

XIII.—PHENOLOGICAL OBSERVATIONS, CANADA, 1899, BY A. H. MACKAY, LL. D.

(Read 9th April, 1900.)

The schedule on which the observations referred to here were recorded specifies 100 different objects, some with subdivisions. Of the great majority of them, two classes of observations are asked to be recorded: "When first seen," and "When becoming common." In the tabulated dates recorded by the Botanical Club of Canada, given at the end of this paper, the first series only is taken. The character of the schedule is also indicated in these tables of observations at the thirteen stations throughout Canada.

The identical schedule is also used in the public schools of the Province of Nova Scotia. The observations here are made by the pupils in attendance as a part of their "nature study," when going to and returning from school, and are tested and recorded by the teacher in duplicate, one copy of which is preserved as a local record, and the other is sent with the school returns to the Inspector for the Education Office.

Seven hundred and twenty-five school sections (school districts, localities, or stations) returned schedules of observations, the majority more full than those of the thirteen stations of the Botanical Club reporting. The summation of these in tabular form would require a large volume, and cannot, therefore, be attempted here. The schedules are bound up in a volume for each year, so that the information may not only be preserved for the future use of students, but may be conveniently accessible. The series of volumes will be a mine of information bearing on at least one phase of the problem of secular variation of climate.

The same ten plants taken last year are here selected from the list of one hundred objects for the purpose of comparison.

as to the average time of *first* flowering and when flowering was *beginning* to become common. In some counties the observations were so full that thirty good stations could be selected for averaging, ten from the *sea coast*, ten from *low inland* settlements, and ten from *high land* settlements. These average dates or phenochrons of flowering are arranged in parallel columns for the sake of comparison. In some counties only twenty satisfactory stations for averaging, and in others only ten, were found, as can be seen at a glance from the tabulation of the figures.

The average phenochron for each plant's *first* flowering and flowering *becoming common* is calculated for each county, and the mean of the two series is finally taken for comparison with the similar general phenochron for the same phenomenon in 1898. These general phenochrons are plotted on the accompanying diagram so as to show their curves through the counties of the Province arranged in a linear series beginning at the west and south, and proceeding to the east and north.

This order of the counties will be uniformly followed in future plottings of the phenochronic curves, for the greater ease of comparing those of one year with those of another. Last year the counties were arranged in the order of their most general phenochrons. Were the same rule followed this year the positions of some of the counties would be changed; but if the positions of the counties remain fixed the configurations of the phenochronic curves will illustrate the variations very clearly from year to year.

On a future occasion I propose to plot the phenochrons of the same phenomena running through the counties of the province for two or three consecutive years, in order to study the character of the annual observations, or the peculiarities of climate or flowering. Unfortunately, we cannot be sure of the degree of variation originating in the latter causes until we are sure of a uniform system of correct observations symmetrically distributed.

Apart from any generalization of value which may be expected from such work carried on continuously for years, it is found to be a valuable stimulus to the formation of habits of accurate observation in the pupils of the public schools, and to the study of nature on the road to and from school, when it does not interfere with any other study, and when it adds interest and often amusement to otherwise monotonous road travel. For this purpose alone the trifling cost of supplying the schedules are many thousands of times repaid.

The names of the *ten* plants whose average dates of flowering are given in the columns following, as described, cannot be given on the same page with their phenochrons without overcrowding. The names are, therefore, to be understood to be prefixed in the following order to each column :

1. The Mayflower (*Epigœa repens*).
2. The Blue Violet (*Viola cucullata*).
3. The Red Maple (*Acer rubrum*).
4. The Dandelion (*Taraxacum officinale*).
4. The Strawberry (*Fragaria Virginiana*).
6. The Wild Red Cherry (*Prunus Pennsylvanicum*).
7. The Tall Buttercup (*Ranunculus acris*).
8. The Indian Pear (*Amelanchier Canadensis*).
9. The Cultivated Apple (*Pyrus malus*).
10. The Lilac (*Syringa vulgaris*).

FLOWERING PHENOCHRONS

*Of the foregoing ten Plants in the Eighteen Counties of Nova Scotia,
for the year 1899.*

YARMOUTH COUNTY, 1899.

First Seen.				Becoming Common.				General Phenochrons.	
Coast.	Low Inlands	High-lands.	Average.	Coast.	Low Inlands.	High-lands.	Average.	Annual date.	Monthly date.
98.2	87.8	.....	93.0	109.7	103.7	.....	106.7	99.85	10 April.
117.8	118.2	.....	118.0	127.4	124.2	.....	125.8	121.90	2 May.
125.2	129.2	.....	127.2	130.5	134.2	.....	132.3	129.77	10 "
117.4	119.7	.....	118.5	129.6	127.5	.....	128.5	123.55	4 "
118.3	115.6	.....	116.9	131.8	125.8	.....	128.8	122.87	3 "
135.9	137.3	.....	136.6	144.1	142.9	.....	143.5	140.05	21 "
141.8	130.6	.....	136.2	153.8	141.2	.....	147.5	141.85	22 "
142.8	136.6	.....	139.7	146.6	143.4	.....	145.0	142.35	23 "
147.5	139.0	.....	143.2	157.4	148.9	.....	153.1	148.20	29 "
160.4	151.6	.....	156.0	166.9	158.0	.....	162.4	159.22	9 June.
130.53	126.56	.....	128.54	139.78	134.98	.....	137.38	132.96	13 May.

SHELBURNE COUNTY, 1899.

99.9	101.2	.....	100.5	108.2	110.9	.....	109.5	105.05	16 April.
122.0	121.0	.....	121.5	129.5	127.0	.....	128.2	124.87	5 May.
125.5	124.0	.....	124.7	134.2	133.9	.....	134.0	129.40	10 "
120.0	123.5	.....	121.7	132.7	131.1	.....	131.9	126.82	7 "
121.8	121.9	.....	121.8	133.2	130.1	.....	131.6	126.75	7 "
142.0	140.5	.....	141.2	150.0	146.8	.....	148.4	144.82	25 "
135.7	144.8	.....	140.2	148.4	151.0	.....	149.7	144.97	25 "
138.1	137.6	.....	137.8	146.7	146.6	.....	146.6	142.25	23 "
147.0	147.0	.....	147.0	155.1	155.4	.....	155.2	151.12	31 "
156.7	157.8	.....	157.2	163.9	163.3	.....	163.6	160.42	10 June.
130.87	131.93	.....	131.40	140.19	139.61	.....	139.90	135.65	16 May.

DIGBY COUNTY, 1899.

102.4	102.6	104.1	103.0	110.6	117.4	122.0	116.6	109.86	20 April.
119.7	120.2	122.6	120.8	127.2	130.6	127.3	128.3	124.58	5 May.
130.4	133.4	126.2	130.	137.8	138.8	132.0	136.2	133.10	14 "
118.4	121.4	123.9	121.2	128.0	127.8	121.3	125.7	123.46	4 "
116.4	120.2	119.7	118.7	128.8	130.4	128.2	129.1	123.95	4 "
136.8	143.6	136.9	139.1	148.2	153.8	143.6	148.5	143.81	24 "
145.8	146.4	143.6	145.2	153.2	156.4	150.7	153.4	149.35	30 "
141.0	136.8	132.5	136.7	149.6	148.2	138.2	145.3	141.05	22 "
144.8	142.4	140.0	142.4	154.2	151.6	147.3	151.0	146.71	27 "
156.6	157.6	152.6	155.6	162.0	164.8	159.3	162.0	158.81	8 June.
131.24	132.46	130.21	131.20	139.96	141.98	136.99	139.64	135.47	16 May.

FLOWERING PHENOCHRONS—*Continued.*

QUEENS COUNTY, 1899.

First Seen.				Becoming Common.				General Phenochrons.	
Coast.	Low Inlands.	High-lands.	Average.	Coast.	Low Inlands.	High-lands.	Average.	Annual date.	Mensual date.
103.2	106.2	104.7	112.7	.....	113.8	113.2	108.97	19 April.
124.2	121.4	122.8	131.5	.....	127.4	129.4	126.12	7 May.
128.6	120.4	124.5	135.9	.....	125.8	130.8	127.67	8 "
125.5	123.7	124.6	134.4	.....	134.1	134.2	129.42	10 "
125.9	123.3	124.6	138.4	.....	134.0	136.2	130.40	11 "
140.7	138.4	139.5	147.4	.....	145.5	146.4	143.00	23 "
149.9	148.3	149.1	158.9	.....	157.9	158.4	153.75	3 June.
136.2	133.0	134.6	145.2	.....	137.2	141.2	137.90	18 May.
146.9	144.2	145.5	152.5	.....	151.1	151.8	148.67	29 "
157.0	152.6	154.8	164.2	.....	157.0	160.6	157.70	7 June.
133.81	131.15	132.48	142.11	.....	138.38	140.24	136.36	17 May.

ANNAPOLIS COUNTY, 1899.

.....	99.9	107.7	103.8	.....	110.1	117.1	113.6	198.70	19 April.
.....	124.7	126.0	125.3	.....	132.2	133.1	132.6	129.00	9 May.
.....	129.3	123.7	126.5	.....	134.0	128.4	131.2	128.85	9 "
.....	125.3	128.8	127.0	.....	133.6	135.1	134.3	130.70	11 "
.....	122.2	123.5	122.8	.....	130.7	133.5	132.1	127.47	8 "
.....	137.8	140.7	139.2	.....	143.6	146.9	145.2	142.25	23 "
.....	145.9	147.5	146.7	.....	155.1	156.3	155.7	151.20	1 June.
.....	133.4	136.0	134.7	.....	137.5	141.2	139.3	137.02	18 May.
.....	139.9	145.7	142.8	.....	148.3	152.3	150.3	146.55	27 "
.....	152.3	153.7	153.0	.....	159.1	159.4	159.2	156.12	6 June.
.....	131.07	133.33	132.20	.....	138.42	140.33	139.37	135.78	16 May.

LUNENBURG COUNTY, 1899.

102.4	104.6	105.3	104.1	111.1	114.2	114.7	113.3	108.71	19 April.
123.5	123.9	122.8	123.4	130.4	129.9	129.6	129.9	126.68	7 May.
123.6	120.2	122.0	121.9	129.7	129.4	127.5	128.8	125.40	6 "
126.2	128.3	127.0	127.1	131.3	137.2	134.0	134.1	130.66	11 "
126.0	125.3	122.7	124.6	131.6	134.1	130.2	131.9	128.31	9 "
139.1	137.2	139.9	138.7	144.2	143.2	146.5	144.6	141.68	22 "
150.5	149.7	148.9	149.7	157.6	156.6	155.0	156.4	153.05	3 June.
142.0	130.5	132.0	134.8	148.6	139.4	138.2	142.0	138.45	19 May.
144.3	145.8	144.6	144.9	155.0	152.3	152.3	153.2	149.05	30 "
158.5	154.5	153.0	155.3	164.5	159.8	156.7	160.3	157.83	7 June.
133.61	132.00	131.82	132.47	140.40	139.61	138.47	139.49	135.98	16 May.

FLOWERING PHENOCHRONS — *Continued.*

KINGS COUNTY, 1899.

First Seen.				Becoming Common.				General Phenochrons.	
Coast.	Low Inlands.	High-lands.	Average.	Coast.	Low Inlands.	High-lands.	Average.	Annual date.	Mensual date.
.....	103.8	109.9	106.8	.....	114.8	118.6	116.7	111.77	22 April.
.....	120.7	125.8	123.2	.....	126.7	134.4	130.5	126.90	7 May.
.....	124.1	125.6	124.8	.....	132.3	133.0	132.6	128.75	9 “
.....	123.6	127.5	125.5	.....	133.6	135.8	134.7	130.12	11 “
.....	122.5	123.5	123.0	.....	133.5	131.7	132.6	127.80	8 “
.....	142.0	141.5	141.7	.....	150.2	146.3	148.2	145.00	25 “
.....	140.2	152.7	146.4	.....	153.8	157.9	155.8.	151.15	1 June.
.....	136.2	134.7	135.4	.....	144.0	140.7	142.3	138.90	19 May.
.....	141.6	145.8	143.7	.....	152.6	152.4	152.5	148.10	29 “
.....	152.9	154.6	153.7	.....	159.1	161.3	160.2	156.97	6 June.
.....	130.76	134.16	132.46	.....	140.06	141.21	140.63	136.54	17 May.

HANTS COUNTY, 1899.

.....	103.8	109.3	106.5	.....	114.9	119.1	117.0	111.77	22 April.
.....	123.8	127.8	125.8	.....	129.4	134.8	132.1	128.95	9 May.
.....	126.6	126.9	126.7	.....	131.0	131.8	131.4	129.07	10 “
.....	125.2	129.6	127.4	.....	134.3	136.7	135.5	131.45	12 “
.....	123.2	126.6	124.9	.....	134.7	132.7	133.7	129.30	10 “
.....	138.6	146.2	142.4	.....	147.2	151.3	149.2	145.82	26 “
.....	141.3	153.3	147.3	.....	154.6	159.7	157.1	152.22	2 June.
.....	135.6	144.0	139.8	.....	142.6	149.5	146.0	142.92	23 May.
.....	144.7	150.8	147.7	.....	151.1	157.5	154.3	151.02	1 June.
.....	153.1	156.9	155.0	.....	160.6	163.7	162.1	158.57	8 “
.....	131.59	137.14	134.36	.....	140.04	143.68	141.86	138.11	19 May.

HALIFAX COUNTY, 1899.

104.6	105.9	108.2	106.2	119.2	114.9	118.8	117.6	111.93	22 April.
123.3	123.9	128.7	125.3	132.2	130.1	136.7	133.0	129.15	10 May.
124.6	126.3	122.7	124.5	132.7	133.9	133.0	133.2	128.86	9 “
126.3	127.5	130.1	127.9	135.9	134.4	138.6	136.3	132.13	13 “
126.9	124.0	125.8	125.5	137.1	135.3	135.5	135.9	130.76	11 “
144.1	144.1	142.6	143.6	152.9	150.1	147.3	150.1	146.85	27 “
151.8	149.6	150.0	150.4	161.5	157.2	161.0	159.9	155.18	5 June.
143.5	138.1	138.1	139.9	150.7	145.5	145.6	147.2	143.58	24 May.
154.5	148.3	151.1	151.3	164.1	156.8	157.5	159.4	153.38	5 June.
167.7	158.0	156.9	160.8	175.6	164.6	162.7	167.6	164.25	14 “
136.73	134.57	135.42	135.57	146.19	142.28	143.67	144.04	139.81	20 May.

FLOWERING PHENOCHRONS — *Continued.*

GUYSBORO COUNTY, 1899.

First Seen.				Becoming Common.				General Phenochrons.	
Coast.	Low Inland.	High-lands.	Average.	Coast.	Low Inland.	High-lands.	Average.	Annual date.	Mensual date.
.....	113.8	.....	.....	.....	122.4	118.10	29 April.
.....	129.7	.....	.....	.....	135.2	132.45	13 May.
.....	123.7	.....	.....	.....	131.3	127.50	8 "
.....	135.7	.....	.....	.....	141.8	138.75	19 "
.....	132.9	.....	.....	.....	144.4	138.65	19 "
.....	148.6	.....	.....	.....	153.2	150.90	31 "
.....	139.7	.....	.....	.....	165.0	162.35	12 June.
.....	145.4	.....	.....	.....	150.8	148.10	29 May.
.....	156.5	.....	.....	.....	162.3	159.40	9 June.
.....	164.7	.....	.....	.....	169.0	166.85	16 "
.....	141.07	.....	.....	.....	147.54	144.30	25 May.

CUMBERLAND COUNTY, 1899.

116.7	111.9	110.7	113.1	123.5	121.7	118.5	121.2	117.16	28 April.
124.8	127.3	127.5	126.5	131.2	136.0	134.4	133.8	130.20	11 May.
127.4	126.8	123.1	125.7	134.6	132.7	130.9	132.7	129.25	10 "
131.4	130.2	128.8	130.1	137.6	139.7	136.0	137.7	133.95	14 "
126.8	129.0	123.7	126.5	134.3	141.3	134.7	136.7	131.63	12 "
145.9	141.1	140.4	142.4	151.2	146.9	146.4	148.1	145.21	26 "
154.7	149.1	150.3	151.3	160.3	159.5	155.8	158.5	154.95	4 June.
141.0	137.4	135.5	137.9	147.1	145.3	142.7	145.0	141.50	22 May.
152.4	149.3	149.5	150.4	158.6	154.3	155.7	156.2	153.30	3 June.
156.5	155.2	155.5	155.7	162.6	161.5	161.2	161.7	158.75	8 "
137.76	135.73	134.50	135.99	144.10	143.89	141.63	143.20	139.60	20 May.

COLCHESTER COUNTY, 1899.

106.1	112.2	118.9	112.4	118.1	117.6	125.4	120.3	116.38	27 April.
124.4	126.3	127.3	126.0	132.9	132.6	134.2	133.2	129.61	10 May.
129.5	127.9	128.9	128.7	135.3	132.5	134.6	134.1	131.45	12 "
128.4	129.7	128.9	129.0	137.2	136.3	136.6	136.7	132.85	13 "
126.8	126.5	126.0	126.4	134.7	136.2	135.0	135.3	130.86	11 "
141.3	140.3	147.4	143.0	147.3	147.8	152.4	149.1	146.08	27 "
149.3	148.6	149.5	149.1	157.5	156.7	156.1	156.7	152.95	2 June.
141.2	138.4	141.2	140.2	147.1	143.7	148.7	146.5	143.38	24 May.
148.1	146.5	152.0	148.8	155.5	154.6	158.5	156.2	152.53	2 June.
156.5	157.4	160.8	158.2	163.4	162.3	166.8	164.1	161.20	11 "
135.16	135.38	138.09	136.21	142.90	142.03	144.83	143.25	139.73	20 May.

FLOWERING PHENOCHRONS - *Continued.*

PICTOU COUNTY, 1899.

First Seen.				Becoming Common.				General Phenochrons.	
Coast.	Low Inland.	High-lands.	Aver- age.	Coast.	Low Inlands.	High- lands.	Aver- age.	Annual date.	Mensual date.
107.4	111.8	112.2	110.4	118.0	122.5	119.2	119.9	115.18	26 April.
126.4	127.1	127.1	126.8	134.4	134.8	134.8	134.6	130.76	11 May.
126.7	123.3	126.2	125.4	133.0	130.1	131.9	131.6	128.53	9 " "
127.3	128.6	130.4	128.7	134.5	135.5	137.2	135.7	132.25	13 " "
128.8	126.2	126.7	127.2	135.8	136.8	137.2	136.6	131.91	12 " "
148.5	144.6	145.9	146.3	152.8	149.7	151.0	151.1	148.75	29 " "
148.8	148.7	150.0	149.1	155.7	155.9	156.4	156.0	152.58	2 June.
142.0	141.3	140.9	141.4	147.4	145.4	145.3	146.0	143.71	24 May.
150.9	146.7	149.4	149.0	156.1	153.5	156.3	155.3	152.15	2 June.
156.1	156.2	157.2	156.5	161.3	160.9	162.7	161.6	159.06	9 " "
136.29	135.45	136.60	136.11	142.90	142.51	143.20	142.87	139.49	20 May.

ANTIGONISH COUNTY, 1899.

.....	.....	.....	117.4	.....	.....	.....	125.9	121.65	2 May.
.....	.....	.....	127.6	.....	.....	.....	134.6	131.10	12 " "
.....	.....	.....	132.8	.....	.....	.....	136.6	134.70	15 " "
.....	.....	.....	130.1	.....	.....	.....	136.8	133.45	14 " "
.....	.....	.....	128.2	.....	.....	.....	139.9	134.05	15 " "
.....	.....	.....	146.9	.....	.....	.....	153.4	150.15	31 " "
.....	.....	.....	153.8	.....	.....	.....	161.0	157.40	7 June.
.....	.....	.....	145.4	.....	.....	.....	151.2	148.30	29 May.
.....	.....	.....	152.9	.....	.....	.....	158.1	155.50	5 June.
.....	.....	.....	160.4	.....	.....	.....	165.8	163.10	13 " "
.....	.....	.....	139.55	.....	.....	.....	146.33	142.94	23 May.

RICHMOND COUNTY 1899.

.....	.....	.....	110.7	.....	.....	.....	121.5	116.10	27 April.
.....	.....	.....	129.9	.....	.....	.....	136.5	133.20	14 May.
.....	.....	.....	138.2	.....	.....	.....	145.9	142.05	23 " "
.....	.....	.....	131.6	.....	.....	.....	140.6	136.10	17 " "
.....	.....	.....	132.0	.....	.....	.....	140.4	136.20	17 " "
.....	.....	.....	154.0	.....	.....	.....	159.1	156.55	6 June.
.....	.....	.....	159.2	.....	.....	.....	166.4	162.80	12 " "
.....	.....	.....	146.9	.....	.....	.....	152.4	149.65	30 May.
.....	.....	.....	160.3	.....	.....	.....	166.9	163.60	13 June.
.....	.....	.....	167.8	.....	.....	.....	172.2	170.00	20 " "
.....	.....	.....	143.06	.....	.....	.....	150.19	146.62	27 May.

FLOWERING PHENOCHRONS — *Continued.*

CAPE BRETON COUNTY, 1899.

First Seen.				Becoming Common.				General Phenochrons.	
Coast.	Low Inlands.	Highlands.	Average.	Coast.	Low Inlands.	Highlands.	Average.	Annual date.	Mensual date.
			111.8				120.8	116.30	27 April.
			132.0				137.9	134.95	15 May.
			128.0				134.5	131.25	12 "
			132.2				139.4	135.80	16 "
			127.7				138.7	133.20	14 "
			150.6				156.3	153.45	3 June.
			149.2				163.7	154.95	4 "
			147.2				152.9	150.05	31 May.
			156.6				163.4	160.00	10 June.
			164.9				170.3	167.60	17 "
			140.2				147.49	143.75	24 May.

INVERNESS COUNTY, 1899.

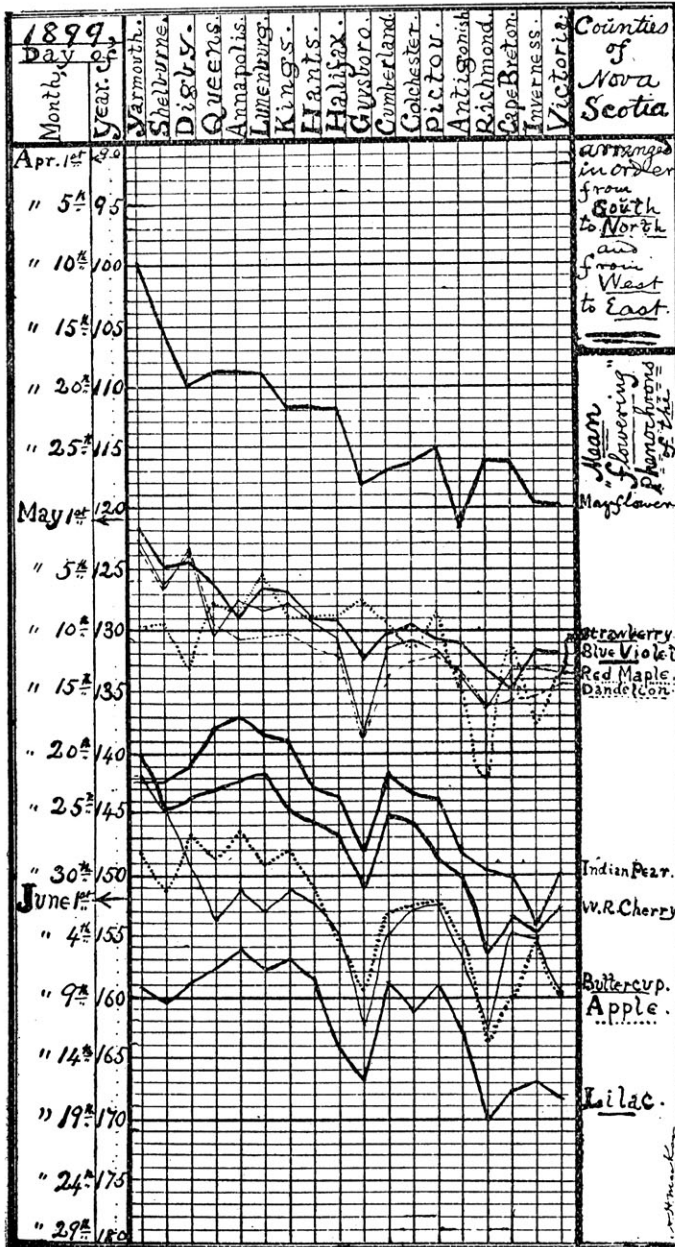
			116.5				122.8	119.65	30 April.
			128.1				135.3	131.70	12 May.
			134.1				141.2	137.65	18 "
			131.9				138.9	135.40	16 "
			129.7				136.6	133.15	14 "
			151.9				157.7	154.80	4 June.
			151.2				159.3	155.25	5 "
			148.7				159.6	154.15	4 "
			152.9				158.5	155.70	5 "
			163.8				170.1	166.95	16 "
			140.88				148.00	144.44	25 May.

VICTORIA COUNTY, 1899.

			117.2				122.3	119.75	30 Apr.1.
			129.9				133.6	131.75	12 May.
			130.3				136.8	133.55	14 "
			131.7				137.3	134.50	15 "
			127.9				135.5	131.70	12 "
			149.8				155.2	152.50	2 June.
			155.8				163.5	159.65	9 "
			147.2				152.7	149.95	30 May.
			157.1				162.8	159.95	9 June.
			164.7				171.8	168.25	18 "
			141.16				147.15	144.15	25 May.

PHENOCHRON CURVES OF FLOWERING.

(Mean of "first seen" and "becoming common").



Observations of Botanical Club of Canada.

In order to keep unbroken the series of observations made by the Botanical Club of Canada, in the Transactions of the Institute, especially as they have not yet become too voluminous, the following tabular summation of them for 1899 is given. The *seven* stations in the other provinces of the Dominion show observations which will be interesting in comparison with those made in Nova Scotia.

Phenological Stations and Observers of the Botanical Club of Canada, 1899.

St. Stephen, N. B.—J. Vroom, Esq.
 Yarmouth, N. S.—S. A. Starratt, Esq.; Seymour Critcher, Esq.
 Berwick, N. S.—Miss Ida A. Parker.
 Halifax, N. S.—Harry Piers, Esq.
 Musquodoboit Harbour, N. S.—Rev. James Rosborough.
 New Glasgow, N. S.—Miss Maria Cavanagh.
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 Charlottetown, P. E. I.—John McSwain, Esq.
 Beatrice, Muskoka, Ontario.—Miss Alice Hollingworth.
 Pheasant Forks, Assiniboia.—Thomas R. Donnelly, Esq.
 Olds, Alberta.—T. N. Willing, Esq.
 Willoughby, Saskatchewan.—Rev. C. W. Bryden.
 Vancouver, B. C.—J. K. Henry, Esq., B. A.

Explanation of Annotations over the Date Figures in the following Table :

*—“When becoming common.”	|	<i>s</i> —Ranunculus rhomboideus.
<i>b</i> —Rubus spectabilis (flowering).	|	<i>t</i> —Fragaria Chilensis.
<i>c</i> — “ “ (fruiting).	|	<i>u</i> —Prunus emarginata.
<i>f</i> —Rubus occidentalis.	|	<i>v</i> —Trielium ovatum.
<i>k</i> —Turdus propinqua.	|	<i>w</i> —Trientalis Europæa.
<i>o</i> —Sturnella neglecta.	|	<i>x</i> —Amelanchier alnifolia.
<i>q</i> —Chordeiles Henryei.	|	<i>y</i> —Rosa Nutkana.

PHENOLOGICAL OBSERVATIONS, CANADA, 1899.

Number.	Day of the year 1899, corresponding to the last day of each month. Jan. 31 July.....212 Feb. 59 Aug.....243 March... 90 Sept.....273 April... 120 Oct.....304 May ... 131 Nov.... 334 June...181 Dec.... 365 (First flowering or fruiting of plants and first appearance of migratory animals, etc.)	St. Stephen, N. B.	Yarmouth, N. S.	Berwick, N. S.	Halifax, N. S.	Musquodoboit, N. S.	New Glasgow, N. S.	Wallace, N. S.	Charlottetown, P. E. I.	Beatrice, Muskoka, Ont.	Pheasant Forks, Man.	Olds, Alberta.	Willoughby, Sask.	Vancouver, B. C.
		77a	First autumn frost, hoar.	227	258	...	258	...	251	...	254	221	221	...
77b	“ “ hard..	...	...	...	307	...	...	...	...	...	...	...	...	...
78a	First snow to fly in air....	276	...	...	...	...	...	277	315	...	...	...	...	...
78b	“ whiten ground	294	...	...	316	...	307	294	317	...	...	...	...	...
79a	Closing of Lakes.....	...	...	...	...	...	...	319	370	...	...	...	...	...
79b	“ Rivers.....	...	...	...	...	...	341	...	...	...	...	...	...	...
80	Thunderstorms—dates....	64	64	64	...	...	64	5	64	...	...	...	...	...
		...	78	...	...	...	64	...	104	...	108	...	...	...
		122	122	...	...	...	121	...	120	126	...	...	...	...
		146	...	...	...	...	128	...	148	...	142	...	...	...
		156	156	...	...	...	164	...	149	...	...	...	...	...
		157	...	157	157	...	...	...	165	151	...	162	...	...
		165	...	...	...	...	...	...	...	155	...	169	...	...
		170	166	...	...	...	166	167	...	156	...	...	...	...
		171	...	...	...	...	...	...	...	157	172	188	...	...
		172	...	172	...	...	...	172	...	163	173	...	...	...
		176	176	...	...	...	...	174	...	165	175	...	...	...
		177	...	...	...	...	177	176	176	174	177	219	...	...
		185	...	...	...	...	...	181	177	184	178	...	...	...
		187	...	...	...	...	...	...	186	198	197	220	...	...
		194	...	...	...	...	194	194	194	214	204	221	...	...
		202	...	...	...	...	195	202	195	224	210	...	...	...
		208	...	...	...	...	...	...	200	233	212	236	...	...
		210	225	201	...	218	255
		216	202	...	221
		246	246	246	220	...	229	250
		316	...	247	273	226	260	231

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80	Thunderstorms—dates							228	287				
								246	296				
								257					
81a	Wild ducks migrating, N.			86						110	99		
81b	“ “ S.												
82a	“ geese “ N.	100	94	78	81			90		110	100		
82b	“ “ S.		347					246	291		286		
83	Melospiza fasciata, North.	105	92	94	94			98					
84	Turdus migratorius, “	102	80	88	97	100		96		<i>k</i> 116	<i>k</i> 97	<i>k</i> 116	
85	Junco hiemalis, “		102	81	99			112					
86	Actitis macularia, “												
87	Sturnella magna “									<i>o</i> 106			
88	Ceryle Aleyon. “		102										
89	Dendroeca coronata, “		149		144								
90	D. aestiva, “				?	146							
91	Zonotrichia alba, “		120					134					
92	Trochilus colubris, “		143	128	135		144						
93	Tyrannus Carolinen, “				145								
94	Dolychonyx oryzivor., “												
95	Spinis tristis, “		144										
96	Setophaga ruticilla, “					146							
97	Ampelis cedrorum, “												
98	Chordeiles Viginian., “		151		149			156		<i>q</i> 148			
99	First piping of frogs	115	106	97	112	144		117	107	115	108	110	
100	First appearance, snakes.		109							123	127		