Rent of land		$3·50
Use of machinery		1·00
Ploughing—		
Teamster, 11 hours at 36 cents per hour	$3·96	
Team work, 10 hours at 20 cents per hour	2·00	5·96
Discing—		
Teamsters, 8 hours at 36 cents per hour	2·88	
Team work, 10 hours at 20 cents per hour	2·00	4·88
Harrowing—		
Teamsters, 1·5 hours at 36 cents per hour	0·54	
Team work, 1·4 hours at 20 cents per hour	0·28	0·82
Seeding—		
Teamsters, 1·2 hours at 36 cents per hour	0·43	
Team work, 1·3 hours at 20 cents per hour	0·26	0·69
Seed, 3 bushels at $2.00 per bushel		6·00
Harvesting—		
Teamsters, 3·4 hours at 36 cents per hour	1·22	
Team work, 4·0 hours at 20 cents per hour	0·80	2·02
Silo filling—		
Tractor operator, 1 hour at 55 cents per hour	0·55	
Gasoline, 1 gallon at 40 cents	0·40	
Labour, 6 hours at 35 cents per hour	2·10	3·05
Total cost per acre		$27·92
Yield per acre.....tons		4·03
Cost per ton		6·93

ROOT CROPS

No root crops were planted under field conditions this year other than those included in the rotations and experiments dealt with elsewhere, the reason being that the available land was all utilized in rotation and cultural experiments.

POTATOES

Only one acre of potatoes was grown this year outside the rotations and experiments. The tubers were planted on June 3, on a clover sod which had been manured just before ploughing at the rate of sixteen tons per acre. The rows were about thirty inches apart and the sets were dropped about one foot apart in the row. Owing to dry weather the growth was slow and the yield light. The statement covering cost of production is as follows:—

STATEMENT SHOWING COST OF PRODUCING POTATOES

Area included		1 acre
Items of cost—		
Rent of land		$3·50
Use of machinery		1·00
Manure one half share of 16 tons		8·00
Planting—		
Teamsters, 12·1 hours at 36 cents per hour	$4·36	
Team work, 11 hours at 20 cents per hour	2·20	
Labour, 20 hours at 35 cents per hour	7·00	13·56
Cultivating...—		
Teamster, 9·9 hours at 36 cents per hour	3·56	
Single horse 9 hours at 10 cents per hour	0·90	4·46
Digging—		
Teamsters, 10 hours at 36 cents per hour	3·60	
Single horse 10 hours at 10 cents per hour	1·00	
Labour 102 hours at 35 cents per hour	35·70	40·30
Seed 20 bushels at $1.50		30·00
Total cost per acre		100·82
Yield per acre		61·5
Cost per bushel		1·64

CULTURAL EXPERIMENTS

As was stated in connection with the rotations, there are no definite data available with regard to the most satisfactory and economical system of treating the new soil in this district. There is also need of information as to the best methods of growing some of the newer ensilage crops like sunflowers, O.P.V., etc. With the object of getting some definite results on these problems a number of cultural experiments have been established. As some of the experiments are only getting under way, few figures are available this year on these.

RATES OF SEEDING SUNFLOWERS

The object of this experiment is to compare the yields of sunflowers from various rates of seeding. Twelve plots one-twentieth acre each in size, were planted on May 25, with Mammoth Russian sunflowers and fall-ploughed clover sod, which had been winter manured at the rate of fifteen tons per acre. The plots were harvested on September 19, and the following table gives the different rates of seeding, and the results obtained in 1922, together with the average for two years.

RATES OF SEEDING SUNFLOWERS

Number of Plot	Distance between rows	Distance between plants in the rows	Average Height		Yield per acre in 1922		Average yield of two years, 1921–1922	
	inch.	inch.	ft.	in.	tons	lbs.	tons	lbs.
1	24	6	6	0	7	1,800	16	1,500
2	24	12	7	0	7	200	14	1,750
3	24	18	7	10	8	1,400	16	1,300
4	30	6	7	0	5		13	1,700
5	30	12	3	5	1	1,200	8	300
6	30	18	6	6	3	1,000	11	950
7	36	6	4	0	1	1,800	6	859
8	36	12	6	4	3	400	9	150
9	36	18	7	8	3	800	10	1,000
10	42	6	6	10	5	1,000	8	1,800
11	42	12	7	0	8	600	12	650
12	42	18	7	6	4	1,200	9	500

A close perusal of this table will indicate that the distance between the rows seems to have a considerable bearing on the yields, while the distance between the plants in the row does not seem to affect the yield very much. In order to make this point appear a little more clear, the following tables have been included.

Table number one gives the average yield of sunflowers in 1922, and also the average yield for the two years from all plots having different distances between the rows, while table number two gives the average yield of sunflowers in 1922, and also the average yield for two years from all plots having the plants different distances apart in the row.

RATES OF SEEDING SUNFLOWERS, ROWS DIFFERENT DISTANCES APART

Distance between rows	Yield per acre in 1922 from rows different distances apart		Average Yield for two years from rows different distances apart	
	tons	lbs.	tons	lbs.
Rows 24 inches apart	7	1,800	16	183·5
Rows 30 inches apart	3	733	11	316·5
Rows 36 inches apart	2	1,666	8	1,333·0
Rows 42 inches apart	6	266	10	316·0

RATES OF SEEDING SUNFLOWERS, PLANTS DIFFERENT DISTANCES APART

Distance between plants	Yield per acre in 1922 with plants different distances apart in the row		Average Yield for two years from plants different distances apart in the row	
	tons	lbs.	tons	lbs.
Plants 6 inches apart in the row	5	150	11	962·0
Plants 12 inches apart in the row	5	100	11	212·5
Plants 18 inches apart in the row	5	100	11	1,937·5

The yield in 1922 was very light owing to dry weather. Plots five and seven were both cut down with frost as they were on slightly lower land than the others, and this accounts for their abnormally low yield.

RATES OF SEEDING ENSILAGE CROPS

The object of this experiment is to compare the yields of ensilage crops from various rates of seeding. The crops used were sunflowers, corn, and a mixture of oats, peas and vetches. All plots were seeded on May 25, in duplicate one-twentieth acre plots on fall-ploughed soil, which had previously been in night pasture and manured at the rate of fifteen tons per acre. The sunflowers and corn were sown in drills 24, 30, 36, and 42 inches apart, and the plants were thinned to six inches apart in the row, while the oats, peas and vetches were sown in a mixture as follows:—

Oats, 1 bushel; peas, 1 bushel per acre.
Oats, 1½ bushels; peas, 1 bushel per acre.
Oats, 1 bushel; peas, 1 bushel; vetch, ½ bushel per acre.

Oats, 1½ bushels; peas, 1 bushel; vetch, ½ bushel per acre.

The corn got frosted, hence no results were obtained from it. The other plots were harvested on September 20, and the results obtained are as follows:—

RATES OF SEEDING ENSILAGE CROPS

Crop	Rate of seeding	Yield per acre in 1922	Average Yield per acre 1921-22	Remarks on Crop in 1922
	inch.	tons lbs.	tons lbs.	
Sunflowers	24	11 1,700	15 550	Fairly uniform, average height 7 feet.
Sunflowers	30	12 1,800	12 1,625	Fairly even, average height, 7 feet 2 inches.
Sunflowers	36	10 1,500	11 130	Slightly uneven, average height, 7 feet 3 inches.
Sunflowers	42	13 1,700	13 400	Heavy stalks, average height, 7 feet 4 inches.
Corn	24	.....	2 1,320	Frosted, no results.
Corn	30	.....	2 80	Frosted, no results.
Corn	36	.....	2 1,000	Frosted, no results.
Corn	42	.....	2 1,280	Frosted, no results.
	Bush.			
Oats	1			
Peas	1	5 500	4 1,792	An even stand.
Oats	1½	4 1,800	5 725	An even stand.
Peas	1			
Oats	1			
Peas	1			
Vetch	½	5 1,600	5 950	An even stand.
Oats	1½			
Peas	1			
Vetch	½	5 900	4 1,902	An even stand, average height, 3 feet.

In this experiment also, the rows being close together seemed to increase the yield per acre. The extra weight of those 42 inches apart, appears to be due to a number of stalks which bend out from the rows and grow abnormally large. It is doubtful, however, if overlarge stalks make as good silage as those of medium size. With the O.P.V., a mixture of oats one bushel, peas one bushel and vetches one-half bushel gave the largest yield, both in 1922 and in the average of the two years.

DATES OF SEEDING ENSILAGE CROPS

The object of this experiment is to compare the yields of ensilage crops, when sown on different dates. Sunflowers, corn, and a mixture of oats and peas and vetches were used in this test. The seed was sown on different dates at intervals of seven days, commencing on May 23, in one-twentieth acre plots on fall-ploughed land, which had previously been in night pasture and had also been manured at the rate of fifteen tons per acre. The corn and sunflowers were sown in drills forty-two inches apart, and the plants thinned to six inches apart in the row, while the oats, peas and vetches were sown at the rate of one bushel of oats, one bushel of peas and one-half bushel of vetches per acre. Plots three and six were harvested on September 7, and the remainder on September 21. The results obtained in 1922, and the average yield for two years are as follows:—

DATES OF SEEDING ENSILAGE CROPS

Crops	Date of seeding 1922	Yield per acre in 1922	Average yield per acre 1921–22	Remarks on Crop in 1922
		tons lbs.	tons lbs.	
Sunflowers	May 23	9 400	10 550	Crop somewhat uneven owing to poor germination.
Corn	" 23			Frosted, no results.
O.P.V.	" 23	2 880	2 1,770	Only a fair crop, vetch did not show up much.
Sunflowers	" 30	7 1,400	9 1,970	Uneven germination, crop not uniform.
Corn	" 30		2 220	Frosted, no results.
O.P.V.	" 30	3 1,120	5 1,150	A fair stand but vetch did not do very well.
Sunflowers	June 6	7 200	9 1,750	A fair crop, but uneven.
Corn	" 6		2 1,815	Frosted, no results.
O.P.V.	" 6	3 000	2 1,490	A fair stand, but very little vetch.
Sunflowers	" 13	7 000	10 850	Poor germination, an uneven stand.
Corn	" 13		3 120	Frosted, no results.
O.P.V.	" 13	2 1,400	4 1,990	Somewhat uneven, with very little vetch

In the average yield for two years, the seedings do not come on the same date each year, but the first seeding in each year is used in making up the first average and so on with the second, third and fourth seedings in each year.

While this table indicates that the date of seeding, within reasonable limits, does not affect the yield of sunflowers very much, yet it is possible that, everything considered, the early planting would be most satisfactory, as the the season's work would be completed sooner, the plants would be more mature and should make a better silage. However, it also shows that a good crop of silage may be grown with very late seeding, which might be an advantage under certain circumstances.

ENSILAGE AND ROOT EXPERIMENT

The objects of this experiment are to compare the yields of sunflowers, corn, and a mixture of oats, peas and vetches for ensilage, with roots and also to compare the yields of oats after each of the ensilage and root crops. This experiment is undertaken on a four-year rotation using four acres of land as follows:—

First year—One-quarter acre roots, one-quarter acre sunflowers, one-quarter acre corn, one-quarter acre O.P.V.

Second year—Oats.

Third year—Clover hay.

Fourth year—Timothy.

Only one acre was used in 1922 for this experiment, but the four acres will be included another year. The soil is a clay loam with some muck in spots.

The timothy sod is manured at the rate of sixteen tons per acre, and fall-ploughed in preparation for the ensilage and root crops, which are crops grown in the first year of the rotation.

After the ensilage and roots are harvested, the land is again fall-ploughed and seeded out to grass and clover the next spring, using oats as a nurse crop. The third year, clover hay is cut, and timothy hay the fourth year.

The results obtained in 1922 from each quarter acre are as follows:—

ENSILAGE AND ROOT EXPERIMENT, 1922

Crops	Yield per acre	
	tons	lbs.
O.P.V.	5	164
Turnips	2	1,800
Corn	Frosted	
Sunflowers	2	1,640

It will be noted that the yields of the turnips and sunflowers are particularly light. They are not representative yields for these crops, as the soil was so dry that the seed did not germinate and thus the results are subnormal from this cause.

GREEN MANURE EXPERIMENT

PLOUGHING DOWN SWEET CLOVER AND SUMMER FALLOWING

The object of this experiment is to determine the value, if any, of ploughing down sweet clover and afterwards summer-fallowing. This experiment occupies five acres of virgin clay loam soil and is undertaken on a five-year rotation as follows:—

First year—Oats seeded to sweet clover.
Second year—Sweet clover ploughed down and summer-fallowed.
Third year—Barley seeded to timothy and clover.
Fourth year—Clover hay.
Fifth year—Timothy.

The land is fall-ploughed in preparation for the oat crop which is grown the first year.

The sweet clover is let grow until it is a fair stand before being ploughed under the second year. During the remainder of the season, the land is cultivated at regular intervals, in order to conserve moisture and keep down weeds.

The third year, grass and clover are seeded, using barley as a nurse crop, and the fourth and fifth years are clover and timothy hay respectively.

PLOUGHING DOWN SWEET CLOVER AND BUCKWHEAT

The objects of this experiment are to determine the value, if any, of sweet clover ploughed down, and also to compare the effect on the following crops of buckwheat ploughed under, versus buckwheat grown and harvested for grain.

The area occupied by this experiment is five acres of clay loam virgin soil and the rotation covers five years as follows:—

First year—Oats seeded to sweet clover.
Second year—Sweet clover ploughed down, buckwheat planted and one-half of plot ploughed down, while the other half is cut for grain if this is possible.
Third year—Barley seeded to timothy and clover.
Fourth year—Clover hay.
Fifth year—Timothy hay.

In preparation for the oat crop, the first year the soil is fall-ploughed; and the sweet clover is ploughed under in time the second year to permit of seeding the buckwheat before it is too late. After the buckwheat is harvested, the land is again fall-ploughed and prepared for seeding to grass and clover the third year, using barley as a nurse crop. Clover hay and timothy hay are cut the fourth and fifth years respectively.

These two experiments are very similar, the only difference being the way the land is dealt with after the sweet clover is ploughed down in the second year. In the first case it is simply summer-fallowed for the rest of the season, while in the second instance it is all seeded to buckwheat, one-half of which is also ploughed under and the other half harvested as a grain crop. This gives a comparison of sweet clover alone ploughed down versus sweet clover and buckwheat ploughed down versus sweet clover alone ploughed down and buckwheat harvested.

NO GREEN MANURE CROP PLOUGHED DOWN

The objects of this experiment are to compare the results obtained when no green manure is ploughed down versus when green manure is ploughed down as in the former two rotations. This experiment is undertaken on four acres of virgin soil and a four-year rotation is used as follows:—

First year—Peas.
Second year—Oats.
Third year—Clover hay.
Fourth year—Timothy hay.

The land is fall-ploughed in preparation for the peas. After the pea crop is harvested, the land is again fall-ploughed and seeded out the next spring to grass and clover, using oats as a nurse crop. The third and fourth years clover hay and timothy hay are taken off respectively.

NO GREEN MANURE PLOUGHED DOWN

The object of this experiment is to compare the effect of oats and barley in the rotation versus peas and oats in the rotation previous. The area occupied by this experiment is four acres of land which was first cropped in 1921, and the rotation is a four-year one as follows:—

First year—Oats.
Second year—Barley.
Third year—Clover hay.
Fourth year—Timothy hay.

Before this experiment was decided on in 1922, this area of ground had been winter manured, hence the crops will benefit some from this for the first few years of the test.

The first year, the oat crop is sown on fall-ploughed timothy sod. After this crop is harvested, the land is again ploughed in preparation for barley the second year.

The grass and clover seed is sown at the same time as the barley and clover hay and timothy hay are the third and fourth year crops respectively.

FARM MANURE EXPERIMENT

The object of this experiment is to compare the results obtained in a four-year rotation by the application of sixteen tons of farmyard manure once in the rotation to the oat crop, versus no manure applied as in the same rotation in-

cluded in the green manure experiment. This experiment also occupies four acres of land, which was cropped first in 1921. It was also winter manured before the rotation was decided on in 1922. The land is fall-ploughed and winter manured at the rate of sixteen tons per acre, in preparation for the oat crop the first year. After harvest it is again fall-ploughed and seeded out to grass and clover the following spring, using barley as a nurse crop. The third and fourth years of the rotation are clover hay and timothy hay respectively.

LIME EXPERIMENT

The object of this experiment is to determine the effect of an application of two tons of ground limestone to the acre during the second year in the rotation. The area occupied by this experiment is four acres of land cropped for the first time in 1921. It received an application of manure before this experiment was decided on in 1922. It is undertaken on a four-year rotation as follows:—

First year.—Oats. (Disc in 16 tons manure per acre.)

Second year.—Barley. (Applying 2 tons of ground limestone.)

Third year.—Clover hay.

Fourth year.—Timothy hay.

This rotation is practically the same as that used in the farm manure experiment and also in the experiment where no green manure crop is ploughed down, the only difference being the application of two tons of ground limestone per acre in the second year. The mode of operation would consequently be the same, with the exception that the manure is disced in. The ground limestone is applied either in the fall or spring before the barley crop is sown.

DRAINAGE EXPERIMENT

The object of this experiment is to compare the results obtained from tile-drained land versus land which is not tile drained. For this experiment twenty acres of uniform soil were selected. Ten acres were under-drained by four drains, which were put sixty feet apart. The other ten acres were not drained and the whole area is cropped similarly in a four-year rotation as follows:—

First year.—Hoed crops or O.P.V.

Second year.—Oats or barley.

Third year.—Clover hay.

Fourth year.—Timothy hay.

The sod is fall-ploughed and five acres of each ten are manured before ploughing in the fall and the other five acres are winter manured and disced in in the spring in preparation for the hoed crops or O.P.V. the first year. After these are removed, the land is again fall-ploughed and seeded out to grass and clover in the spring, using oats or barley as a nurse crop. The third and fourth years of the rotation are clover hay and timothy hay respectively.

STATEMENT SHOWING THE COST PER TON, TO PRODUCE HAY ON UNDRAINED LAND IN 1922

Area included ..... 10 acres.

Items of Cost

Rent of land		$ 3 50
Use of machinery		1 00
Red clover, 8 lbs. at 35 cts. per lb	$ 2 80	
Alsike, 2 lbs. at 28 cts. per lb	$ 0 56	
Timothy, 8 lbs. at 20 cts. per lb	1 60	
	3)4 96(	1 65
Haying		
Teamster, 2·5 hours at 36 cts. per hour	0 90	
Team work, 2·5 hours at 20 cts. per hour	0 50	
Labour, 1·3 hours at 35 cts. per hour	0 45	
		1 85
Cost per acre		8 00
Yield per acre, in tons		0 4
Cost per ton		20 00

STATEMENT SHOWING THE COST, PER TON, TO PRODUCE HAY ON DRAINED LAND IN 1922

Area included ..... 10 acres.

Items of Cost

Rent of land		$ 3 50
Use of machinery		1 00
Interest on cost of tiling, $35.93 at 6 per cent		2 15
Red clover, 8 lbs. at 35 cts. per lb	$ 2 80	
Alsike, 2 lbs. at 28 cts. per lb	0 56	
Timothy, 8 lbs. at 20 cts. per lb	1 60	
	$ 3)4·96(	1 65
Haying		
Teamsters, 2·7 hours at 36 cts. per hour	$ 0 97	
Team work, 2·7 hours at 20 cts. per hour	0 54	
Labour, 1·7 hours at 35 cts. per hour	0·59	
		2 10
Cost per acre		$ 10 41
Yield per acre, tons		0 53
Cost per ton		$ 19 64

SURFACE DRAINAGE EXPERIMENT

The object of this experiment is to compare the results obtained from four areas of equal size given similar treatment in every way with the exception of the width of lands used in ploughing, which are as follows:—

First area of 4·5 acres, lands 18 feet in width.
Second area of 4·5 acres, lands 24 feet in width.
Third area of 4·5 acres, lands 36 feet in width.
Fourth area of 4·5 acres, lands 48 feet in width.

The whole area is put under a four year rotation as follows:—

First Year.—Oats.

Second year.—Barley.

Third year.—Clover hay.

Fourth year.—Timothy hay.

This experiment was just started this year, consequently no results have been obtained as yet. The land is fall-ploughed in preparation for the oat crop. After the oat crop is removed it is again fall-ploughed and seeded out to grass and clover the next spring, using barley as a nurse crop. The third and fourth years of the rotation are clover hay and timothy hay respectively.

METHOD OF APPLYING BARNYARD MANURE

The object of this experiment is to compare the results obtained from applying manure on sod and ploughing it under in the fall, versus applying it during the fall and winter after ploughing and discing it in in the spring.

This experiment is conducted in combination with the tile drainage experiments and covers the same area. Five acres of the tile drained, and five acres of the undrained are manured before ploughing in the fall, in preparation for the hoed crops or O.P.V. the first year of the rotation; while the other five acres in each ten are manured after ploughing, in the fall or early winter.

TREATMENT OF VIRGIN SOIL

The object of this experiment is to compare the results obtained from various methods of treating virgin soil. For this experiment, a twenty-four acre area of newly cleaned land was divided into four areas and treated as follows:—

Block 1.—Plough, summer-fallow and backset in late fall.

Block 2.—Plough, summer-fallow.

Block 3.—Plough and leave untouched.

Block 4.—Not ploughed until next spring.

An accurate record is kept of the cost of these different treatments, and, after the rotation is completed, a comparison can be made between the profitableness of the various treatments given.

LAND CLEARING

The object of this experiment is to determine the most economical method and time of clearing new land. For this experiment five acres of uniform green bush land were selected and the timber all cut and burned, at a cost of $40 per acre in 1920. In the fall of 1920, the first acre was cleared at a cost of $63. This acre was sown to fall wheat; and seeded out to grass and clover the next spring.

In 1921, the second acre was cleared at a cost of **$53.75**. The land seemed too low for fall wheat, hence the second acre was left until spring and seeded out to clover and timothy, using oats as a nurse crop.

In 1922, the third acre was cleared as a cost of **$46.23**, distributed as follows:—

Teamsters, 38 hours at 36 cents per hour	$ 13 68
Team work, 35 hours at 20 cents per hour	7 00
Labour, 73 hours at 35 cents per hour	25 55
Total cost	46 23

It may be noted that as the stumps became older and more decayed, the cost of clearing was reduced. At the end of the experiment a comparison will be made between the total profit obtained from the crops produced by each acre, in order to determine which is the most economical time to clear land, that is, immediately after slashing and burning, or one, two, three, and four years later.

This was a particularly good year for clearing land and we were fortunate in getting sixty-five acres cleared of stumps. Fourteen acres were cleared early in the spring on lot twenty-five, concession twelve, at a cost of **$21.50** per acre; and this area was all included in the cultural experiments discussed elsewhere in this report. Eighteen acres were cleared on lot twenty-four, concession twelve, at a cost of **$45** per acre and this area has been fall ploughed and disced so that it is now all ready for the spring crop. Twenty-four and one-

half acres were cleared during the early summer on lot twenty-five, concession twelve, at a cost of $30 per acre, and this area was used in the experiment dealing with the treatment of virgin soil discussed elsewhere in this report. The other eight and one-half acres consisted of several smaller areas, which were cleared up, in order to square up fields or complete areas where small, low lying patches had been gone around during previous clearing operations.

HORTICULTURE

The spring of 1922 was somewhat backward, so that no seeding was done in the garden until May 16. After this, the weather warmed up and germination with most seeds was rapid and fairly even. The season's growth, however, was very poor owing to continued drought, which lasted throughout May, June and part of July. It was the 7th of July before rain enough fell to cause any growth worth while, and even after this, there was soon need of more rain, which failed to come; in fact, the ground was so hard at freezing up time on November 19 that ploughing was very difficult.

Summer frosts, while not very frequent, did considerable damage. Three in particular, which occurred on June 12, 21, and 24 were the worst. These cut down the more tender plants, such as beans, corn, etc.

ORCHARD

The orchard, which was planted out in 1918, and consists of the more hardy varieties of apples, pears, plums and crabs, has developed slowly. None of the trees gave any sign of bloom during the spring, and consequently no fruit set. The trees are standing the winters fairly well, however, as only one-third have been winter-killed and it is possible that, as time goes on, some varieties will be found which will bear fruit in this climate.

SMALL FRUITS

RED CURRANTS

Seven varieties of red currants were set out in rows six feet apart and five feet between the bushes in the spring of 1920. No fruit was produced by any of these varieties until this year, when the results obtained were as follows:—

VARIETY TEST OF RED CURRANTS

Variety	Date ready for use	Yield from six bushes in 1922	
		lbs.	ozs.
Long Bunch Holland	July 7	2	12
Red Grape	" 6	2	8
London Red	" 4	2	8
Victoria	" 6	2	4
Simcoe King	" 3	1	8
Red Dutch	" 7	1	8
Red Cross	" 6	1	0

The yield of all these was small, but it shows that a number of varieties have possibilities.

BLACK CURRANTS

Fourteen varieties of black currants were set out at the same time as the red currants and in the same way. No fruit was produced by these either until this year when the results obtained are as follows:—

VARIETY TEST OF BLACK CURRANTS

Name of Variety	Date ready for use	Yield from six bushes in 1922	
		lbs.	ozs.
Saunders	July 13	15	4
Climax	" 8	14	0
Ontario	" 12	10	0
Eagle	" 10	9	2
Victoria	" 15	9	0
Kerry	" 8	7	0
Topsy	" 12	7	0
Magnus	" 10	6	2
Beauty	" 13	5	8
Clipper	" 13	4	8
Buddenborg	" 11	4	4
Eclipse	" 8	4	0
Collins Prolific	" 12	4	0
Lee Prolific	" 10	2	8

As this is the first year that yields have been obtained, it is too soon to draw any definite conclusions; but the table would seem to indicate that a large number of varieties of black currants will be suitable for this climate.

GOOSEBERRIES

Fifteen varieties of gooseberries were set out in 1920, in rows six feet apart and five feet between the bushes. No fruit was produced until this year when the yields obtained are as follows:—

VARIETY TEST OF GOOSEBERRIES (YIELDS OF FIVE BEST VARIETIES)

Name of Variety	Date ready for use	Yield from six bushes in 1922	
		lbs.	ozs.
Deacon	July 22	3	0
Lancashire Summer	" 22	2	2
Mabel	" 22	2	0
Downing	" 22	1	4
Silvia	" 22	1	4

While the yields seem light, this is partly due to the bushes being very small, and consequently they should increase as the bushes become larger .

RASPBERRIES

Eight varieties of raspberries were set out in 1920, in rows six feet apart and the canes three feet apart in the row. These have yielded fairly well for the last two years. The results obtained in 1922 and the average yield for two years are as follows:—

VARIETY TEST OF RASPBERRIES

Name of Variety	Yield in 1922		Average yield 1921–1922	
	lbs.	ozs.	lbs.	ozs.
Sunbeam	13	0	10	6·5
Brighton	14	8	10	4·0
King	12	12	9	14·0
Newman 23	13	10	9	0·0
St. Regis	9	8	8	3·0
Early June	14	5	8	0·0
Cuthbert	8	4	6	4·0
Herbert	10	12	6	5·0

The Sunbeam variety produced the greatest yield last year and is ahead in the average of the two years. It is a hardy variety of good quality. In fact, most of the varieties tested seem fairly hardy in this climate and need little winter protection.

STRAWBERRIES

No variety test of strawberries has been carried on to date, but several hundred plants were set out in the spring of 1920. These grew very well and several more were set out in the spring of 1921. In 1922 a fair yield was obtained from each of these plantings.

VEGETABLES

BEANS

Seventeen varieties of garden beans were tested in 1922. The seed was sown on May 27 in rows thirty feet in length, two and one-half feet apart and the plants two inches apart in the row. Round Pod Kidney Wax and Refugee were ready for use on August 16, and all of the others were ready for use on August 17, with the exception of Stringless Green Pod and Hidasta, which were not ready until August 18. The results from the seventeen varieties in 1922, together with the average yield for three years for those grown that long, are as follows:—

VARIETY TEST OF GARDEN BEANS

Variety	Length of vine	Yield of green pods 1922	Average yield of three years 1920-22	Notes on table quality in 1922
	Inches	Quarts	Quarts	
Round Pod Kidney Wax	10	3·5	15·5	Tender, crisp, stringless, good flavour
Davis White Wax	7	3·5	13·5	Crisp, stringless, good flavour.
Early Red Valentine	10	8·75	11·4	Tender, crisp, good quality.
Masterpiece	8	4·5	10·5	Crisp.
Bountiful	6	3·16	7·5	Medium quality and flavour.
Plentiful French	8	4·25	6·08	Crisp and of good flavour.
Refugee	9	2·5	5·8	Crisp and of good flavour.
Pencil Pod Black Wax	12	1·0	5·6	Medium quality.
Stringless Green Pod	14	7·5	5·5	Crisp and of good quality.
Wardwell Kidney Wax	10	2·25	5·4	Medium in quality.
Kentucky Wonder Wax	8	6·0	4·6	Crisp, stringless, and of good flavour
Fordhook Favourite	9	7·5	.....	Medium in quality.
Challenge Black Wax	9	4·0	.....	Medium in quality.
Yellow Eye	12	3·5	.....	Crisp, stringless, and of good flavour.
Grenells Rustless	10	2·75	.....	Medium in quality.
Hodson Long Pod	8	2·5	.....	Crisp and of good quality.
Hidasta	10	2·0	.....	Crisp and of good quality.

The Round Pod Kidney Wax, which was ahead in 1921, and also in the three-year average, is of really good quality.

The yields this year would have been much larger, had it not been for three frosts in June, on the 12th, 21st and 24th.

BROAD BEANS

Nineteen varieties of broad beans were tested in 1922. The seed was planted on May 16, in thirty-foot rows which were three feet apart, the plants being three inches apart in the row. The results obtained are as follows:—

VARIETY TEST OF BROAD BEANS

Variety	Date ready for use	Average height of plants	Yield from 30 ft. row of green beans	Notes on Quality in 1922
	July	inches	quarts	
Windsor Taylor	28	25	12	Very good.
Green Windsor	20	23	11	Very good.
Broad Windsor Harlington	18	25	11	Good.
Long Pod Conqueror	23	24	10	Good.
Windsor Common	22	25	10	Good.
Giant Four Seeded	20	23	10	Good.
Long Pod Early	20	20	9	Good.
Masterpiece Green	20	27	9	Good.
Broad Windsor Harlington Green	21	27	9	Good.
Dwarf Bog or Cluster	20	15	8	Medium.
Aquadulce	23	20	8	Good.
Early Mazagan	20	24	8	Medium.
Monarch	24	24	8	Medium.
Long Pod Bunyards Exhibition	24	21	7	Poor.
Long Pod Seville	20	24	7	Good.
Johnson Wonder	24	27	7	Good.
Beck Green Gem	20	20	7	Good.
Long Pod Hangdown	20	25	7	Good.
Long Green	20	23	6	Good.

Broad beans are very hardy and should prove successful in any part of northern Ontario.

BEETS

Eight varieties of beets were tested this year. They were seeded on May 17, in drills thirty feet in length and eighteen inches apart, and the plants were thinned to two inches apart in the row. The results obtained in 1922, together with the three-year average for those varieties grown that long, are as follows:—

VARIETY TEST OF BEETS

Variety	Date ready for use	Yield from 30 ft. row in 1922		Average yield from 30-ft. row for 3 years		Notes on Quality in 1922.
	August	lbs.	ozs.	lbs.	ozs.	
Crimson Globe	3	21	8	14	13	Medium quality.
Detroit Dark Red	3	30	0	13	10	Fine quality.
Early Wonder	3	25	0	13	5	Good quality.
Eclipse	3	19	0	12	0	Good quality.
Black Red Ball	3	20	0	11	13	Good quality.
Crosby Egyptian	3	21	0	11	5	Medium quality
Cardinal Globe	3	18	0	.....		Good quality.
Early Model	3	16	8	.....		Medium quality.

Crimson Globe, which is ahead in the three-year average, is not the best in quality. The Detroit Dark Red, which was first this year and second in the three-year average, is a good table beet. In fact most of those listed, if not grown too far apart in the row, will make a satisfactory table beet.

CARROTS

Nine varieties of carrots were tested in 1922. The seed was sown in drills thirty feet in length and one and one-half feet apart, on May 17, and the plants were thinned to one and one-half inches apart in the row. The yields obtained in 1922, together with the average yield for three years for those varieties grown that long, are as follows:—

VARIETY TEST OF CARROTS

Variety	Date ready for use	Yield from 30 ft. row in 1922		Average yield from 30 ft. row for 3 years		Notes on Quality in 1922
	August	lbs.	ozs.	lbs.	ozs.	
Chantenay (McDonald)	5	5	8	11	8	Good.
Improved Danvers	5	6	0	11	0	Good.
Nantes Half Long Scarlet	5	5	0	9	10	Medium.
Oxheart	5	7	8	.....		Very good.
Chantenay (Ottawa)	5	7	0	.....		Good.
Garden Gem	5	5	8	.....		Medium.
Intermediate	5	5	8	.....		Medium.
Early Scarlet Horn	5	4	8	.....		Good.
Danvers	5	4	0	.....		Good.

The Chantenay variety, which is ahead in the three-year average, is a carrot with good quality and is especially good for winter use. The Improved Danvers is also a variety with good quality.

CABBAGE

Eighteen varieties of cabbage were tested in 1922. They were started in the hot-bed on May 10, and were set out in the garden on June 23. The plants were set eighteen inches apart in rows which were thirty inches apart. The results obtained in 1922, together with the average yield for three years for those varieties grown that long, are as follows:—

VARIETY TEST OF CABBAGE

Variety	Date ready for use	Yield from 30 foot row in 1922		Average yield from 30 ft. row, 1920–22		Note on firmness and types of heads in 1922
		lbs.	ozs.	lbs.	ozs.	
Marblehead Mammoth	Aug. 22	54	0	60	0	Good.
Danish Ballhead	Sept. 1	46	0	59	0	Good.
Copenhagen Market	Aug. 24	42	0	57	10	Good.
Perfection Drumhead Savoy	Sept. 1	45	0	55	0	Medium.
Succession	Aug. 22	38	0	52	0	Medium.
Delicatesse	" 23	36	0	51	10	Good.
Jersey Wakefield	" 3	38	0	47	5	Good.
Enkhuizen Glory	Sept. 1	43	0	43	0	Good.
Kildonan	Aug. 22	50	0	.....		Good for winter.
Chester Savoy	" 22	49	0	.....		Solid.
Northern Favourite	Sept. 1	47	8	.....		Medium.
Early Winnigstadt	Aug. 3	45	0	.....		Medium.
Autumn King	Sept. 20	44	0	.....		Good for winter.
Brandon Market	Aug. 22	41	0	.....		Good.
Early Paris Market	" 22	40	0	.....		Good.
Stanley	" 22	36	0	.....		Medium.
Fottlers Improved Brunswick	" 22	36	0	.....		Good.
Danish Red Stonehead	" 22	34	0	.....		Good.

Jersey Wakefield and Early Winnigstadt were the earliest of the lot but are not the highest producers. Marblehead Mammoth, Danish Ballhead and Copenhagen Market are later, but are all good yielders and of good quality.

CAULIFLOWER

Only one variety of cauliflower was tested in 1922. The seed was sown in the greenhouse on April 14, and the plants were set out in the garden on May 30, in a thirty-foot row, with eighteen inches between the plants. The variety tested was Bolgiano; it gave a yield of thirty pounds from the thirty-foot row and the heads were ready for use on July 18.

CELERY

Eight varieties of celery were tested in 1922. The seed was sown in the greenhouse on April 11, and the plants were set out in the garden on July 3. The rows were four feet apart and the plants six inches apart in the row. The results obtained in 1922, together with the average yield for three years for those varieties grown that long, are as follows:—

VARIETY TEST OF CELERY

Variety	Date ready for use	Yield from 50 foot row in 1922		Average yield from 50 foot row in 1920–1922		Notes on table quality in 1922
		lbs.	ozs.	lbs.	ozs.	
Evans Triumph	Sept. 30	25	0	28	5	Good.
Winter Queen	" 30	23	8	27	0	Crisp.
Giant Pascal	" 30	25	0	25	0	Good.
White Plume	" 30	24	0	17	10	Good.
Easy Blanching	" 30	25	0	.....		Good.
French Succession	" 30	24	0	.....		Medium.
Paris Golden Yellow	" 30	23	0	.....		Crisp.
Golden Self Blanching	" 24	19	0	.....		Good.

The three varieties, Evans Triumph, Winter Queen and Giant Pascal, which are the three first on the list, are all of good quality and promising varieties for this section.

CORN

Twenty-two varieties of corn were tested this year. The seed was planted on May 29, in rows thirty-six inches apart and the hills 36 inches apart in the row. Owing to dry weather, the germination was slow, leaving the crop late and consequently it became a victim of early fall frosts, so that no results were obtained, with the exception of one variety, named Pickaninny. It is a particularly early sort, was ready for use on September 16, and yielded twenty-four cobs which weighed two pounds, from a thirty-foot row. In 1921, however, nine varieties all gave fairly good results.

CUCUMBERS

Nine varieties of cucumbers were tested in 1922. The seed was sown in the greenhouse on May 1, and the plants were set out in the garden on July 3, in hills six feet apart each way. Owing to the unfavourable season, however, no results were obtained. It may be noted that in 1921, five varieties did fairly well.

KOHL RABI

Two varieties of kohl rabi were tested in 1922. The seed was sown on May 17, in rows thirty inches apart and the plants were thinned to eight inches apart in the row. The results obtained are as follows:—

VARIETY TEST OF KOHL RABI

Variety	Date ready for use	Yield in 1922 from 30 foot row
		lbs.
Early Purple	Oct. 1	28
White Vienna	" 1	25

This is a very hardy vegetable and serves well for table use. It is well adapted to this climate and should be grown in every garden in the north.

KALE OR BORECOLE

Only one variety of kale was tested in 1922. The seed was sown in the hotbed on May 10 and the plants were set out in the garden on June 23 in rows thirty inches apart and twenty-four inches between the plants in the row. The results obtained are as follows:—

VARIETY TEST OF KALE OR BORECOLE

Variety	Date ready for use	Yield of leaves from 30 foot row in 1922
		lbs.
Dwarf Green Curled	Aug. 1	9

This is a very hardy vegetable and well suited to our northern climate.

LETTUCE

Nine varieties of lettuce were tested in 1922. The seed was sown on May 17, in drills fifteen inches apart and the plants were thinned to six inches apart in the row. The results obtained in 1922, together with the two and three year averages for varieties grown that long, are as follows:—

VARIETY TEST OF LETTUCE

Variety	Date ready for use	Average yield from 30 foot row 1920-22		Average yield from 30 foot row 1921-22		Yield from 30 foot row in 1922		Notes on table quality in 1922
		lbs.	ozs.	lbs.	ozs.	lbs.	ozs.	
Salamander	Aug. 4	17	10	10	0	7	0	Tender.
Grand Rapids	" 1	16	10	11	0	7	0	Very tender.
Iceberg	" 1	16	0	15	0	8	0	Crisp.
New York	" 1	.....		17	0	7	0	Very tender.
Crisp as Ice	" 4	.....		9	2	6	4	Crisp.
Earliest Wayahead	" 4	.....		9	0	8	0	Crisp.
Early Paris Market	" 1	.....		8	14	7	12	Very crisp.
Black Seeded Simpson	" 1	.....		.....		9	0	Tough.
Golden Queen	" 4	.....		.....		8	8	Tough.

Salamander, Grand Rapids and Iceberg are all varieties of good quality and flavour.

ONIONS

Eleven varieties of onions were tested in 1922. The seed was sown on May 17, in drills fifteen inches apart and the plants were thinned to one inch apart in the row. The results obtained in 1922, together with the three-year average for those varieties grown that long, are as follows:—

VARIETY TEST OF ONIONS

Variety	Yield from 30 foot row in 1922		Average yield for three years from 30 foot row 1920-22	
	lbs.	ozs.	lbs.	ozs.
Australian Brown	1	4	17	13
Ailsa Craig	1	8	14	13
Yellow Globe Danvers (Graham)	3	0	13	3
Giant Prize Taker	2	0	10	0
Southport Yellow Globe	4	4	9	12
White Barletta	1	8	9	8
Extra Early Flat Red	1	4	9	1
Yellow Globe Danvers (C.E.F.)	2	0	8	8
Southport Red Globe	2	0	7	5
Southport White Globe	4	0	7	5
Large Red Wethersfield	1	4	6	9

It will be noted that the yield was very low this year as compared with the three-year average. This was caused by dry weather, as there was not enough rain to cause any marked growth. Onions, however, are generally a fairly good crop in the north.

PARSLEY

Four varieties of parsley were tested in 1922. The seed was sown in drills fifteen inches apart on May 17, and the plants were thinned to six inches apart in the row. The results obtained are as follows:—

VARIETY TEST OF PARSLEY

Variety	Date ready for use	Yield in 1922	Notes on quality in 1922
		ozs.	
Dwarf Perfection	Aug. 2....	12	Fairly good.
Double Curled	" 2....	8	Good curl.
Champion Moss Curled	" 2....	8	Best curl.
Triple Curled	" 2	7	Good flavour.

The yields was very light with all varieties, owing to dry weather but the quality was fairly good.

PARSNIPS

Two varieties of parsnips were tested this year. The seed was sown on May 17, in rows thirty inches apart and the plants were thinned to two inches apart in the row. The results obtained are as follows:—

VARIETY TEST OF PARSNIPS

Variety	Date ready for use	Yield from 30 foot row in 1922	Notes on quailty in 1922
		lbs.	
Guernsey Half Long	Oct. 1	25	Fairly good flavour.
Ho.low Crown	" 1	21	Very good.

PEAS

Eighteen varieties of peas were tested in 1922. The seed was sown on May 16, in rows thirty feet long, which were three feet apart and the plants were one inch apart in the row. The results in 1922, together with the average yield for three years for varieties grown that long are as follows:—

VARIETY TEST OF PEAS

Variety	Date ready for use	Average length of vine	Yield from 30-ft. row in 1922	Average yield from 30-ft. row for 3 years	Notes on table quality of green peas
		inches	quarts	quarts	
Thomas Laxton	July 20	34	9·5	15·6	Good size, juicy.
English Wonder	" 14	15	9·5	12·8	Good flavour.
Stratagem	" 17	20	10·0	12·6	Juicy, good flavour.
Little Marvel	" 17	18	9·0	12·0	Very good flavour.
Sutton Excelsior	Aug. 10	18	8·5	10·8	Very good flavour.
Pioneer	" 17	20	10·5	10·1	Tender, good flavour.
Gradus (Kent)	July 18	30	9·0	10·0	Good flavour.
Gradus (Carter)	" 18	30	8·5	9·8	Good.
Laxtonian	Aug. 10	30	8·0	9·3	Very good flavour.
American Wonder	July 8	10	8·0	9·1	Dry.
Gregory Surprise	" 18	20	10·0	8·6	Small pea, good flavour.
Eight Weeks	" 14	15	7·0	8·6	Very good flavour.
Early Morn	Aug. 10	20	6·0	6·3	Good flavour.
Lincoln	" 10	18	11·0	.....	Very good flavour.
Blue Bantam	" 10	10	11·0	.....	Dry.
Harrison Glory	" 10	20	9·5	.....	Dry.
Pilot	" 8	18	8·0	.....	Good flavour.
Alaska	July 12	24	7·0	.....	Tender and juicy.

Thomas Laxton and Stratagem are among the best varieties for a main crop, while American Wonder, Alaska and Eight Weeks are all early varieties. The table indicates that many varieties can be successfully grown and a long season may be arranged, either by successive plantings of the same variety or by growing a number of early, medium and late varieties.

POTATOES

Five varieties of potatoes were tested in 1922. They were planted on June 5, in rows thirty inches apart, the potatoes being spaced twelve inches apart in the row. They were ploughed in on clover sod which had been manured just before ploughing. The results obtained are as follows:—

VARIETY TEST OF POTATOES

Variety	Yield per acre				Date ready for use	Size	Colour	Shape
	marketable		Unmarketable					
	bush.	lb.	bush.	lb.				
Reg. Green Mountain	116	27	5	32	Sept. 1	Medium	White	Flattish oval.
Green Mountain	101	28	6	02	" 1	Medium	White	Flattish oval.
Irish Cobbler	74	44	3	27	Aug. 20	Medium	White	Round.
Early Ohio	63	15	3	27	" 10	Medium	Red	Oval.
Early Canada	57	57	3	49	" 15	Medium	Red	Oval.

The varieties all gave a very light yield this year. This was largely due to dry weather. The Registered Green Mountain gave the largest yield and Early Ohio was the first to mature. The tubers were all a fair sample and apparently very free from disease.

PUMPKINS

Six varieties of pumpkins were tested this year. The seed was sown on May 1, in the greenhouse, and the plants were set out into hills ten feet apart on July 3. Owing to dry weather and continued unfavourable season no results were obtained. It may be noted, however, that pumpkins did fairly well and matured in 1921.

RADISH

Eight varieties of radish were tested in 1922. The seed was sown on May 17, in drills thirty feet in length and fifteen inches between the rows. The results obtained are as follows:—

VARIETY TEST OF RADISH

Variety	Date ready for use	Yield from 30-ft. row 1922	
		lbs.	ozs.
Scarlet Turnip White Tip (D. & F.)	June 20	2	8
Scarlet Turnip White Tip (Graham)	July 1	2	0
Scarlet Round White Tip	" 1	2	0
Icicle	" 1	1	8
Scarlet Oval	" 1	1	0
Improved French Breakfast	" 2	1	0
Early Scarlet Turnip	" 3	1	0
Scarlet Olive	" 3	1	0

Owing to the unfavourable season, the yields of all varieties were very light.

SPINACH

Three varieties of spinach were tested in 1922. The seed was sown on May 17, in rows which were fifteen inches apart and thirty feet in length. The results obtained are as follows:—

VARIETY TEST OF SPINACH

Variety	Date ready for use	Yield from 30-ft. row 1922	Notes on quality in 1922
		lbs.	
Long Standing	Aug. 7....	6	A little stringy.
New Zealand	" 7....	4	Very tender.
Victoria	" 7....	3	Tender.

SQUASH

Eight varieties of squash were tested in 1922. The seed was sown in the greenhouse on May 1, and the plants were set out in the garden on July 3, in hills ten feet apart. Owing to dry weather, however, no results were obtained. It is worthy of note that squash did fairly well in 1921.

SALSIFY

Two varieties of salsify were tested this year. The seed was sown on May 17, in rows which were thirty inches apart and thirty feet in length. The plants were thinned to one and one-half inches apart in the row. The results obtained are as follows:—

VARIETY TEST OF SALSIFY

Variety	Date ready for use	Yield from 30-ft. row 1922	Notes on table quality in 1922
		lbs.	
Long White	Sept. 1....	13	Tender.
Mammoth Sandwich Island	" 1....	12	Good for salad.

SAGE

Only one variety of sage was tested in 1922. The seed was sown on May 17, in rows which were thirty inches apart and thirty feet in length. The plants came along well and gave a fair yield of good quality sage.

TOMATOES

Sixteen varieties of tomatoes were tested in 1922. The seed was sown in the greenhouse on April 13, and the plants were set out in the garden on June 21. Six plants of each variety were set out in rows four feet apart and the plants were four feet apart in the rows. Before the fruit set, each plant was tied to a stake with raffia. Owing to the unfavourable season, none of the varieties ripened, but a small quantity of green fruit was obtained as follows:—

VARIETY TEST OF TOMATOES

Variety	Yield of green fruit from six plants 1922
	lbs.
Prosperity	10
John Baer	10
Bonny Best	8
Early Round Scarlet Skin	7
Northern Adirondak (Grade 2)	7
Earlibell	5
Sunny Brook Earliana	5
Langdon Earliana	4
Alacrity (C.E.F.)	3
Red Head	3
Chalk's Jewel	3
Danish Export	3
Crimson Canner	3
Alacrity (0-18-15-29)	3
Matchless	3
Perfection	1

TURNIPS

Five varieties of turnips were tested in 1922. The seed was sown on May 17, in drills which were fifteen inches apart and thirty feet in length. The plants were thinned to two inches apart in the row. The results obtained are as follows:—

VARIETY TEST OF TURNIPS

Variety	Date ready for use	Yield from 30-ft. row 1922		Notes on table quality in 1922
		lbs.	ozs.	
Red Top Strap Leaf	July 18	32	0	Strong.
Early Snowball	" 14	30	0	Tender.
Extra Early Purple Top Milan	" 16	27	0	Rough.
Golden Ball	" 18	24	0	Good flavour.
Yellow Globe	" 13	24	0	Tender.

FLOWERS

Forty-six distinct types or kinds of annuals were under test in 1922. Some of these were represented by many varieties or colours. Eighteen kinds were sown in the greenhouse on April 21, and were set out in the borders on June 26. Twenty-eight kinds were sown in the borders direct on May 23. In spite of dry weather and occasional frosts, the bloom was fairly good and presented an attractive appearance. The following table gives the names and most important information regarding the annual flowers this season:—

VARIETY TEST OF ANNUAL FLOWERS

Sown in the open Variety	Number of varieties	Duration of bloom	Height inches	Bloom
Alonsoa	1	Aug. 3 to Oct. 6	6½	Very good.
Alyssum	1	Aug. 10 to Sept. 25	12	Very good.
Bartonia Aurea	1	Aug. 5 to Sept. 25	18	Good.
Browallia Elata	1	Aug. 5 to Sept. 25	9	Good.
Candytuft	1	Aug. 1 to Sept. 25	9	Good.
Crysanthemum Annual	1	Aug. 20 to Sept. 25	20	Good.
Clarkia	1	Aug. 25 to Sept. 25	10	Good.
Cosmos	1	Aug. 8 to Sept. 25	24	Very good.
Calendula	1	Aug. 20 to Sept. 25	10	Good.
Datura Wrightii (Meteloides)	1	Aug. 6 to Sept. 25	8	Good.
Dimorphotheca Hybrids	1	Aug. 20 to Sept. 25	15	Good.
Eschscholtzia	1	Aug. 8 to Sept. 29	14	Good.
Hibiscus Africanus	1	Aug. 4 to Sept. 29	9	Good.
Jacobea	1	Aug. 10 to Sept. 29	12	Good.
Larkspur	2	Aug. 14 to Sept. 25	18	Good.
Lavatera Trimestris	2	Aug. 15 to Sept. 25	16	Good.
Linaria	2	Aug. 3 to Sept. 29	12	Good.
Linum	1	Aug. 7 to Sept. 25	14	Good.
Malope	1	Aug. 4 to Sept. 25	15	Good.
Mignonette	1	Aug. 14 to Sept. 25	6	Good.
Nasturtium Tall	6	Sept. 14 to Sept. 25	25	Good.
Nasturtium Tom Thumb	6	Sept. 14 to Sept. 25	6	Good.
Poppy	1	Aug. 17 to Sept. 25	15	Good.
Portulaca	1	Aug. 15 to Sept. 25	10	Good.
Rhodanthe	1	Aug. 16 to Sept. 25	6	Good.
Sunflower Primrose Stella	1	Aug. 4 to Sept. 25	24	Good.
Sweet Peas	70	Aug. 28 to Sept. 25	30	Good.
Virginian Stock	1	July 7 to Sept. 25	8	Good.

VARIETY TEST OF ANNUAL FLOWERS

Started in greenhouse Variety	Number of varieties	Duration of bloom	Height	Bloom
			inches	
Amaranthus	1	Aug. 8 to Oct. 6	9	Very good.
Antirrhinum	7	Aug. 7 to Sept. 30	12	Very good.
Asters	27	Aug. 1 to Sept. 30	14	Very good.
Balsam	1	July 27 to Oct. 20	11	Very good.
Carnation	1	Sept. 15 to Sept. 25	17	Good.
Celosia Plumosa	1	Aug. 17 to Sept. 25	12	Good.
Cobaea Purple	1	Sept. 7 to Sept. 25	9	Very good.
Dahlia	1			
Helichrysum	6	Aug. 5 to Oct. 10	18	Very good.
Lobelia Ramosa Tall	1	Aug. 17 to Sept. 25	10	Very good.
Pansy	2	June 29 to Oct. 9	3	Very good.
Petunia	1	Aug. 5 to Oct. 7	8	Good.
Phlox Drummondii	1	July 1 to Sept. 29	8	Very good.
Salvia	1	Aug. 14 to Sept. 25	16	Good.
Salpiglossis	1	Aug. 2 to Sept. 25	20	Very good.
Tagetes	1	Aug. 5 to Sept. 25	8	Good.
Verbena	1	Aug. 9 to Sept. 25	9	Good.
Zinnia	1	Aug. 28 to Sept. 25	10	Good.

BULBS

During the fall of 1921 a start was made with outdoor bulb culture, when the following bulbs were set out in the borders; hyacinths, five varieties; tulips, five varieties; narcissus, six varieties; crocus, two varieties; freesias, one variety, and galanthus, one variety. It is interesting to note that all these gave good results with the exception of freesias, which never germinated and were apparently unable to withstand the winter freezing. They were all set out on November 26, and no artificial protection given any of the bulbs planted, so that all those which survived should give equally good results in any part of northern Ontario. The following table gives the name and most important information regarding the bulbs set in 1921:—

VARIETY TEST OF BULBS

Name	Quantity	Date germinated	Duration of bloom
Hyacinths—			
King of Belgians	10	May 6	May 16 to June 1.
Lady Innocence	10	" 5	May 15 to June 1.
Lady Derby	10	" 8	May 17 to June 1.
Grand Maitre	10	" 8	May 17 to June 20.
McMahon	10	" 5	May 17 to June 20.
Tulips—			
Artus	50	April 28	May 22 to June 30.
Cottage Maid	50	" 29	May 21 to June 30.
Gold Finch	50	" 28	May 22 to June 30.
Lady Boreel	50	" 29	May 19 to June 30.
Day Dream	50	" 30	May 22 to June 30.
Narcissus—			
Albe pleno Odorato	50	May 1	May 16 to June 20.
Inc. Plenus	50	" 1	May 16 to June 20.
Emperor	50	" 3	May 17 to June 20.
Mme. De Graaf	50	" 2	May 16 to June 20.
Princeps	50	" 1	May 16 to June 20.
Poly, Grand Monarque	25	" 3	May 17 to June 20.
Crocus—			
Baron Brunow	50	April 28	May 5 to May 20.
Large Yellow	50	" 28	May 5 to May 20.
Freesias—			
Refracta Alba	25	.....	.....
Galanthus niv Simplex	100	" 28	May 1 to May 19.

TREES AND SHRUBS

The season of 1922 has been a very hard one on trees and shrubs owing to continued dry weather from spring until fall. Consequently, those planted out made slow growth, but very few have died and it is not expected that this winter will have any detrimental effect on them, as there is no late tender growth to freeze back. Among the best of those tried for quick growth and windbreaks may be mentioned the Laurel-leaved willow and Russian poplar; for lawn decoration the Lilacs, *Syringa villosa, Viburnum Lantana, Sorbus Aucuparia* and *Berberis Thunbergii* are among the hardiest. For hedges, the Caragana and Laurel-leaved willow seem to be the best tried.

LAWNS

The remainder of the lawn in front of the superintendent's house was levelled and seeded down this season. The seed germinated slowly; but by fall a fairly good covering was obtained. Among the best grasses and clovers tried for a lawn mixture are Kentucky blue grass and White Dutch clover.

CEREALS

The season of 1922 was somewhat backward, so that seeding operations could not be commenced until May 13. However, the soil was in fairly good tilth at that time and indications pointed to a better season than it afterwards turned out to be. The extremely dry weather which followed seeding caused uneven germination and, consequently, an uneven ripening of the crops. Occasional very light showers, however, during May and June, plus a rain of 1·28 inches on July 7, and a total of 3·04 inches in July, made it possible for the cereal plants to come along fairly well and mature into reasonably good crops in the end.

While there were some fairly heavy frosts during the growing season, it is remarkable how well the cereals escaped serious injury from these.

SPRING WHEAT

During the season of 1922, four varieties of spring wheat were under test. The seed was sown on May 13, in duplicate one-fortieth acre plots at the rate of two bushels per acre on uniform clay loam soil, which had previously produced a crop of sunflowers. The results obtained are as follows:—

VARIETY TEST WITH SPRING WHEAT

Variety	Date of ripening	Number of days maturing	Average length of straw including head	Strength of straw on scale of ten points	Actual yield of grain per acre	Weight per measured bushel after cleaning
			inch.		bush. lbs.	lbs.
Huron Ottawa 3	Aug. 31	110	40·0	9·5	30 20	65·0
Marquis Ottawa 15	Aug. 31	110	34·5	9·5	29 ..	65·0
Ruby Ottawa 623	Aug. 31	100	26·0	9·0	15 ..	65·2
Prelude Ottawa 135	Aug. 16	95	26·0	9·0	9 40	65·8

As one year's results are not always a reliable criterion by which to judge the real value of a variety, and as we now have the results of three years with these four varieties, it has been thought advisable to show the three-year average in a separate table as follows:—

VARIETY TEST WITH SPRING WHEAT— THREE YEAR AVERAGE

Variety	Average number of days to mature	Average Yield of grain per acre for 3 years 1920-1922
		bush. lbs.
Huron Ottawa 3	109·3	27 10
Marquis Ottawa 15	109·6	25 43
Prelude 135	92·0	15 17
Ruby Ottawa 623	96·6	14 33

It will be noted that Huron Ottawa 3, has given slightly larger yields than Marquis Ottawa 15. The Huron wheat is bearded, with a somewhat open head and brown chaff. The straw is a fair length and has good strength; but the grain, while larger and longer, is not of as good milling quality as the Marquis and this, together with the fact that it is a bearded wheat, makes it a doubtful superior to the Marquis, even if it has given slightly larger yields.

The Marquis is the best known spring wheat of the lot. It is a beardless wheat, with straw of medium length and strength. It gives a uniform sample of grain which is short, amber in colour, medium in size, of good milling and baking quality and is usually heavy per measured bushel. Where there is not too much danger from frost, either the Marquis or Huron gives promise of good results.

The relative position of Prelude and Ruby has been changed in the average for three years. While they are very even in yields, it is significant that the Prelude is over three days earlier in maturing than the Ruby, so that on small areas in new sections, where the danger from frost is greatest, it might be advisable to use one of these rather than the later maturing varieties Huron and Marquis, although as large a yield need not be expected.

The Prelude has short straw which is slightly weak, and short, bearded and somewhat open heads. The grain is a dark reddish colour and shatters very readily if let get overripe.

Ruby Ottawa 623, has medium fine straw which is rather short. The head is short, somewhat pointed and bald. The kernels are red, flinty, medium in size and of good milling quality.

OATS

Five varieties of oats were tested at this Station in 1922. The seed was sown on May 13, in duplicate one-fortieth acre plots at the rate of two and one-half bushels per acre on uniform clay loam soil, which had produced a crop of sunflowers the previous year. The results obtained are as follows:—

VARIETY TEST OF OATS

Variety	Date of ripening	Number of days maturing	Average length of straw including head	Strength of straw on scale of ten points	Actual yield grain per acre		Weight per measured bushel after cleaning
			inch.		bush.	lbs.	lbs.
Banner Ottawa 49	Aug. 30	109	40·0	9·0	48	8	41·0
Victory	" 30	109	33·0	9·6	45	30	45·2
Gold Rain	" 28	107	32·0	9·3	41	6	47·0
Alaska	Aug. 23	102	31·5	9·2	38	8	46·0
Liberty Ottawa 480	" 21	100	25·5	9·2	25	30	52·0

None of the yields of oats were high this year, owing to continued dry weather which followed seeding until well into July. It is worthy of note, however, and also very encouraging that all the above sorts matured without any injury from frost.

The Banner oat seems to give good promise for northern Ontario as it has been included in the tests for the last three years and has, without exception, been in the lead. It is a large, white oat with tall straw of good colour and strength.

Victory has also been tested for three years and two out of the three years it has held second place, indicating that it also may be looked upon with favour for this section. It is shorter in grain and straw than Banner and about the same in earliness.

Gold Rain is a fair-sized plump, yellow oat, somewhat earlier than Banner or Victory, and gives a fair yield. Its yellow colour, however, detracts somewhat from its market value, as it has the appearance of being weathered although the feeding value is good.

Alaska is a very early variety. It has fine, short straw and gives a medium yield. It may have a place, however, on small areas of new land where the danger from frost is greatest. It does best on rich, well tilled land.

Liberty is a hulless oat which is fairly early and a good yielder, considering that the hull of other varieties represents from twenty to forty per cent of their total weight. It is sometimes badly affected by smut and shells rather easily if let get overripe. It is an excellent grain for poultry and young stock such as pigs, calves and colts, and while it is not desirable that it should be grown in large areas like the standard varieties, such as Banner and Victory, it may have a place for the purposes above mentioned.

BARLEY

Four varieties of six-rowed barley and one variety of two-rowed barley were tested this year. They were sown on May 13, in duplicate one-fortieth acre plots, at the rate of two bushels per acre, on uniform clay loam soil which had previously produced a crop of sunflowers. The results obtained are as follows:—

VARIETY TEST OF BARLEYS

Variety	Date of ripening	Number of days maturing	Average length of straw including head	Strength of straw on scale of ten points	Actual yield of grain per acre	Weight per measured bushel after cleaning
			inch.		bush. lbs.	lbs.
TWO-ROWED						
Duckbill Ottawa 57	Aug. 23	102	33·0	9·5	35 20	57·0
SIX-ROWED						
Manchurian Ottawa 50	Aug. 31	100	33·0	9·5	30 20	54·0
O.A.C. No. 21	" 21	100	27·0	9·0	23 16	54·0
Albert Ottawa 54	" 14	93	28·5	9·5	20 ...	53·1
Himalayan Ottawa 59	" 21	100	24·0	9·2	23 16	65·2

These five varieties have been grown for two years and three of them, namely, Duckbill, O.A.C. No. 21, and Albert, for a period of three years. Following is a table giving two- and three-year averages:—

VARIETY TEST WITH BARLEY—TWO AND THREE YEAR AVERAGES

Variety	Three year averages 1920-1922		Two year averages 1921-1922	
	Number of days maturing	Actual yield of grain per acre	Number of days maturing	Actual yield of grain per acre
		bush. lbs.		bush. lbs.
TWO-ROWED				
Duckbill Ottawa 57	106	28 47	104·0	29 13·0
SIX-ROWED				
Manchurian Ottawa 50	.....	.....	98·5	27 36·5
O.A.C. No. 21	102	22 38	98·0	22 33·5
Albert Ottawa 54	94·6	19 39·5	93·0	20 35·0
Himalayan Ottawa 59	.....	.....	96·5	17 55·0

It is evident that, although the Duckbill is a two-rowed variety, it is keeping ahead of the six-rowed varieties, both in the two- and three-year averages. It is fairly long in straw and gives large, plump grain of good quality.

The Manchurian, which was second this year and in the average, was ahead last year and seems to be fairly well adapted for this climate. It is a six-rowed variety with good length and strength of straw, somewhat earlier than Duckbill and the grain is well filled and of good quality.

The O.A.C. No. 21 has given very uniform yields from year to year. It is fairly early and has given good results under field conditions.

Albert is a very early variety which generally has short straw and heads, but produces a fair yield of good quality grain. It suffers less damage from frost than any other variety tried, but it should be grown on rich land.

Himalayan is a hulless variety, weighing over sixty pounds to the bushel and naturally makes a stronger meal than any of the others. It is short in straw and head and, consequently, should be grown on rich, well-tilled soil.

FIELD PEAS

Four varieties of peas were tested this year, in duplicate one-fortieth acre plots. The soil was a heavy clay loam which had previously produced a crop of sunflowers. The seeding was done on May 13, and the rate of seeding varied from two and one-half bushels to three and one-half bushels, depending upon the size of the peas, making an average rate of about three bushels per acre. The results obtained are as follows:—

VARIETY TEST OF FIELD PEAS

Variety	Date of ripening	Number of days maturing	Average length of plant	Actual yield of grain per acre	Weight per measured bushel after cleaning
			inch.	bush. lbs.	lbs.
Canadian Beauty	Sept. 19	129	36	53 0	64·6
Golden Vine	" 19	129	48	50 40	66·2
Black Eyed Marrowfat	" 19	129	54	46 40	64·8
Arthur Ottawa 18	" 19	129	38	45 40	66·0

The yield from peas this year was exceptionally good. The period required to mature was abnormally long, but this may be accounted for by the fact that the weather was so dry after seeding that the seed did not germinate and start growing for an unusually long time.

The Canadian Beauty variety, which has headed the list for the two years tested, is a large, white and smooth pea with straw and pods of good length.

The Golden Vine variety, which has stood second in the two years' test, is a small, firm pea with long straw.

The Black Eyed Marrowfat is medium to large in size with a distinct black speck where it is attached to the placenta. It has long straw and ripens evenly.

The Arthur, which is last in the list, is a medium to large pea with fair length of straw. It produces the best quality peas of the lot, and this may be partly due to its characteristic of producing a large percentage of pods near the end of the vines. While the same length of time was taken to mature all the varieties this year, the Arthur normally is an earlier pea than any of the other three.

These four varieties have been grown for two years and the two-year averages are as follows:—

VARIETY TEST OF FIELD PEAS—TWO-YEAR AVERAGES

Variety	Number of days maturing	Actual yield of grain per acre
		bush. lbs.
Canadian Beauty	123·5	38 35
Golden Vine	123·5	35 25
Black Eyed Marrowfat	123·5	31 30
Arthur Ottawa 18	117·0	30 5

SPRING RYE

Only one variety of spring rye was tested this season. It was sown on May 13, in duplicate one-fortieth acre plots, at the rate of one and one-half bushels to the acre. The soil was a heavy clay loam and the previous crop was sunflowers. The results obtained are as follows:—

VARIETY TEST OF SPRING RYE

Variety	Date of ripening	Number of days maturing	Average length of straw including head	Strength of straw on scale of ten points	Actual yield of grain per acre	Weight per measured bushel after cleaning
			inch.		bush. lbs.	lbs.
Common Spring Rye	Aug. 31	110	45	9·5	25 40	61·6

While there was only one variety under test the result would seem to indicate that spring rye can be successfully grown in this part of Ontario. This experiment will be strengthened by the addition of more varieties another year.

DATES OF SEEDING WINTER WHEAT

Dawson's Golden Chaff winter wheat was sown during the autumn of 1921 on eight different dates, the object being to determine what date or dates of seeding would give the best results. The plots were one-tenth acre in size and the soil was ploughed in July and given an application of manure at the rate of twenty tons per acre. The rate of seeding was one and three-quarter bushels per acre. The plots all made good growth in the fall, except those seeded on September 15 and 22, these being, apparently, altogether too late. They came through the winter in good shape and made a fair growth in spite of dry weather, but frosts in June caused an almost complete failure of the crop. They were all harvested on August 16. The results obtained are as follows:—

DATES OF SEEDING WINTER WHEAT

Variety	Date sown in 1921 head	Average length of straw including points	Strength of straw on scale of ten points	Actual yield of grain per acre
		inch.		bush. lbs.
Dawson's Golden Chaff	Aug. 4	25	10	3 20
" " "	" 11	25	10	3 00
" " "	" 18	26	10	4 00
" " "	" 25	26	10	4 30
" " "	Sept. 1	25	10	4 30
" " "	" 8	24	10	4 10
" " "	" 15	22	10	3 50
" " "	" 22	20	10	0 21

Even with eight different dates of seeding, none was able to escape the damage from frost. It is significant to note, however, that the plots sown from August 18 to the first week in September suffered the least of any and this is about the date of seeding which we have found to give the best results under field conditions in past years.

During the autumn of 1922, this experiment was repeated with winter wheat using two varieties, Dawson's Golden Chaff and O.A.C. 104.

WINTER RYE

Two varieties of winter rye were tested in one-tenth acre plots this season. The plots were seeded on August 18, 1921, at the rate of one bushel per acre, on heavy clay soil which had been ploughed in July and had also received a dressing of manure at the rate of twenty tons per acre. The plots made good fall growth and came through the winter in good condition; but the same frosts that damaged the winter wheat also struck the winter rye and practically destroyed it. The results obtained are as follows:—

VARIETY TEST OF WINTER RYE

Variety	Date of ripening	Number of days maturing	Average length of straw including head	Strength of straw on scale of ten points	Actual yield of grain per acre
			inch.		bush. lbs.
Common Winter Rye	Aug. 16	363	44	9·5	3 32
Vasa	" 16	363	36	9·0	3 12

While the grain crop was practically all destroyed by frost, it is worthy of note that the plots were a good height and made a nice stand; indicating that, in normal years, winter rye might give good results. The experiment was repeated during the autumn of 1922, in combination with the date of seeding experiment, using two varieties, New Rosen and Common winter rye.

DATES OF SEEDING WINTER RYE

Common winter rye was seeded on five different dates during the autumn of 1921; the object being to determine what date or dates of seeding would give the best results. The seed was sown at the rate of one bushel per acre at intervals of seven days from August 22 to September 19, in one-twentieth acre

plots, on heavy clay soil which was ploughed in July and top dressed with manure. Each plot made a good growth except the one seeded on September 19. The plots came through the winter in good condition and made a good stand, but, like the other winter grains this year, they suffered severely from the June frosts. They were all harvested on August 16. The results obtained are as follows:—

DATES OF SEEDING WINTER RYE

Variety	Date sown in 1921	Average length of straw including head	Strength of straw on scale of ten points	Actual yield of grain per acre
		inch.		bush. lbs.
Common Winter Rye	Aug. 22	48	9·5	5 0
" "	" 29	46	9·5	4 16
" "	Sept. 5	44	9·5	6 24
" "	" 12	38	9·5	6 44
" "	" 19	30	9·5	6 4

While none of the plants escaped injury from frost, it would appear that those seeded during the first two weeks of September were the least affected.

The experiment is being repeated another year.

FLAX

The objects of this experiment are to determine whether flax can be profitably grown in this district, and if so, what varieties are the most suitable for fibre production, and also to ascertain what rate of seeding gives the best results.

Two varieties were seeded in 1922 on May 17, in one-sixteenth acre plots on land which had previously grown a crop of sunflowers. One plot of each variety was sown at the rate of one bushel per acre and one plot at the rate of one and one-half bushels per acre. Owing to dry weather, the seed germinated very unevenly and the crop developed slowly. It was pulled on September 8, and cured in four-sheave stooks, after which it was baled and shipped to Ottawa for a fibre test. The results obtained are as follows:—

VARIETY TEST OF FLAX FOR FIBRE

Variety	Rate of seeding	Yield of cured and undeseeded crop per acre
		lbs.
No. 5	1 bushel per acre	440
No. 5	1½ bushels per acre	340
Blue Dutch	1 bushel per acre	300
Blue Dutch	1½ bushels per acre	232

FORAGE CROPS

In most years, forage crops do well in Northern Ontario. Some of them, however, are easily affected by dry weather and frosts, consequently our results this year are not as good as we had hoped for, or as the average of the past few years.

The extremely dry weather throughout May, June and a part of July, seriously affected most of the crops under test. The seed of the root crops and silage crops germinated unevenly and the growth was very slow. Clover seed gave fair results this year and alfalfa hay yielded reasonably well, but the second cut of alfalfa was rather light. No second crop worth while was obtained from any of the other grasses or clovers, hence alfalfa proved the most successful in this regard.

The forage crop work to date has consisted of variety tests of sunflowers, corn, mangels, swede and fall turnips and field carrots; also various tests with grasses and clovers alone and in mixtures for hay production; methods of seeding and treating alfalfa for hay production; variety tests of oats, peas and vetches separately as annual hays and methods of seeding timothy, alsike and red clover for seed production.

ENSILAGE CROPS

SUNFLOWERS

Seven varieties of sunflowers were tested in 1922. They were seeded on May 29, in one-twentieth acre plots, on land previously in clover sod, which was manured at the rate of fifteen tons per acre. The rows were thirty inches apart and the plants were thinned to six inches apart in the row. They were all harvested and ensiled on September 19. The results obtained are as follows:—

VARIETY TESTS OF SUNFLOWERS

Variety	Source of seed	Average height		Percentage matured	Yield per acre	
		Ft.	in.		tons	lbs.
Mammoth Russian Dakota Improved	Mitchell	8	0	20	13	600
Mammoth Russian	McDonald	8	0	10	9	1,600
Early Ottawa 76	C.E.F.	5	5	80	9	1,500
Mixed Mennonite	Rosthern	6	0	85	9	200
Manteca 7A	Rosthern	7	0	20	8	200
Brooks Dwarf 8B	Rosthern	6	8	20	7	1,600
Prolific White 9C	Rosthern	3	0	20	1	1,600

As may be noted, the Mammoth Russian Dakota Improved produced the greatest yield and the Mammoth Russian from McDonald the next largest. The Mammoth Russian variety seems well suited for ensilage purposes, even if it does not mature very well, as it nearly always gives a large yield of satisfactory silage.

Early Ottawa 76, is a much earlier variety than the Mammoth Russian and also gave a very good yield this year.

Mixed Mennonite was well matured, having commenced to bloom earlier than any of the others.

The Manteca, Brooks Dwarf and Prolific White were all about the same in maturity and would have, in all probability, yielded about the same but the Prolific White germinated poorly, hence its yield is abnormally low from this cause.

CORN

Four varieties of corn were tested in 1922. They were sown on May 23, in rows thirty-six inches apart in duplicate one-quarter acre plots. The seed made poor germination, and three frosts on the nights of June 11, 20 and 23, caused the crops to be a complete failure, hence no results could be obtained.

The varieties sown were Disco Pride Yellow Dent, Disco Ninety Day White Dent, North Western Dent and Disco Yellow Flint.

ANNUAL HAY CROPS

OATS AS AN ANNUAL HAY

The objects of this experiment are to determine the suitability and productiveness of oats used as hay and to ascertain the most desirable varieties and best time for harvesting to obtain best results.

Twelve varieties of oats were seeded on May 13 in duplicate one-fortieth acre plots, on land which had previously produced a crop of sunflowers. The oats were seeded at the rate of two and one-half bushels per acre and one-third of the crop was cut when the plants were in bloom, that is, when the majority of the plants were shedding pollen, one-third was cut when the plants were turning, that is, when ten per cent of the top kernels of grain were light in colour, and the last third was cut when the plants were nearly ripe, that is when ten per cent of the standing plants still had a green tinge on them.

The green weight was taken from each cutting and also the weight of cured hay. A sample from each cutting of each variety was forwarded to the Dominion Chemist for analysis.

The results obtained are as follows:—

VARIETY TEST OF OATS FOR ANNUAL HAY

CUT WHEN IN BLOOM

Variety	Date cut	Yield per acre green weight		Yield per acre cured hay	
		tons	lbs.	tons	lbs.
Abundance	July 28	6	900	1	902·5
Leader	" 28	4	520	0	1917·0
Liberty	" 28	3	1,740	0	1,785·75
Sensation	" 28	3	1,440	0	1,756·5
Banner	" 28	2	1,820	0	1,395·0
Victory	" 28	2	1,460	0	1,365·0
Alaska	" 28	2	1,040	0	1,324·5
Gold Rain	" 28	2	1,580	0	1,323·0
O.A.C. No. 3	" 28	2	260	0	1,203·0
Daubeney	" 28	1	1,840	0	960·0
20th Century	" 28	2	20	0	904·5
Ligowa	" 28	1	1,840	0	864·0

VARIETY TEST OF OATS FOR ANNUAL HAY—*Concluded*

CUT WHEN TURNING

Variety	Date cut	Yield per acre green weight		Yield per acre cured hay	
		ton	lbs.	tons	lbs.
Abundance	August 23	5	1,700	1	1,903·75
Leader	" 23	4	1,600	1	1,648·75
Liberty	" 16	3	1,740	1	853·00
Sensation	" 23	4	640	1	1,399·00
Banner	" 23	3	1,200	1	745·00
Victory	" 23 and Sept 1	3	1,200	1	1,048·75
Alaska	August 10	2	1,520	0	1,998·00
Gold Rain	" 21	2	1,700	1	178·75
O.A.C. No. 3	" 10	2	260	0	1,618·5
Daubeney	" 10	1	1,420	0	1,218·0
20th Century	" 23	2	620	0	1,707·0
Ligowa	" 23 Sept. 1	2	1,700	1	370·0

CUT WHEN NEARLY RIPE

Variety	Date cut	Yield per acre green weight		Yield per acre cured hay	
		tons	lbs.	tons	lbs.
Abundance	Sept. 1	5	200	2	342·5
Leader	" 1	3	900	1	1,007·5
Liberty	Aug. 29	2	1,400	1	463·75
Sensation	Sept. 1	2	1,700	1	598·75
Banner	"	2	1,820	1	754·00
Victory	" 1 & 7	1	1,840	0	1,845·75
Alaska	Aug. 29	2	680	1	76·00
Gold Rain	" 29	2	800	1	70·00
O.A.C. No. 3	Sept. 1	2	800	0	1,950·00
Daubeney	Aug. 29 and Sept. 1	1	940	0	1,378·5
20th Century	Sept. 1	2	1,100	1	205·00
Ligowa	" 1 & 7	1	1,840	0	1,756·5

It will be noted from this table that the yields of nearly all varieties were comparatively light. This, of course, was the direct result of dry weather. The average yields per acre of the twelve varieties cut at the different stages of maturity are as follows:—

AVERAGE YIELDS OF TWELVE VARIETIES AT DIFFERENT STAGES OF MATURITY

Stage of Maturity	Average yield per acre green weight of 12 varieties		Average yield per acre cured hay, 12 varieties	
	tons	lbs.	tons	lbs.
When in Bloom	3	205	0	1,475·0
When Turning	3	775	1	557·3
When nearly Ripe	2	1,335	1	370·6

This indicates that the greatest weight of both green and cured crop was obtained when the plots were turning.

Feeding tests were carried out with samples of each stage of maturity, both in the green and cured state. The stock seemed to relish the first two cuttings about equally well, while the third cutting was apparently not so palatable, either in the green or cured condition.

PEAS AS ANNUAL HAY

The objects of this experiment are to determine the suitability and productiveness of peas as a hay crop and also to ascertain the most desirable varieties for this district.

Four varieties of peas were seeded on May 13, in duplicate one-fortieth acre plots, on soil which had previously grown sunflowers. The rate of seeding depended upon the size of the peas and ran from two and one-half to three and one-half bushels per acre. The peas were all cut on August 23 and 24. The results obtained are as follows:—

VARIETY TEST OF PEAS AS ANNUAL HAY

Variety	Yield per acre green weight		Yield per acre cured hay	
	tons	lbs.	tons	lbs.
Golden Vine	11	400	2	827·5
Black Eyed Marrowfat	8	1,760	2	0,002·0
Arthur	8	1,900	1	1,885·0
Canadian Beauty	8	300	1	1,260·0

The green weight of the peas ran very high and the cured hay fairly high. The peas were cut when the majority of the pods would be about right for table use.

In the feeding tests with these, the green pea hay seemed fairly palatable but the cured pea hay did not seem to be relished by the stock. Pea hay is better for feeding when mixed with oat hay than when fed alone.

VETCHES AS AN ANNUAL HAY

The object of this experiment is to determine the suitability and productiveness of vetches as a hay crop.

Common vetch was seeded on May 13, in duplicate, one-fortieth acre plots. The seed seemed to germinate slowly and the crop developed unevenly. The plots were harvested on September 22, and gave an average yield of two tons per acre green weight and 1,400 pounds per acre of cured hay. Vetches alone do not seem as palatable as when mixed with oats or oats and peas.

SWEET CLOVER AS AN ANNUAL HAY

The object of this experiment is to compare the yields of hay obtained from white blossom sweet clover, yellow blossom sweet clover and Hubam, an annual sweet clover, the same year as seeded.

In 1922 one-half acre of each variety was seeded, but owing to dry weather no results were obtained. In 1923, the Hubam plot will be reseeded and compared with the other two, as biennials, while a second series of the three varieties will be seeded and tested as annual hays.

FIELD ROOTS

MANGELS

Twenty-five varieties of mangels were tested in 1922. They were seeded on June 2 and 3, on land which had previously been a clover sod, fall-ploughed and winter manured at the rate of fifteen tons per acre, in duplicate one-fiftieth, one-fortieth and one-twentieth acre plots. The plants were thinned to one foot apart in the row. Owing to continued dry weather causing poor germination and slow growth, the crop was almost a complete failure. They were harvested on October 6, 7 and 9. The results obtained are as follows:—

VARIETY TEST OF MANGELS

Variety	Source of seed	Yield per acre		Remarks
		tons lbs.	bush. lbs.	
Mammoth Prize, Long Red	McDonald	3 1,460	149 10	Long in type and fairly smooth.
Giant Half Sugar	McDonald	3 260	125 10	Fair size and good quality but not uniform.
Giant White Sugar	Rennie	2 1,160	103 10	Small but uniform.
Giant White Half Sugar	Ewing	2 920	98 20	Small and smooth.
Long Red Gate Post	Rennie	2 600	92 00	Fairly smooth and uniform.
Yellow intermediate	McDonald	2 360	87 10	Smooth and uniform.
Yellow Leviathian	Rennie	2 200	84 00	Fairly smooth and very uniform.
Golden Tankard	Rennie	2 120	82 20	Somewhat uneven in shape.
Giant White	Bruce	2 040	80 40	Fair size and smooth.
Giant Yellow Intermediate	Steele Briggs	1 1,560	71 10	Fairly uniform and smooth.
Mammoth Long Red	Steele Briggs	1 1,520	70 20	Small and uneven.
Giant Yellow Intermediate	Ewing	1 1,400	68 00	True to type and smooth.
Mammoth Long Red	Rennie	1 1,320	66 20	Small and smooth.
Golden Tankard	McDonald	1 1,300	66 00	Uneven in type.
Yellow Leviathian	Bruce	1 800	56 00	Smooth and uniform.
Giant Yellow Globe	Ewing	1 680	53 80	Globe shaped and small.
Yellow Globe	McDonald	1 560	51 10	Uniform but very small.
Long Red Mammoth	Ewing	1 520	50 20	Long in shape but small.
Giant Yellow Globe	Steele Briggs	1 520	50 20	Globe shaped but uneven.
Golden Fleshed Tankard	Steele Briggs	1 280	45 80	Small and uneven but smooth.
White Sugar	Steele Briggs	1 200	44 00	Small and uneven.
Danish Sludstrup	Kentville N. S.	1 000	40 00	Small and uniform.
Yellow Globe Selected	Steele Briggs	0 1,300	26 00	Globe shaped but very small.
Golden Tankard	Ewing	0 1,120	22 20	Uneven and small.
Yellow Intermediate	C.E.F.	0 950	19 00	Very small.

It will be noted that the yields were particularly light this year, the average yield of the twenty-five varieties being only 1 ton 1,406 pounds per acre.

The half sugar type, however, averaged 2 tons 516 pounds and the Long Red type averaged 2 tons 284 pounds per acre. These two types have been the heaviest yielders, both last year and this year, and are apparently the best suited for this district.

TURNIPS

Eighteen varieties of swede turnips were tested in 1922. The seed was sown on June 3, in rows thirty inches apart on fall-ploughed clover sod which had been winter manured. The plants were thinned to one foot apart in the row. Owing to dry weather, however, causing poor germination and slow growth, the crop was almost a failure this year. The turnips were harvested on October 5 and 6. The results obtained are as follows:—

VARIETY TEST WITH SWEDE TURNIPS

Variety	Source of seed	Yield per acre		Remarks
		tons lbs.	bush. lbs.	
Derby Green Top	Bruce	4 1,700	198	Green top and smooth.
Hall's Westbury	McDonald	4 1,400	188	Round and smooth.
Monarch Improved	Ewing	4 100	162	Globe shaped and smooth.
Conqueror Green Top	Ewing	4 00	160	Globe shaped and smooth.
Bangholm	Charlottetown	3 1,800	156	Round and smooth.
Hall's Westbury	Bruce	3 1,700	154	Round and smooth.
Elephant Jumbo Purple Top	Bruce	3 1,500	150	Long and smooth.
Canadian Gem	Rennie	3 1,000	140	Long and smooth.
Hall's Westbury	Ewing	2 1,700	114	Round and smooth.
Prize Elephant	McDonald	2 1,600	112	Small.
Durham Bronze Top	Steele Briggs	2 1,100	102	Uniform and smooth.
Derby Swede	Rennie	2 800	96	Round and smooth.
Purple Top	Steele Briggs	2 500	90	Oblong and uneven.
Improved Derby Bronze Top	Steele Briggs	2 100	82	Smooth and round.
Improved Jumbo	Rennie	1 1,200	64	Oblong and smooth.
Derby Bronze Top	Rennie	1 800	56	Smooth and oblong.
Jumbo	Steele Briggs	1, 500	50	Oblong and smooth.
Danish Queen	McDonald	1 300	46	Smooth and good quality.

As before stated, the crop was practically a failure this year, but this was entirely due to unusual climatic conditions, as the turnip crop is generally a fairly sure one in this section. The eighteen varieties averaged 2 tons 1,877·7 pounds per acre and the ten best averaged 3 tons 1,650 pounds per acre.

FALL TURNIPS

Fourteen varieties of fall turnips were tested in 1922. The seed was sown on the same date in a similar way and on the same kind of soil as the swedes. They were harvested on October 6. The yields ran a little higher than the swedes; but were also very light. The results obtained are as follows:

VARIETY TEST OF FALL TURNIPS

Variety	Source of seed	Yield per acre		Remarks
		tons lbs.	bush. lbs.	
Hardy Green Round	Sutton, Eng.	10 500	410	Round and smooth.
Ostersundum	Sutton, Eng.	9 800	376	Long in type.
Purple Top Mammoth	Sutton, Eng.	9 800	376	Globe shaped and smooth.
Red Paragon	Sutton, Eng.	8 1,800	336	Globe shaped and smooth.
Early Six Weeks	Sutton, Eng.	8 00	320	Flat, rough and white.
White Globe	Ewing	7 1,100	302	Globe shaped and firm.
Yellow Tankard	Sweden	7 00	280	Uniform and smooth.
Purple Top Aberdeen	Sutton, Eng.	5 1,500	230	Round and firm.
Devonshire Greystone	Steele Briggs	5 1,500	230	Round and smooth.
Green Top Yellow Aberdeen	McDonald	5 1,300	226	Smooth and uniform.
Yellow Aberdeen Purple Top	Rennie	4 1,700	194	Round and smooth.
Purple Top Yellow Aberdeen	Ewing	4 1,100	182	Round and smooth.
Purple Topped Mammoth Improved Greystone	Steele Briggs	4 100	162	Flat, firm and smooth.
Purple Top Yellow Aberdeen	Bruce	3 1,100	142	Dark purple top, round and smooth.

The average yield of the fourteen varieties was 6 tons 1,521 pounds per acre. The feature of fall turnips is that they are quick growers and generally give a little larger yields than the swedes; but of course, they are not nearly so good keepers, but are satisfactory for fall feeding.

FIELD CARROTS

Seven varieties of field carrots were tested in 1922. They were seeded on June 5, in rows thirty inches apart, the plants being thinned to four to five inches apart in the row. They were seeded in duplicate one-hundredth acre plots, on fall-ploughed clover sod which had been winter manured at the rate of fifteen tons per acre. Like the other root crops, owing to dry weather they were practically a failure. They were harvested on October 7. The results obtained are as follows:—

VARIETY TEST OF FIELD CARROTS

Variety	Source of seed	Yield per acre		Remarks
		tons lbs.	bush. lbs.	
Improved Short White	Steele Briggs	2 1,000	100	A uniform white carrot.
Mammoth Short White	Rennie	1 1,500	70	A good type of white carrot.
Improved White Belgian	McDonald	1 1,500	70	A smooth uniform white carrot
Danish Champion	McDonald	1 1,000	60	A yellow fleshed carrot of good quality.
Long Red Surrey	Steele Briggs	1 300	46	A long type of red carrot.
Large White Vosges	Bruce	0 1,400	28	Small and smooth in type.
Large White Belgian	Steele Briggs	0 1,000	20	Grows above ground.

The average yield of the seven varieties was 1 ton 814 pounds per acre. The short white as a type appears to be giving slightly the largest yields from year to year.

LEGUMES AND GRASSES

HAY PRODUCTION FROM GRASSES ALONE AND IN COMBINATION WITH CLOVERS

The objects of this experiment are to compare the hay yields from timothy, orchard grass and meadow fescue, when grown alone and in mixtures and when these grasses are sown alone or in combination with red clover, alsike clover, and red and alsike clover, and also to compare results when these mixtures are sown with and without a nurse crop.

The first series of this experiment was seeded in 1920 and the first results obtained in 1921, when two cuttings of hay were taken off. The season of 1922 was the second year for this seeding and owing to dry weather only one crop was obtained. This experiment was repeated in 1921. The seed was sown on May 17 in duplicate one-fortieth acre plots without a nurse crop. The first results were obtained from these plots this year, and owing to the dry season only one cut was obtained. The following table gives the results in detail in 1922 from those plots seeded in 1920, with and without a nurse crop, and also the results from the series which was seeded in duplicate in 1921 without a nurse crop:—

HAY PRODUCTION FROM GRASSES ALONE AND IN COMBINATION WITH CLOVERS

No. of plot	Seed sown	Amount sown per acre	Yield per acre in 1922 from plots seeded in 1920 without a nurse crop		Yield per acre in 1922 from plots seeded in 1920 with a nurse crop		Average yield per acre in 1922 from duplicate plots seeded in 1921 without a nurse crop	
		lbs.	tons	lbs.	tons	lbs.	tons	lbs.
1	Red clover	10	1	1,400	1	600	1	1,860
	Timothy	8						
2	Red clover	10	1	400	1	800	1	1,160
	Meadow fescue	15						
3	Red clover	10	1	600	1	600	1	1,840
	Orchard grass	15						
4	Red clover	10						
	Timothy	6	1	600	1	920	1	1,620
	Meadow fescue	10						
5	Red clover	10						
	Timothy	6	1	800	1	200	2	200
	Orchard grass	10						
6	Red clover	10						
	Orchard grass	10	1	000	1	200	2	440
	Meadow fescue	10						
7	Alsike	6	2	800	2	200	3	300
	Timothy	8						
8	Alsike	6	1	1,800	1	1,400	2	1,600
	Meadow fescue	15						
9	Alsike	6	2	600	1	400	2	1,000

HAY PRODUCTION FROM GRASSES ALONE AND IN COMBINATION WITH CLOVERS—*Concluded*

No. of plot	Seed sown	Amount sown per acre	Yield per acre in 1922 from plots seeded in 1920 without a nurse crop		Yield per acre in 1922 from plots seeded in 1920 with a nurse crop		Average yield per acre in 1922 from duplicate plots seeded in 1921 without a nurse crop	
		lbs.	tons	lbs.	tons	lbs.	tons	lbs.
	Orchard grass	15						
10	Alsike	6						
	Timothy	6	1	1,800	1	1,200	2	740
	Meadow fescue	10						
11	Alsike	6						
	Timothy	6	2	000	1	920	1	1,200
	Orchard grass	10						
12	Alsike	6						
	Meadow fescue	10	2	200	1	320	1	500
	Orchard grass	10						
13	Red clover	8						
	Alsike	2	1	600	1	000	1	900
	Timothy	8						
14	Red clover	8						
	Alsike	2	1	1,400	1	000	1	1,100
	Meadow fescue	15						
15	Red clover	8						
	Alsike	2	1	400	1	200	1	1,220
	Orchard grass	15						
16	Red clover	8						
	Alsike	2	1	800	1	000	1	1,640
	Timothy	6						
	Meadow fescue	10						
17	Red clover	8						
	Alsike	2	1	600	1	1,000	2	600
	Timothy	6						
	Orchard grass	10						
18	Red clover	8						
	Alsike	2	1	200	1	800	2	1,780
	Meadow fescue	10						
	Orchard grass	10						
19	Timothy	12	1	1,000	2	000	2	1,200
20	Meadow fescue	30	1	200	1	400	2	540
21	Orchard grass	30	1	400	1	000	2	1,500
22	Timothy	8	1	1,200	1	1,280	2	1,100
	Meadow fescue	15						
23	Timothy	8	1	400	1	1,200	2	900
	Orchard grass	15						
24	Meadow fescue	15	1	400	1	400	1	1,200
	Orchard grass	15						

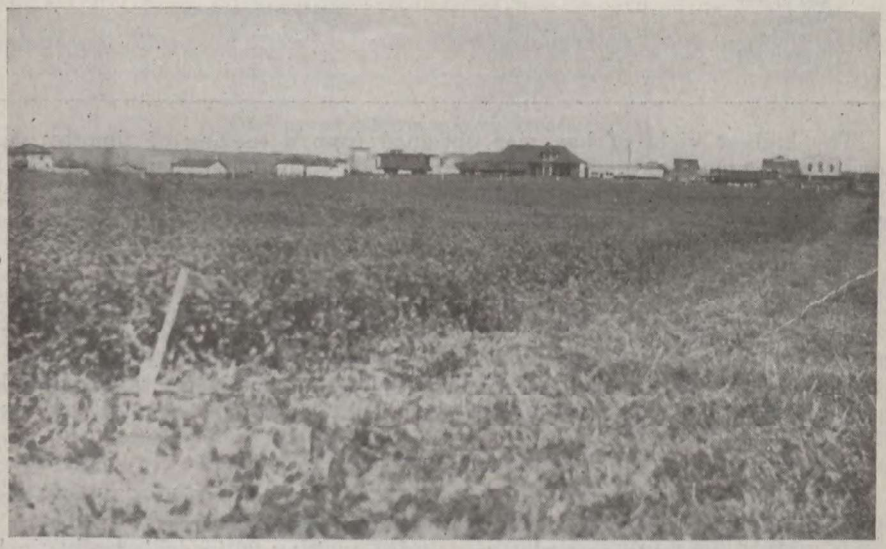
The average yield of all plots in 1921 which were seeded down without a nurse crop in 1920 was 3 tons 1,331·6 pounds per acre, while those seeded with a nurse crop gave an average yield of 4 tons 1,346 pounds per acre. In 1922 the average yield from these same plots was 1 ton 1,025 pounds per acre from those seeded without a nurse crop and 1 ton 710 pounds per acre from those seeded with a nurse crop; indicating that it does not pay to seed without a nurse crop.

It is too soon yet to draw any definite conclusions as to the best mixtures of grasses and clovers for hay production. This experiment will be repeated for five years and with three years results from each seeding some reliable data should be obtained. It is worthy of note, however, how well all grasses and clovers have done both alone and in various combinations.

The third series of this experiment was seeded in 1922 in duplicate one-fortieth acre plots using barley as a nurse crop. Owing to dry weather, however, a poor stand was obtained.

TIMOTHY AND CLOVERS FOR HAY PRODUCTION

The objects of this experiment are to test the yield and quality of hay produced by seeding with various amounts of timothy, red clover and alsike clover and to ascertain to what extent red clover may be profitably replaced with alsike in the standard hay mixture.



Red Clover at Kapuskasing, 1922

In 1920 ten duplicate half-acre plots were seeded with this experiment. The ten plots seeded on muck failed to catch, hence no results were obtained in 1921. The ten which were on clay were reported on in the 1921 report; but since then this area has been taken as a poultry yard, consequently no results were obtained from these in 1922.

In 1921 ten one-half acre plots were seeded with this experiment using barley as a nurse crop. The soil was a mixture of muck and clay that had previously produced a crop of sunflowers. The grass and clovers made a good stand in the fall of 1921 and produced a fairly good crop of hay in 1922. The results obtained are as follows:—

TIMOTHY AND CLOVERS FOR HAY PRODUCTION

No. of plot	Seed sown	Amount of seed sown per acre	Yield of crop per acre in 1922	
		lbs.	tons	lbs.
1	Timothy	8	1	1,850
	Red clover	10		
2	Timothy	8		
	Red clover	8	2	980
	Alsike	2		
3	Timothy	8		
	Red clover	6	1	1,850
	Alsike	3		
4	Timothy	8		
	Red clover	4	2	1,280
	Alsike	4		
5	Timothy	8		
	Red clover	2	2	660
	Alsike	5		
6	Timothy	6	1	370
	Red clover	10		
7	Timothy	6		
	Red clover	8	1	990
	Alsike	2		
8	Timothy	6		
	Red clover	6	1	1,840
	Alsike	3		
9	Timothy	6		
	Red clover	4	1	1,690
	Alsike	4		
10	Timothy	6		
	Red clover	2	2	1,220
	Alsike	5		

The highest yield of hay was obtained from a seeding of timothy eight pounds, red clover and alsike clover four pounds each; but it is too soon yet to draw any definite conclusions. This experiment was repeated again this year, hence more valuable data should be available another year.

BROME GRASS

The object of this experiment is to determine the suitability and productiveness of this grass as a hay crop for this district. In 1921 one plot one-tenth acre in size was seeded on May 23 in rows twelve inches apart without a nurse crop. The grass developed rather slowly and made a thin stand that year. In 1922 it gave a yield of two tons 1,350 pounds of good quality hay per acre from one cutting.

PERENNIAL RED CLOVER

The object of this experiment is to ascertain if a strain of red clover showing perennialism at Ottawa will show the same character here.

In 1921 a one-tenth acre plot was seeded on May 26 in drills twelve inches apart on well drained clay loam soil without a nurse crop. It made good growth that season and gave a yield of two and one-half tons per acre in 1922.

This experiment was repeated this year as a part of the variety test with red clover.

NITRO CULTURE OF RED CLOVER

The object of this experiment is to compare the yields of hay obtained from red clover seeded with and without nitro culture treatment. In 1921, two one-tenth acre plots were seeded on August 25 with red clover on heavy clay loam soil, without a nurse crop.

In 1922 the treated plot gave a yield of 2 tons 400 pounds per acre, while the untreated plot yielded 3 tons 300 pounds per acre. The plots were only cut once this year.

METHODS OF SEEDING ALFALFA FOR HAY PRODUCTION

The objects of this experiment are to ascertain the best method of seeding alfalfa for hay production and to compare the yields of alfalfa when seeded with and without a nurse crop.

The first series of this experiment was seeded on May 28, 1920, on a clay knoll which had previously produced a crop of turnips. The soil had received an application of lime at the rate of two tons per acre. The Grimm variety of alfalfa was used and the seed was treated with nitro culture. The first results from these plots were obtained in 1921 and are included in that year's report.

The second series of this experiment was seeded on May 18, 1921. The soil was more level and flat; but otherwise the treatment was the same. The following table gives the results from each series in 1922:—

METHODS OF SEEDING ALFALFA FOR HAY PRODUCTION RESULTS IN 1922 FROM PLOTS SEEDED IN 1920

Methods of seeding	Yield per acre in 1922					
	First cut		Second cut		Totals	
With a nurse crop	tons	lbs.	tons	lbs.	tons	lbs.
In drills 12 inches apart	1	1,738	1	360	3	98
Broadcast 20 pounds per acre	2	10	1	160	3	170
Without a nurse crop						
In drills 12 inches apart	2	1,920	1	1,200	4	1,120

RESULTS IN 1922 FROM PLOTS SEEDED IN 1921

With a nurse crop						
In drills 12 inches apart	1	440	0	890	1	1,330
Broadcast 20 pounds per acre	1	796	0	530	1	1,326
In drills 12 inches apart	1	1,660	0	1,510	2	1,170
Broadcast 20 pounds per acre	1	252	0	670	1	922

The plots seeded in 1920 gave a much better yield this year than last as the average yield in 1921 was 1 ton 1,081 pounds per acre, while this year on the same plots the average yield was 3 tons 1,129 pounds per acre. The average from all cuttings from 1920 seeding equals 2 tons 1,145 pounds per acre for those seeded with a nurse crop and 3 tons 1,087 pounds per acre for those seeded without a nurse crop.

In 1922 the crop from 1921 seeding averaged 1 ton 1,328 pounds per acre for those plots seeded with a nurse crop and 2 tons 46 pounds per acre for those seeded alone. This would seem to indicate the advisability of seeding alfalfa alone rather than with a nurse crop.

This experiment was repeated again this year and while owing to dry weather none of the plots made a very good stand, those which were seeded alone made much the better showing in the fall.

In view of the fact that alfalfa is doing so well at this Station and also because it makes such a desirable feed for stock, especially young stock, we feel like recommending it to the farmers of northern Ontario. A hardy variety like Grimm should be used and it should be seeded alone on a well drained rich piece of soil. The seed should also be treated with nitro culture.

NITRO CULTURE ON ALFALFA

The object of this experiment is to compare the yields of hay obtained from alfalfa seeded with and without nitro culture. In 1921 two one-tenth acre plots were seeded with Grimm alfalfa on heavy clay loam without a nurse crop. The results obtained are as follows:—

NITRO CULTURE TREATMENT OF ALFALFA SEED

Treatment	Yield per acre in 1922					
	First cut		Second cut		Total	
	tons	lbs.	tons	lbs.	tons	lbs.
Treated	1	240	0	1,700	1	1,940
Untreated	0	1,400	0	1,180	1	580

The plots were cut the first time on July 11, and the second time on September 13. Besides the yield being greater on the plot which was treated, there was also a marked difference in the colour of the plants; those on the treated plot being a dark, rich green, while those on the untreated plot had, in many cases, a yellow tinge.

THE PRODUCTION OF SEED

RED CLOVER SEED PRODUCTION

The objects of this experiment are to compare the results in seed production of using first or second cutting for seed and to compare the seed yields obtained from seeding broadcast, in rows twelve inches apart and in rows twenty-four inches apart and also to compare the monetary returns from red clover as a hay crop compared with red clover as a seed crop.

In 1920 the first series of this experiment was seeded on May 22, in duplicate one-half acre plots on well drained heavy clay loam soil, using spring wheat as a nurse crop. The results from these plots in 1921 were included in that year's report. In 1921 the second series of this experiment was seeded on clay loam soil, using oats as a nurse crop.

The following two tables give the results in detail for the year 1922 from the series seeded in 1920 and also the series seeded in 1921:—

RESULTS IN 1922 FROM PLOTS SEEDED IN 1920

Method of seeding	Amount of seed sown per acre	Purpose of crop	Yield of seed per acre in 1922	Value of seed per acre in 1922 at $15 per bushel	Yields of hay and clover straw per acre in 1922	Value of hay and clover straw per acre at $25 and $15 per ton	Total value of crop per acre in 1922
	lbs.		bush. lbs.	$ cts.	tons lbs.	$ cts.	$ cts.
Broadcast	8	Two cuttings for hay			1 1,716	46 45	46 45
Broadcast	8	First cutting for hay			1 626	32 82	
		second for seed	0 30	7 50	0 800	6 00	46 32
Broadcast	8	First cutting for seed	1 13	18 25	0 1,230	9 22	27 47
Rows 12 inches apart		First cutting for seed	1 14	18 50	0 1,268	9 51	28 01
Rows 24 inches apart		First cutting for seed	1 21	20 25	0 1,360	10 20	30 45

RESULTS IN 1922 FROM PLOTS SEEDED IN 1921

Broadcast	8	Two cuttings for hay			2 1,948	74 35	74 35
Broadcast	8	First cutting for hay					
		second for seed			2 1,405	67 56	67 56
Broadcast	8	First cutting for seed	4 4	61 00	1 801	21 00	82 00
Rows 12 inches apart		First cutting for seed	3 8	47 00	1 352	17 64	64 64
Rows 24 inches apart		First cutting for seed	1 36	24 00	0 1,402	10 51	34 51

Owing to dry weather no second crop was cut on any of the plots seeded in 1921 and a very light cut was obtained from plots one and two seeded in 1920.

It is too soon yet to draw any definite conclusions; but the results would seem to indicate that unless a clover crop gave promise of over four bushels of seed to the acre, it would pay better to utilize it as a hay crop.

The prices used in this experiment are the market prices in the district for the products concerned.

When a crop of seed is desired the results would indicate that the first crop is much surer to give a fair yield than the second crop.

The third series of this experiment has been seeded in 1922 on clay loam soil using barley as a nurse crop. Owing to dry weather, however, a very poor stand developed.

ALSIKE SEED PRODUCTION

The object of this experiment is to compare the seed yields from seeding broadcast, in rows twelve inches apart and in rows twenty-four inches apart.

The first series of this experiment was seeded in 1920 and the results were reported on in 1921. In 1922, owing to dry weather the crop on these plots was a failure, so that no results could be obtained.

In 1921 the second series of this experiment was seeded on May 17, on clay loam soil, using oats as a nurse crop. They were seeded in duplicate one-half acre plots; but the Canadian National Railway have since run a wye across three of the plots, so the results as herein presented are from single plots only.

METHODS OF SEEDING ALSIKE FOR SEED PRODUCTION

Method of seeding	Yield of seed per acre in 1922	
	bush.	lbs.
Broadcast 5 pounds per acre	2	24
Rows 12 inches apart	2	30
Rows 24 inches apart	1	50

Owing to dry weather these yields are very light.

The experiment was repeated in 1922, using barley as a nurse crop.

TIMOTHY SEED PRODUCTION

The object of this experiment is to compare the yields of seed obtained from seeding broadcast in combination with red clover, broadcast alone, in rows twelve inches apart and in rows twenty-four inches apart.

The first series of this experiment was seeded in 1920, and the results of 1921 were reported on in that year. Owing to dry weather in 1922 no results were obtained from these plots.

The second series was seeded in 1921 in duplicate one-half acre plots, using oats as a nurse crop. The soil was mostly muck and the stand obtained was only fair. The results obtained from these plots in 1922 are as follows:—

METHODS OF SEEDING TIMOTHY FOR SEED PRODUCTION

Method of seeding	Amount of seed sown per acre	Yield of seed per acre in 1912	
	lbs.	bush.	lbs.
Broadcast timothy	10		
" red clover	8	0	60
Broadcast timothy	10	2	24
Rows 12 inches apart		2	30
Rows 24 inches apart		2	1

The yields were all very light owing to dry weather.

The third series of this experiment was seeded in 1922 on clay loam soil, using barley as a nurse crop.

NEW WORK

VARIETY TEST WITH TIMOTHY

The object of this experiment is to compare the yields and quality of hay produced from different varieties of timothy. Eight varieties were seeded on May 16, in duplicate one-hundredth acre plots on soil which had previously been in sunflowers. Barley was used as a nurse crop and gave a fair yield, but owing to dry weather a poor stand of timothy was obtained.

VARIETY TEST WITH RED CLOVER

The object of this experiment is to determine the productiveness and suitability in general of different varieties of red clover produced in different sections of Canada and Europe. Twelve varieties were seeded on May 15, in duplicate one-fiftieth acre plots, using barley as a nurse crop. The barley was a fair crop, but the clover made a poor stand owing to dry weather.

LATE AND EARLY CLOVER WITH LATE AND EARLY GRASS

The object of this experiment is to compare the yields and quality of hay produced from a mixture of late and early clover and late and early grass. Four different mixtures were seeded on May 15 in duplicate one-fortieth acre plots, using barley as a nurse crop. The growth was slow owing to dry weather. The mixtures sown are as follows:—

LATE AND EARLY CLOVER WITH LATE AND EARLY GRASS

No. of plot	Seed sown	Amount sown per acre
		lbs.
1	Timothy	8
	Early red clover	10
2	Meadow fescue	15
	Early red clover	10
3	Timothy	8
	Late red clover	10
4	Meadow fescue	15
	Late red clover	10

LATE VERSUS EARLY CLOVER IN STANDARD HAY MIXTURES

The object of this experiment is to compare the suitability and productiveness of early and late red clover when used in the standard hay mixture.

Two mixtures were seeded on May 17 in duplicate one-quarter acre plots using barley as a nurse crop. The mixtures sown are as follows:—

LATE VERSUS EARLY CLOVER IN STANDARD HAY MIXTURES

No. of plot	Seed sown	Amount sown per acre
		lbs.
1	Timothy	10
	Alsike	2
	Common red clover	8
2	Timothy	10
	Alsike	2
	Late red clover	8

Owing to dry weather a poor stand was obtained.

VARIETY TEST WITH WHITE DUTCH CLOVER

The object of this experiment is to determine the suitability of this clover for this district and to compare the productiveness of different strains. Six varieties or strains of White Dutch clover were seeded on May 16, in duplicate one-fiftieth acre plots, using barley as a nurse crop. Owing to dry weather the plots all made a poor stand this year.

CHEMISTRY

FERTILIZER EXPERIMENTS—1922

In 1920 an experiment was commenced at this Station the object being to test the effect of various fertilizers in a four-year rotation as follows: First year, potatoes; second year, barley; third year, clover hay; and the fourth year, timothy hay. In 1921, the second year in the rotation, plots 1, 2, 3 and 4 were divided and one-half of each plot and all of plots 31 and 32 were given an application of nitrate of soda at the rate of 150 pounds per acre. The following table shows the fertilizers applied and the amount of each also the yield of hay in 1922 and the value of variation in yield for the last three years. In figuring out the value of variation no account was taken of the cost of production. The values given the crops each year were local market values and were as follows:—

Potatoes	1920	$ 1.80 per bushel
Barley	1921	0.72 per bushel
Hay	1922	25.00 per ton

Fertilizer Experiment Commenced in 1920

TABLE OF RESULTS ON "PER ACRE" BASIS FOR THREE YEARS

No. of Plot	Fertilizers applied	Amount of fertilizers applied in 1920–21	Cost of fertilizer applied in 1920–21	Value of variation from check in 1920, Potatoes	Value of variation from check in 1921, Barley	Yield of hay in 1922	Value of variation from check in 1922 Hay	Total value of variation from check 1920–22	Profit for 3 years deducting cost of fertilizers	Average profit of duplicate plots for 3 years
		lbs.	$ cts.	$ cts.	$ cts.	tons lbs.	$ cts.	$ cts.	$ cts.	$ cts.
1A	Check									
	Nitrate of soda	150	7 12							
1B	Check					2 760				
2A	Basic slag	500	10 00							
	Nitrate of soda	150	7 12	24 00	2 40	2 1,300	6 75	33 15	23 15	55 77
2B	Basic slag	500	10 00							
3A	Basic slag	750	15 00							
	Nitrate of soda	150	7 12	69 00	3 60	2 1,200	5 50	78 10	63 10	40 25
3B	Basic slag	750	15 00							
4A	Basic slag	1,000	20 00							
	Nitrate of soda	150	7 12	72 00	5 40	2 1,200	5 50	82 90	62 90	56 72
4B	Basic slag	1,000	20 00							
5	Check					2 1,060				
6	Quick lime	3,000	45 00	−3 00	0 45	2 1,260	2 50	−00 05	−44 95	−44 60
7	Slaked lime	4,500	67 50	3 00	0 45	2 1,560	6 25	9 70	−57 80	−66 47
8	Ground limestone	6,000	19 80	60 00	0 90	3 100	13 00	73 90	54 10	20 12
9	Check					2 1,740				
10	Basic slag	500								
	Quick lime	3,000	55 00	64 20	3 15	3 1,040	16 25	83 60	28 60	−41 64
11	Basic slag	750								
	Quick lime	3,000	60 00	84 60	4 95	3 140	5 00	94 55	34 55	−32 65
12	Basic slag	1,000								
	Quick lime	3,000	65 00	43 20	5 85	3 780	13 00	62 05	−2 95	−52 78
13	Check					3 440				
14	Superphosphate	200								
	Basic slag	200	14 75	115 20	0 90	3 500	00 75	116 85	102 10	93 88
	Nitrate of soda	100								
15	Superphosphate	400								
	Nitrate of soda	100	15 25	33 00	0 54	2 1,760	− 8 50	25 04	9 79	57 71
16	Check					2 1,100				
17	Quick lime	3,000	45 00	− 1 80	4 05	2 980	− 1 50	00 75	−44 25	
18	Slaked lime	4,500	67 50	−11 40	4 50	2, 1,040	− 0 75	− 7 65	−75 15	
19	Ground limestone	6,000	19 80	6 00	2 70	2 880	2 75	5 95	−13 85	
20	Check					2 1,640				
21	Basic slag	500								
	Quick lime	3,000	55 00	−48 00	0 36	2 900	− 9 25	−56 89	−111 89	
22	Basic slag	750								
	Quick lime	3,000	60 00	−39 00	0 90	2 1,500	− 1 75	−39 85	−99 85	

23	Basic slag	1,000									
	Quick lime	3,000	65 00	−34 80	0 18	2	1,400	− 3 00	−37 62	−102 62	
24	Check					2	1,180				
25	Basic slag	500	10 00	101 40		2	940	− 3 00	98 40	88 40	
26	Basic slag	750	15 00	34 20	00 45	2	1,000	− 2 25	32 40	17 40	
27	Basic slag	1,000	20 00	65 40	5 40	2	1,160	− 0 25	70 55	50 55	
28	Check					2	660				
29	Superphosphate	200									
	Basic slag	200	14 75	93 60	1 06	2	1,120	5 75	100 41	85 66	
	Nitrate of soda	100									
30	Superphosphate	400									
	Nitrate of soda	100	15 25	109 80	2 34	2	1,360	8 75	120 89	105 64	
31	Superphosphate	200									
	Basic slag	200									
	Nitrate of soda	100	23 50	133 80	5 40	2	1,380	9 00	148 20	117 58	136 76
	Muriate of potash	100									
	Nitrate of soda	150	7 12								
32	Quick lime	1,000									
	Superphosphate	400	30 25	172 20	4 50	2	1,700	13 00	189 70	152 33	135 80
	Nitrate of soda	100									
	Nitrate of soda	150	7 12								
33	Superphosphate	200									
	Basic slag	200	23 50	168 00	4 95	2	1,180	6 50	179 45	155 95	
	Nitrate of soda	100									
	Muriate of potash	100									
34	Quick lime	1,000									
	Superphosphate	400	30 25	142 20	1 08	2	1,160	6 25	149 53	119 28	
	Nitrate of soda	100									

The results in this table indicate that some of the fertilizers gave a marked profit while others gave a distinct loss. The greatest average profit of duplicate plots for the three years completed was $136.76 per acre and was obtained from an application of superphosphate 200 pounds, basic slag 200 pounds, nitrate of soda 100 pounds and muriate of potash 100 pounds. One of these duplicate plots No. 31 also received 150 pounds of nitrate of soda in the second year; but this plot gave a smaller profit than plot 33, which did not get the nitrate in 1921. The greatest loss was $66.47 and was obtained from an application of 4,500 pounds of slaked lime. Quick lime also gave a loss of $44.60 per acre and ground limestone a profit of only $20.12 per acre. All applications of basic slag in conjunction with quick lime gave a loss. Quick lime 3,000 pounds and basic slag 1,000 pounds equalled a loss of $52.78. Basic slag alone gave a profit of $55.77 for an application of 500 pounds per acre, $40.25 for 750 pounds, and $56.72 for 1,000 pounds. This would seem to indicate that basic slag was much more beneficial than quick lime. Applications of superphosphate and nitrate of soda gave a profit of $57.71 per acre, while basic slag, superphosphate and nitrate of soda gave a profit of $93.88 and quick lime, superphosphate and nitrate gave a profit of $135.80 per acre.

The prices of the fertilizers used are the straight market prices without the freight charges added. This of course would in some cases amount to a considerable sum, particularly with those materials like the three forms of lime, which demand a heavy application. It was thought advisable, however, not to include the freight charges, as this is something that varies considerably according to amount shipped, distance shipped, etc. It is an easy matter for any farmer to find out what the freight charges on a certain amount of fertilizer are going to be before he makes the purchase.

These results would seem to indicate (1) that on this particular soil applications of quick or slaked lime are not possible and ground limestone only slightly so; (2) that the application of basic slag alone was profitable but not when mixed with the quick lime; (3) that a nitro-phosphatic fertilizer was beneficial when applied alone or applied with quick lime.

However, owing to the spread in the yields of duplicate plots, due very probably to non-uniformity of the soil and other influencing factors these deductions can not be considered final and generally applicable to the district. Final conclusions cannot be drawn until further investigatory work has been carried on.

In 1921 another fertilizer experiment was commenced with the object of determining the effect of various fertilizers on the crop yields on a manured and on a non-manured area. The manured area was divided into thirty-two one-twentieth acre plots for a four-year rotation as follows: First year, oats, peas and vetches; second year, oats; third year, clover hay; fourth year, mixed hay.

The non-manured area was divided into twenty-eight one-tenth acre plots for a five-year rotation as follows: First year, oats, peas and vetches; second year, oats; third year, sweet clover, which is to be ploughed down as a green manure on one-half of each plot; fourth year, oats; and fifth year, red clover. Owing to high freight rates all plots in each area receiving ground limestone were dropped for the year 1921, but were included again in 1922. The following table gives the details of this experiment for the year 1922, which is the second year of the rotation:—

Fertilizer Experiment, Manured Area

TABLE SHOWING FERTILIZERS APPLIED, AND YIELD OF OAT CROP, 1922

Number of plot	Manure applied per acre	Amount of fertilizers applied per acre in 1921						Nitrate of soda applied in 1922	Yield of oats per acre in 1922		Yield of straw per acre in 1922		Variation in yield of grain from check in 1922		Variation in yield of straw from check in 1922	
		Nitrate of soda	Acid phosphate	Basic slag	Muriate of potash	Ground limestone	Quick lime									
	tons	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	bush.	lbs.	tons.	lbs.	bush.	lbs.	tons	lbs.
1A	15	330		510					50	0	0	1,300	−11	26	−0	800
1B	15	220		510				220	63	18	1	1,500	1	26	0	1,400
1C	15	110		510				110	57	02	1	260	− 4	24	0	160
Check	15							330	61	26	1	100				
2A	15	165		510					51	26	0	1,540	8	08	0	220
2B	15	110		510				110	47	02	0	1,600	3	18	0	280
2C	15	55		510				55	53	18	0	1,900	10	0	0	580
Check	15							330	43	18	0	1,320	0	0	0	000
3A	15	330		510	100				51	06	0	1,260	−20	0	−	1,720
3B	15	220		510	100			220	78	28	1	1,660	7	22	0	680
3C	15	110		510	100			110	67	02	1	820	− 4	02	−	160
Check	15								71	06	1	980				
4A	15	330	300						51	06	0	1,660	17	02	0	20
4B	15	220	300					220	74	04	0	1,880	40	00	0	240
4C	15	110	300					110	54	24	0	1,940	20	20	0	300
Check	15								34	04	0	1,640				
5A	15	330		765					49	14	1	420	− 6	16	0	720
5B	15	220		765				220	68	28	1	1,760	12	32	1	060
5C	15	110		765				110	67	22	1	100	11	26	0	400
Check	15								55	30	0	1,700				
6A	15	330	450						51	26	0	1,640	− 4	04	−	60
6B	15	220	450					220	60	20	1	740	4	24	0	1,040
6C	15	110	450					110	60	20	1	020	4	24	0	320
7A	15	110		510		6,000		110	52	12	0	1,620	−17	02	−	820
7B	15	110		510		4,000		110	77	02	1	580	7	22	0	140
8A	15	110	300			6,000		110	67	02	1	320	− 2	12	−	120
8B	15	110	300			4,000		110	60	00	1	1,160	− 9	14	0	720
Check	15								69	14	1	440				
9A	15					6,000			51	26	0	1,440	−17	22	−	1,000
9B	15					4,000			51	20	0	1,460	−17	28	−	980
10A	15						3,000		51	26	0	1,840	− 4	04		140
10B	15						2,000		54	25	0	1,460	− 1	05	−	240

Fertilizer Experiment, Non-Manured Area

TABLE SHOWING FERTILIZERS APPLIED AND YIELDS OF OAT CROP, 1922

Number of Plot	Amount of Fertilizers applied per acre in 1921						Nitrate of soda applied in 1922	Yield of oats per acre in 1922		Yield of straw per acre in 1922		Variation in yield of grain from check in 1922		Variation in yield of straw from check in 1922	
	Nitrate of soda	Acid phosphate	Basic slag	Muriate of potash	Ground limestone	Quick lime									
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	bush.	lbs.	tons	lbs.	bush.	lbs.	tons	lbs
11A	165		756				165	59	4	1	240	16	26	0	530
11B	165		510				165	54	4	0	1,660	11	26	—	50
12A	165	450					165	66	26	1	780	24	14	0	1,070
12B	165	300					165	62	12	2	1,120	20	00	1	1,410
13A	165		756	100			165	56	16	1	130	14	04	0	420
13B	165		510	100			155	55	00	0	1,530	12	22	—	180
Check							165	42	12	0	1,710				
14A	165		765		4,000		165	52	22	0	1,610	6	26	0	430
14B	165		510		4,000		165	55	20	1	960	9	24	0	920
15A	165	450			4,000		165	65	30	1	1,110	20	00	0	1,070
15B	165	300			4,000		165	53	28	1	320	7	32	0	280
16A	165		510			2,000	165	62	32	1	080	20	20	0	370
16B	165	300				2,000	165	60	10	1	300	17	32	0	590
Check							165	46	06	0	1,530				
17A	165		765				165	71	16	1	370	25	10	0	840
17B	165		510				165	68	18	1	820	22	12	0	1,290
18A	165	450					165	51	16	1	900	— 5	10	0	380
18B	165	300					165	59	14	1	180	2	22	—	340
19A	165		765	100			165	51	06	1	060	5	20	—	460
19B	165		510	100			165	59	14	1	020	2	22	—	500
Check								56	26	1	520				
20A	165		765		4,000		165	45	30	0	1,040			—	1,000
20B	165		510		4,000		165	47	12	0	1,190	1	16	—	850
21A	165	450			4,000		165	63	08	1	370	17	12		330
21B	165	300			4,000		165	64	04	1	420	18	08	0	380
22A	165		510			2,000	165	77	02	1	930	20	10	0	410
22B	165	300				2,000	165	86	16	1	1,770	29	24	0	1,250
Check								45	30	1	040				

It will be noted that in the manured series plots 7A, 7B, 8A, 8B, 9A and 9B were cut out in 1921, so that 1922 is the first year they were included in the experiment. This also applies to plots 14A, 14B, 15A, 15B, 20A, 20B, 21A and 21B.

No definite conclusions can be drawn from the results of this experiment this year, as it is only the second year of the rotation. On the manured area the greatest variation from the check plot in increased yield was obtained from plot 4B. It had received 220 pounds of nitrate of soda and 300 pounds acid phosphate in 1921 and 220 pounds of nitrate of soda in 1922.

The greatest variation from the check plot in reduced yield was on plot 9B. This plot was started in 1922 and received 4,000 pounds of ground limestone.

In the non-manured series, the greatest variation from the check plot in increased yield was obtained on plot 22B. It received 165 pounds of nitrate of soda, 300 pounds acid phosphate and 2,000 pounds of quick lime in 1921. In 1922 it received 165 pounds of nitrate of soda. The greatest variation from the check plot in reduced yield was obtained from plot 18A. It received 165 pounds of nitrate of soda and 450 pounds acid phosphate in 1921, but no quick lime. In 1922 it also received 165 pounds of nitrate of soda.

POULTRY

The work at this Station with poultry was started in 1921, when one permanent poultry house, 16 by 32 feet, and three portable colony houses, 10 by 12 feet, were constructed. The large house is divided by a partition in the centre and will house one hundred birds, fifty in each half, while the colony houses will hold twenty-five each if left as one pen or they may be divided for experimental work when they will accommodate ten to twelve in each end.

This year there has been constructed a breeding and experimental house, 16 by 40 feet. It is divided into five equal-sized pens, 8 by 16 feet each, with solid partitions, the doors between the pens being just in front of the roosts.

In view of the plentiful supply of logs in this country, it was decided to erect a permanent poultry house, 16 by 32 feet, the body of which is constructed entirely of spruce logs dovetailed on the corners. This might be termed a settler's poultry house. It is chinked with wood and caulked with oakum and is lined up on the inside with dressed shiplap. It has a straw loft and a cotton and glass front, in fact in every way it is similar to the regular one-hundred-bird house, other than that the body consists of logs instead of frame.

We also had three more, 10 by 12 feet, colony houses built, so that the plant is now able to accommodate between four hundred and five hundred birds.

In addition to the buildings erected the poultry yards were all enclosed with standard poultry fence, so that it will be possible to give the birds suitable range another season.

The Barred Plymouth Rock is the only breed kept to date and seems to suit the climatic and market conditions of the north very well, being a fair sized bird, reasonably hardy, and makes a good showing in egg production.

The experimental work of the plant is along the lines of breeding, feeding, housing and general management of poultry.

SKIM-MILK VERSUS BEEF SCRAP

It is now generally acknowledged by all those who take any interest in poultry, that laying hens need a certain amount of their protein supplied from animal sources. It is a certainty that vegetable protein can not entirely replace

animal protein for egg production; not only that, but the cost of producing eggs can be materially lowered by the addition of animal protein to the grain ration.

The question next is, what kind of animal protein should be used and from what source is it best obtained. The commercial supply may be had in the form of beef scrap, green bone, raw meat, etc., but the former one is generally used as the latter two are poor keepers, especially in warm weather. The home source which is found on a great many farms of Ontario is skim-milk.

In order to obtain some information as to the relative value of skim-milk versus beef scrap for winter egg production an experiment was commenced on November 1, 1921. A regular one-hundred-bird house, 16 by 32 feet, was divided into two pens each 16 feet square. Ninety-eight Barred Rock pullets were equally divided as to weight and general development and forty-nine were placed in each pen. The ration fed to each pen was the same with the exception of skim-milk and beef scrap. Pen 1 got 15 per cent beef scrap in the dry mash and water to drink, while pen 2 got no beef scrap but all the skim-milk they would drink. The scratch ration of each pen consisted of wheat, barley and oats in equal parts by weight fed morning and evening in the litter. They also had access to dry mash, roots and grit at all times.

The dry mash for pen 2 consisted of corn meal, bran and crushed oats in equal parts and this plus 15 per cent beef scrap for pen 1. The results obtained are as follows:—

SKIM MILK VERSUS BEEF SCRAP FOR WINTER EGG PRODUCTION

Beef Scrap

Month	No. of pen	No. of birds in pen	Total weight of birds on Nov. 1	No. eggs laid	Value of eggs at current market prices	Pounds of grain at $2.31 per cwt.	Pounds of meal mash at $1.73 per cwt.	Pounds of beef scrap at $7.00 per cwt.	Pounds of skim milk at $0.50 per cwt.	Pounds of mangels at $0.32 per cwt.	Pounds of sprouted oats at $1.81 per cwt.	Pounds of grit shell and charcoal at $2.00 per cwt.	Total value of feed consumed	Loss or gain per pen	Loss or gain per hen	Cost of one dozen eggs
													$	$	$	$
November	1	49	190·5	21	1·14	188	68·0	12·0	.....	100·0	.....	10·0	6·88	−5·74	−0·1171	3·93
December	1	49	.....	128	8·29	200	53·0	9·0	.....	75·0	.....	7·0	6·55	1·74	0·0355	0·614
January	1	48	.....	98	6·34	270	76·5	13·5	.....	61·0	.....	7·0	8·84	−2·50	0·0520	1·082
February	1	48	.....	230	12·97	270	68·0	12·0	.....	78·0	.....	14·0	8·79	4·18	0·0870	0·458
March	1	48	.....	354	16·81	300	68·0	12·0	.....	73·0	50·0	32·0	10·72	6·09	0·1268	0·363
April	1	48	.....	683	25·32	325	72·0	13·0	.....	80·0	60·0	22·0	11·45	13·87	0·2889	0·201
Total	.....	290	.....	1514	70·87	1553	405·5	71·5	.....	467·0	110·0	92·0	53·23	17·64	0·3649	
Average per bird	.....	48·33	.....	31·32	1·466	32·13	8·39	1·479	.....	9·68	2·27	1·9	1·10	.....	0·3649	0·4219
Average per bird per month	.....	.....	.....	5·22	0·244	5·355	1·398	0·246	.....	1·61	0·38	0·3	0·183	.....	0·0608	

Skim Milk

November	2	49	190·5	51	2·76	183	56·0	.....	314·0	85·0	.....	7·0	7·18	−4·42	−0·0902	1·689
December	2	49	.....	128	8·29	200	60·0	.....	214 0	80·0	.....	7·0	7·13	1·16	0·0236	0·668
January	2	46	.....	145	9·38	265	86·0	.....	268·0	58·0	.....	7·0	9·28	0·10	0·0021	0·768
February	2	46	.....	370	20·87	260	75·0	.....	280·0	63·0	.....	14·0	9·18	11·69	0·2541	0·297
March	2	44	.....	538	25·55	275	70·0	.....	340·0	69·0	50·0	29·0	10·96	14·59	0·3315	0·244
April	2	44	.....	755	27·99	320	80·0	.....	340·0	60·0	50·0	22·00	12·00	15·99	0·3634	0·19
Total	.....	278	.....	1987	94·84	1503	427·0	.....	1756·0	415·0	100·0	86·0	55·73	39·11	0·8441	
Average per bird	.....	46·33	.....	42·88	2·04	32·44	9·21	.....	37·9	8·95	2·16	1·85	1·202	.....	0·8441	33·65
Average per bird per month	.....	.....	.....	7·14	0·34	5·4	1·53	.....	6·26	1·49	0·36	0·3	0·2	.....	0·14	

A careful perusal of this table will indicate that the birds receiving the skim-milk not only gave a much greater number of eggs but were also able to produce them at a reduced cost per dozen. The experiment is being repeated this year and will for a number of years before conclusive proof is obtained, but from present indications it would appear that the farmer may feel safe in supplying his poultry with animal protein by the use of skim-milk, rather than by purchased products. In fact it shows that with beef scrap at $7 per hundred pounds, skim-milk could be used at $1.72 per hundred pounds and still produce the eggs as cheaply. Skim-milk should be fed either always sweet or always sour, the latter preferred, and an average sized hen will use about one hundred pounds in a year if given all she will handle at all times.

CRATE FATTENING CHICKENS

The question of how best to dispose of surplus cockerels is often asked. In order to get some data on this and also to determine which feeds are the best suited for crate fattening, an experiment was conducted this fall using six pens of twelve birds each and six different rations. The objects of this experiment are to determine: (1) if crate fattening cockerels is profitable, (2) if home-grown feeds are suitable for crate fattening, (3) if it pays to purchase a commercial feed like corn and add it to home-grown feeds, (4) if tankage and water could take the place of skim-milk in a fattening ration.

The seventy-two birds were equally divided as to weight and general development and placed in six crates, each of which had three compartments holding four birds. They were housed in the same quarters and fed the following rations: Pen 1, oats one part, barley one part, wheat one part, and skim-milk; pen 2, oats one part, barley one part, wheat one part, tankage 15 per cent, and water; pen 3, oats one part, barley one part, wheat one part, corn one part, and skim-milk; pen 4, oats one part, barley one part, wheat one part, corn one part, tankage 15 per cent, and water; pen 5, oat flour one part, corn one part, middlings one part, and skim-milk; pen 6, oat flour one part, corn one part, middlings one part, tankage 15 per cent, and water. The oats, barley, wheat and corn were all finely ground and the hulls were sifted out of the oats and barley. Market prices were charged for all feeds consumed and are all as follows:—

Oats	$1·735	per 100 pounds
Barley	2·00	"
Wheat	2·70	"
Corn	2·62	"
Middlings	1·45	"
Oat flour	2·44	"
Tankage	3 70	"
Milk	0·50	"

The experiment lasted exactly twenty-one days and every bird finished the test with a good keen appetite. The results obtained are as follows:—

CRATE FATTENING EXPERIMENT, 1922

Number of pen—12 birds each	Pen 1	Pen 2	Pen 3	Pen 4	Pen 5	Pen 6
	lbs. ozs.	lbs. ozs.	lbs. ozs.	lbs. ozs.	lbs. ozs.	lbs. ozs.
Weight of group A—4 birds	13 12	11 12	14 0	13 8	14 8	13 4
Weight of group B—4 birds	15 12	15 12	14 8	14 0	13 12	13 0
Weight of group C—4 birds	13 12	14 4	15 0	13 4	14 0	13 12
Total weight of A, B and C on Nov. 2	43 04	41 12	43 8	41 12	41 04	40 0
Average weight per bird	3 9·6	3 7·6	3 10	3 7·6	3 7	3 5·3
Weight of group A—4 birds	23 4·0	17 8·0	23 12	20 4·0	21 4	24 8·0
Weight of group B—4 birds	24 4·0	22 4·0	24 4	20 12·0	23 0	21 0·0
Weight of group C—4 birds	22 8·0	20 0·0	24 8	19 12·0	22 4	22 8·0
Total weight of A, B and C on Nov. 23	70 0·0	59 12·0	72 8	60 12·0	66 8	66 0·0
Total gain	26 12·0	18 00·0	29 0	19 00·0	25 4	26 0·0
Average gain per bird	2 3·6	1 08·0	2 6·6	1 09·3	2 1·6	2 2·6
Amount of milk used by 12 birds	166 0·0	.....	164 0·0	.....	164 0	
Feed eaten by 12 birds	83 5·0	82 2·0	82 9·0	84 15·0	82 2	84 9·0
Feed eaten per bird	6 15·5	6 13·5	6 14·5	7 1·2	6 13·5	7 0·7
Average feed per day per bird	0 5·3	0 5·2	0 5·2	0 5·3	0 5·3	0 5·2
Value of 12 birds at commencement	$ 12·98	$ 12·54	$ 13·05	$ 12·54	$ 12·38	$ 12·00
Value of 12 birds at finish	21·00	17·94	21·75	18·24	19·95	19·80
Increase in value per 12 birds	8·02	5·40	8·70	5·70	5·57	7·80
Value of feed eaten per 12 birds	2·76	2·08	2·78	2·19	2·59	2·04
Profit per pen, labour neglected	5·26	3·32	5·92	3·51	4·98	5·76
Average profit per bird	0·438	0·2766	0·4933	0·292	0·415	0·48

This table indicates that crate fattening has possibilities. The same rate, thirty cents per pound, was charged for cockerels both at the beginning and at the end of the experiment, so that no profit shown here is due to spread in price, yet spread in price is often a factor.

It also shows that home grown feeds are quite suitable, particularly when supplemented by skim-milk. Oats, barley and wheat, plus corn and skim-milk, gave the cheapest gains; and oat flour, corn and middlings plus tankage, all purchased, gave the second cheapest gains.

Market prices were charged for all feeds; and the hulls sifted out of the oats and barley were also included in the charges, thus it would seem a safe investment for the farmer to crate fatten his surplus cockerels and place a good article on the market rather than sell them direct from the yards.

The crates used in fattening are six feet long sixteen inches wide and twenty inches high inside measurement, each being divided by two tight partitions into three compartments and each of these holds four birds. The birds should be starved for twenty-four hours before being fed and then feeding should be commenced gradually. This experiment will also be repeated for a number of years.

The experimental work under way at the present time consists of (1) skim-milk versus beef scrap for winter egg production; (2) sprouted oats versus clover leaves as a green feed for winter egg production, and (3) a comparison of early pullets, late pullets, yearling hens and two-year-old hens as winter layers. In all, two hundred and four birds are under experiment.

A start has also been made in pedigree work. From the trap nest records the highest producing females are selected and mated with pedigreed males and in this way we shall be able to establish a large flock of pedigreed birds which should prove of great value as a source of foundation stock for the farmers of northern Ontario.

The standard rations being used on the plant this winter are as follows:—

Scratch Grain		Laying Mash	
Corn (cracked)	Two parts	Corn meal	One part
Wheat, whole	Two parts	Oats, crushed	One part
Oats, whole	One part	Barley, ground	One part
Barley, whole	One part	Bran	One part
		Shorts	One part
		Beef scrap	ten per cent

The scratch grain is fed morning and evening in the dry straw litter and the mash is hopper fed. There is also charcoal grit and oyster shell before the birds in the hoppers at all times.

BEES

On November 5, 1921, five colonies of bees were placed in winter quarters in the northwest corner of the office cellar. This portion is partitioned off from the rest of the cellar and it is no trouble to keep it at the proper temperature.

On May 2, 1922, they were removed to outside quarters when it was found that they had come through the winter in good condition. An outer case packed with shavings was placed around each brood chamber until the weather got warm in the summer when it was removed. As in former years one colony was placed on scales and a daily record kept of the gain or loss in weight. Notes were also made on the weather to determine its effect on the honey flow. Owing to dry cool weather, this season was very unfavourable for honey production as the following details of the colony on the scales will indicate.

Record of hive on scales in 1922

Month	May	June	July	August	Sept.	Total
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
Gains	.....	10·5	.....	15	0·5	22·5
Loss	3	.....	0·5			

It will be noted that July which is generally a good month for honey flow gave a loss of one-half pound.

Alsike commenced to bloom on June 8, but no increase in weight of colonies occurred until June 20. The greatest flow of nectar this year was on May 21 and August 23, when the colony on scales gained four pounds on each of the two days. But even this is a very small gain, as the year before the gain ran as high as sixteen pounds in one day which occurred on July 1.

During the first part of July a mated queen was received from the Central Experimental Farm, Ottawa, and introduced into one of the hives which had become queenless.

In August five more mated queens were received from Ottawa and used in the establishment of new colonies by dividing up the five old colonies. These have all developed into fairly strong hives.

Another colony was also established by taking one frame from each of several of the stronger colonies and introducing a queen cell.

The following statement gives the details of the season's operations:—

FINANCIAL STATEMENT OF APIARY IN 1922

Total weight of honey extracted	160 lbs.
Average weight produced per colony, spring count	32 "
Selling price of extracted honey per pound	$ 0·25
Total value of honey produced	40·00
Average value of honey produced per colony	8 00
Value of six colonies increased at $7	42 00

In the fall, four of the stronger colonies, one a twin colony with two queens and a division board, were placed in a four colony wintering case on October 21. They were well packed with dry cut clover on the bottom and top and all sides and the openings are facing east and west. The wintering case is sitting in the closed-in bee yard and directly south of the apiary building. It will be interesting to learn how they come through the winter.

The same date, October 21, the other five colonies, one of which is a twin colony with two queens and a division board, were placed in the cellar of the office where they wintered last year.

EXTENSION AND PUBLICITY

During the past four years it has been the practice of this Station to place an exhibit at several of the fall fairs in northern Ontario. This year the exhibit was put up at six of these fairs, viz., Englehart, New Liskeard, Utterson, Bracebridge, Powassan and Huntsville. The exhibit consisted of various models of farm buildings and equipment, plus a neatly arranged display of grains, grasses, and clovers both in the sheaf and in the threshed condition which were the product of this Station and indicated the varieties which were giving the best results.

The weather was good for all the fairs attended this season resulting in a large attendance. This would appear to be one of the very best means of placing the work of this Station before the people of the north country and it is the intention to strengthen this line of advertising as time goes on.

CORRESPONDENCE

Every year shows a marked increase in the number of inquiries from the settlers relating to farm problems of various kinds. Prompt attention is given to all such matters and further correspondence of this nature is solicited.

GENERAL FARM NOTES

BUILDINGS AND IMPROVEMENTS

The water and sewerage systems were installed in the new office which was constructed in 1921.

The water-tank and one of the silos were repainted.

The former office building was slightly altered and refloored and is now used by the assistant to the superintendent as a residence.

About two miles of road were repaired and regraded during the summer and two miles of permanent fence posts were placed, most of which have been covered with wire. Two portable hog cabins were constructed. Five rack lifters and six wagon-box stands were erected and considerable general repairs were made around the farm, such as rebuilding sidewalks, hanging gates, putting in culverts, etc. The construction work which occurred on the poultry plant has already been described under that heading. Each year the farm is taking on a more permanent and improved appearance and every addition made from now on will have a marked and lasting effect.