

- IX.—1:—PHENOLOGICAL OBSERVATIONS OF THE BOTANICAL CLUB OF CANADA, 1900 ;
- 2:—ABSTRACT OF PHENOLOGICAL OBSERVATIONS ON THE FLOWERING OF TEN PLANTS IN NOVA SCOTIA, 1900 ; WITH
- 3:—REMARKS ON THEIR PHENOCHRONS.—BY A. H. MACKAY, LL. D., *Halifax*.

(Read May 13th, 1901.)

1.

PHENOLOGICAL OBSERVATIONS, CANADA, 1900.

STATIONS AND NAMES OF THE OBSERVERS.

*Nova Scotia.*

Yarmouth, Yarmouth Co.—Miss Janet Keith Bruce Kelley.  
Berwick, Kings Co.—Miss Ida A. Parker.  
Musquodoboit Harbour, Halifax Co.—Rev. James Rosborough.  
Wallace, Cumberland Co.—Miss E. G. Charman.  
East Wallace, Cumberland Co.—Miss A. B. Mackenzie

*Prince Edward Island.*

Charlottetown—Principal John MacSwain.

*Ontario.*

Beatrice, Muskoka—Miss Alice Hollingworth

*Assiniboia.*

Pheasant Forks—Mr. Thomas Donnelly.

*Saskatchewan.*

Willoughby—Rev. C. W. Bryden, B. A.

*British Columbia.*

Vancouver—Mr. J. K. Henry, B. A.

PHENOLOGICAL OBSERVATIONS, CANADA, 1900.

Number.	Day of the year 1900 corresponding to the last day of each month. Jan ..... 31 July ..... 212 Feb ..... 59 Aug ..... 243 March ..... 90 Sept ..... 273 April ..... 120 Oct. .... 301 May ..... 151 Nov ..... 334 June ..... 181 Dec. .... 365	(First flowering or fruiting of plants and first appearance of migratory animals, etc.)	Yarmouth, N. S.	Berwick, N. S.	Musquodoboit, Halifax, N. S.	Wallace, N. S.	East Wallace, N. S.	Charlottetown, P. E. I.	Muskoka, O.	Pheasant-Forks, Assa.	Willoughby, Sask.	Vancouver, B. C.
			1	<i>Alnus incana</i> , Willd.....		95	110	105	102	137	113	
2	<i>Populus tremuloides</i> , Michx.....			111	109		137	113	111			
3	<i>Epigæa repens</i> , L.....	102	80	101	119	115	119	124				1
4	<i>Viola cucullata</i> , Gray.....	112	115	141	140	136		119	126			91
5	<i>V. blanda</i> , Willd.....	112	128	127	136	134		126	132			2
6	<i>Acer rubrum</i> , L.....		121	134	124	129	148	120	125			91
7	<i>Houstonia cærulea</i> , L.....			148								
8	<i>Equisetum arvense</i> , L.....	118	120		151	140		143				77
9	<i>Taraxacum officinale</i> , Weber.....	30	124	136	138	128	144	126	132			
10	<i>Erythronium Americanum</i> , Ker.....							116				
11	<i>Hepatica triloba</i> , Chaix.....							126	<i>a</i> 98	<i>a</i> 112		
12	<i>Coptis trifolia</i> , Salisb.....	137	122	132	144	140		140				
13	<i>Fragaria Virginiana</i> , Mill.....	126	124	136	137	139	154	140	132			
14	“ (fruit ripe).....				168	169			169			3
15	<i>Prunus Pennsylvanica</i> , L.....		150	152	156*	140		140				107
16	“ (fruit ripe).....				210				205			
17	<i>Vaccinium Penn. v. Can.</i> , Lam.....		148		150*	152		140				4
18	“ (fruit ripe).....				210							71
19	<i>Ranunculus acris</i> , L.....	147	151	161	157	157		161				
20	<i>R. repens</i> , L.....	147			176							
21	<i>Clintonia borealis</i> , Raf.....		159	155		162						
22	<i>Trillium erythrocarpum</i> , Michx.....	144	144	143				132				
23	<i>Trientalis Americana</i> Pursh.....		150		160	158		152				
24	<i>Cypripedium acaule</i> , Ait.....		159			161		170				
25	<i>Calla palustris</i> , L.....					155		145				
26	<i>Amelanchier Canadensis</i> , T. & G.....			148		152		139	130			
27	“ (fruit ripe).....							191				

\*=Year 1899. 1=*V. palustris*. 2=*A. macrophyllum*. 3=*P. emarginata*.  
4=*V. myrtilloides*. *a*=*Anemone patens*. *d*=*Acer Negundo*.

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28	Rubus strigosus, Michx.....											
29	“ (fruit ripe).....											
30	Rubus villosus, Ait.....		171									
31	“ (fruit ripe).....											
32	Kalmia glauca, Ait.....			173	154							
33	K. angustifolia, L.....	186	156	179								
34	Cornus Canadensis, L. ....	186	140	162	150	155		154				
35	“ (fruit ripe).....											
36	Sisyrinchium angustifolium .....	155	171	163	159	163						
37	Linnaea borealis, L.....			163		165		157				
38	Linaria Canadensis, Dum. ....											
39	Rhinanthus Crista-galli, L.....			174		182						
40	Sarracenia purpurea, L.....							172				
41	Brunella vulgaris, L.....					176		175				
42	Epilobium angustifolium, L. ....			202	201			190				
43	Rosa lucida, Ehrh. ....	186	181						147		5	134
44	Hypericum perforatum, L. ....	226	186					182				
45	Leontodon autumnale, L.....	186		184								
46	Prunus Cerasus (cultiv.) .....		147		150	154	157					96
47	“ (fruit ripe).....					196						160
48	Cratægus Oxyacantha, L.....						163					
49	C. coccinea, L.....							149	142			
50	Prunus domestica (cultivated).....	146			148	165		141				87
51	Pyrus malus (cultivated) early.....	123	151	159	150	151	158	142				100
52	“ “ late .....				158	152						
53	Ribes rubrum (cultivated) .....		145		145	141		143	132			94
54	“ (fruit ripe).....				193			182				

\*=Year 1899. 5=R. Nutkana.

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55	R. nigrum (cultivated) .....				155	144		143				
56	“ (fruit ripe) .....				197			190				
57	Syringa vulgaris, L. (cultiv.) .....		157		159	163	163	148	148			
58	Solanum tuberosum, L. ....							179	203			
59	Phleum pratense, L. ....			202	167			188				
60	Trifolium repens, L. ....				167	168						
61	T pratense, L. ....		156		165	168		161				135
62	Triticum vulgare, L. ....		159									
63	Avena sativa, L. ....		159									
64	Fagopyrum esculentum, L. ....		235									
65a	Earliest full leafing of tree .....				131			147				
65b	Latest “ “ .....				163			158				
66	Ploughing (first of season) .....		115		113		125	121	95	109		
67	Sowing “ “ .....		122		142			127	103	111		
68	Potato-planting “ .....				141			130	121	121		
69	Sheep-shearing “ .....		138		143			136				
70	Hay-cutting “ .....							194	209			
71	Grain-cutting “ .....				*	237	238	221	221			
72	Potato-digging “ .....				268			267				
73a	Opening of rivers “ .....				80		96		91			
73b	Opening of lakes “ .....											
74a	Last snow to whiten ground .....		102		116			104	123			
74b	“ to fly in air .....		147		132		134	123				
75a	Last spring frost—hard .....				139	155		130				
75b	“ “ hoar .....				168			139				
76a	Water in streams—high .....					111						
76b	“ “ low .....											

\* = Year 1899.

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		77a	First autumn frost, hoar.....	259	*	*	246	251	239		
77b	“ “ hard.....	293	*	*	279	313	258				
78a	First snow to fly in air.....	290			277		275				
78b	“ whiten ground.....				*	316	306				
79a	Closing of lakes.....				319						
79b	“ rivers.....				362	345					
80	Thunderstorms—dates.....	111			99	109	108	112	115		
							133	114			
		138				136	134	126	122		
			151		158		158	134			
		153			172	172	147	147			
							177				
					179	179		153	153		
		*			180	180			156		
		197			181	181			165		
		198			182						
		*					189				
		199			194	193	192				
					202	194	196	200			
		*				206	205	208			
		213			207	209	210	209			
		*			*	213	219	211	218		
		238			218	214	226	223			
		*			*	215	224				
		*			*	236	237	229			
		239									

\* = Year 1899.

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			80	Thunderstorms—dates .....	260 * 261			*		238		
						246		259				
					*		265	262				
						273		280				
								299				
								326				
81a	Wild ducks migrating, N .....		93						100			
81b	“ “ “ S .....											
82a	“ geese “ N .....		94	78	79	110	84					
82b	“ “ “ S .....				251	285						
83	Melospiza fasciata, North .....		82		104	110						
84	Turdus migratorius “ .....	47	67	74	104	92	<i>k</i> 98	<i>k</i> 112				
85	Junco hiemalis “ .....		74	95	111	94						
86	Actitis macularia “ .....											
87	Sturnella magna “ .....			137								
88	Ceryle Alcyon “ .....											
89	Dendroica coronata “ .....											
90	D. æstiva “ .....											
91	Zonothrichia alba “ .....											
92	Trochilus colubris “ .....		138	144		141						
93	Tyrannus Carolinensis “ .....		143	139								
94	Dolychonyx oryzivorus “ .....		116			140						
95	Spinis tristis “ .....											
96	Setophaga ruticilla “ .....											
97	Ampelis cedrorum “ .....											
98	Chordeiles Virginianus “ .....		144		156	137						
99	First piping of frogs .....		94	106	111	108	97	105	61			
100	First appearance, snakes .....		111	134		110	103	119				

\* = Year 1899. *k* = M. propinqua.

2.

PHENOLOGICAL OBSERVATIONS, NOVA SCOTIA.

THE TIME OF FLOWERING OF TEN PLANTS, SPRING OF 1900,  
THROUGHOUT THE PROVINCE OF NOVA SCOTIA.

*(Compiled from Phenological Observations made in the Public  
Schools of the Province.)*

The counties are arranged in the order of latitude and longitude, beginning with the South and West. For the ease of comparison the same order will hereafter be followed.

The tables contain merely the phenochrons or average dates of appearance at ten stations on the "coast," "lowlands" or "highlands," as the case may be—the names of the plants being omitted for the purpose of condensation. But the ten plants in order are the following throughout the whole table :

1. Mayflower (*Epigæa repens*).
2. Blue Violet (*Viola cucullata*).
3. Red Maple (*Acer rubrum*).
4. Dandelion (*Taraxacum officinale*).
5. Strawberry (*Fragaria Virginiana*).
6. Wild Red Cherry (*Prunus Pennsylvanica*).
7. Blueberry (*Vaccinium Can. and Penn.*)
8. Buttercup (*Ranunculus acris*).
9. Apple—cultivated (*Pyrus malus*).
10. Lilac (*Syringa vulgaris*).

The phenochrons of "first" flowering, and flowering "becoming common" of these ten plants on *coast, low inlands and high inlands*, and their general averages, are all lined across the page for the ease of comparison of the effects of coast waters and altitude. The classification of the observation stations into these three groups was made by the Inspectors through whom the schedules were sent to the Education Office.

As a rule, *ten* of the best schedules are averaged in each column. When *ten* good schedules for each of the three divisions of each county could not be had, the *ten* best schedules for the county are averaged, etc.

PHENOLOGICAL OBSERVATIONS.

YARMOUTH COUNTY, 1900.

First Seen.				Becoming Common.				General Phenochrons	
Coast.	Low Inlands.	H gh-lands.	Average.	Coast.	Low Inlands.	High-lands.	Average.	Annual date.	Mensual date.
.....	.....	.....	88.9	.....	.....	.....	104.6	96.75	7 April.
.....	.....	.....	123.4	.....	.....	.....	132.8	128.10	9 May.
.....	.....	.....	122.2	.....	.....	.....	131.9	127.05	8 May.
.....	.....	.....	119.5	.....	.....	.....	133.2	126.35	7 May.
.....	.....	.....	119.5	.....	.....	.....	134.2	126.85	7 May.
.....	.....	.....	145.7	.....	.....	.....	147.7	146.70	27 May.
.....	.....	.....	135.6	.....	.....	.....	153.1	144.35	25 May.
.....	.....	.....	143.7	.....	.....	.....	150.8	147.25	28 May.
.....	.....	.....	141.6	.....	.....	.....	155.8	148.70	29 May.
.....	.....	.....	158.6	.....	.....	.....	167.0	162.80	12 June.
.....	.....	.....	129.87	.....	.....	.....	141.11	135.49	16 May.

SHELBURNE COUNTY, 1900.

.....	.....	.....	96.4	.....	.....	.....	106.3	101.35	12 April.
.....	.....	.....	125.6	.....	.....	.....	132.9	129.25	10 May.
.....	.....	.....	128.1	.....	.....	.....	134.1	131.10	12 May.
.....	.....	.....	121.3	.....	.....	.....	129.8	125.55	6 May.
.....	.....	.....	125.8	.....	.....	.....	132.5	129.15	10 May.
.....	.....	.....	143.0	.....	.....	.....	148.9	145.95	26 May.
.....	.....	.....	134.7	.....	.....	.....	145.3	140.00	20 May.
.....	.....	.....	143.6	.....	.....	.....	150.3	146.95	27 May.
.....	.....	.....	144.7	.....	.....	.....	153.1	148.90	29 May.
.....	.....	.....	157.9	.....	.....	.....	162.9	160.40	10 June.
.....	.....	.....	132.11	.....	.....	.....	139.61	135.86	17 May.

DIGBY COUNTY, 1900.

105.3	100.4	106.7	104.1	111.2	109.0	113.8	111.3	107.70	18 April.
123.2	126.1	122.3	123.9	133.3	133.3	131.5	132.7	128.30	9 May.
135.0	124.3	129.0	129.4	140.4	132.3	134.9	135.9	132.65	13 May.
121.6	123.3	126.1	123.7	138.8	134.6	139.6	137.7	130.70	11 May.
119.6	124.5	124.3	122.3	134.9	135.9	135.1	135.3	129.05	10 May.
145.4	145.9	146.1	145.8	150.0	150.8	152.9	151.2	148.50	29 May.
145.4	143.4	145.1	144.6	152.2	151.3	147.9	150.5	147.55	28 May.
148.7	150.1	147.0	148.6	154.9	155.9	152.6	154.5	151.55	1 June.
147.9	150.3	147.8	148.7	153.8	154.4	156.3	154.8	151.75	1 June.
157.5	160.0	156.6	158.0	164.6	165.0	161.9	163.8	160.90	10 June.
134.96	134.83	135.10	134.96	143.41	142.25	142.65	142.77	138.87	19 May.



PHENOLOGICAL OBSERVATIONS—Continued.

QUEENS COUNTY, 1900.

First Seen.				Becoming Common.				General Phenochrons.	
Coast.	Low Inlands.	High-lands.	Average.	Coast.	Low Inlands.	High-lands.	Average.	Annual date.	Mensual date.
102.1	97.1	99.4	99.5	112.9	110.8	111.0	111.6	105.55	16 April.
128.1	131.6	129.4	129.7	138.8	133.5	136.8	136.4	133.05	14 May.
127.9	120.8	125.1	124.6	136.1	129.0	130.2	131.8	128.20	9 May.
123.1	123.8	134.8	127.2	134.3	131.8	142.0	136.0	131.60	12 May.
128.9	132.0	132.7	131.2	141.9	145.1	142.6	143.2	137.20	18 May.
142.0	142.8	147.4	144.1	152.7	149.8	151.7	151.4	147.75	28 May.
139.2	145.5	143.2	142.6	149.2	151.5	152.4	151.0	146.80	27 May.
150.6	150.0	153.5	151.4	156.8	156.3	156.2	156.4	153.90	3 June.
148.6	147.3	148.1	148.0	156.9	154.1	155.4	155.5	151.75	1 June.
161.6	156.1	154.8	157.5	168.4	160.6	160.3	163.1	160.30	10 June.
135.21	134.70	136.84	135.58	144.80	142.25	143.86	143.64	139.61	20 May.

ANNAPOLIS COUNTY, 1900.

.....	104.0	107.1	105.6	.....	115.9	114.5	115.2	110.40	21 April.
.....	128.6	132.9	130.7	.....	135.9	137.9	136.9	133.80	14 May.
.....	124.9	127.6	126.3	.....	128.0	133.5	130.8	128.55	9 May.
.....	129.6	133.8	131.7	.....	139.6	140.9	140.2	135.95	16 May.
.....	128.5	133.2	130.8	.....	141.3	139.5	140.4	135.60	16 May.
.....	145.6	144.7	145.2	.....	151.0	148.5	149.8	147.50	28 May.
.....	139.6	144.5	142.0	.....	156.6	148.3	152.4	147.20	28 May.
.....	150.9	150.6	150.8	.....	156.0	156.4	156.2	153.50	3 June.
.....	150.3	150.8	150.5	.....	156.0	154.2	155.1	152.80	2 June.
.....	156.5	158.7	157.6	.....	162.0	162.2	162.1	159.85	9 June.
.....	135.85	138.39	137.12	.....	144.23	143.59	143.91	140.52	21 M

LUNENBURG COUNTY, 1900.

102.6	100.6	101.2	101.5	111.7	115.7	111.2	112.9	107.20	18 April.
131.7	128.3	131.8	130.6	138.2	138.3	136.5	137.7	134.15	15 May.
127.1	128.1	123.5	126.2	131.5	127.8	129.3	129.5	127.85	8 May.
127.4	129.5	133.2	130.0	135.2	136.2	139.2	136.9	133.45	14 May.
130.1	129.9	131.9	130.6	139.3	137.3	141.1	139.2	134.95	15 May.
144.7	141.8	144.4	143.6	150.6	147.7	148.0	143.8	146.20	27 May.
141.8	144.6	144.6	143.7	146.4	153.5	151.4	150.4	147.05	28 May.
151.7	147.8	153.0	150.8	158.3	157.0	157.8	157.7	154.25	4 June.
150.4	149.0	150.2	149.9	156.3	156.0	154.9	155.7	152.80	2 June.
160.4	157.7	157.3	158.5	165.5	164.0	162.4	164.0	161.25	11 June.
136.79	135.72	137.11	136.54	143.30	143.35	143.18	143.28	139.91	20 May.

PHENOLOGICAL OBSERVATIONS—*Continued.*

KINGS COUNTY, 1900.

Firs Seen.				Becoming Common.				General Phenochrons.	
Coast.	Low-lands.	High-lands.	Average.	Coast.	Low-lands.	High-lands.	Average.	Annual date.	Mensual date.
.....	103.0	110.2	106.6	.....	111.8	119.2	115.5	111.05	22 April.
.....	124.0	182.6	128.3	.....	139.2	141.8	140.5	134.40	15 May.
.....	123.1	135.1	129.1	.....	129.6	140.2	134.9	132.00	12 May.
.....	131.4	138.5	135.0	.....	138.9	143.9	141.4	138.20	19 May.
.....	121.9	133.2	127.5	.....	139.6	143.9	141.8	134.65	15 May.
.....	147.0	148.1	147.6	.....	152.6	153.4	153.0	150.30	31 May.
.....	148.8	151.8	150.3	.....	155.8	155.3	155.5	152.90	2 June.
.....	148.8	154.6	151.7	.....	157.5	159.9	158.7	155.20	5 June.
.....	147.5	153.5	150.5	.....	153.5	157.3	155.4	152.95	2 June.
.....	158.0	161.2	159.6	.....	162.3	164.8	163.6	161.60	11 June
.....	135.35	141.88	138.62	.....	144.08	147.97	146.03	142.32	23 May.

HANTS COUNTY, 1900.

.....	99.3	107.0	103.2	.....	113.3	116.7	115.0	109.10	20 April.
.....	130.3	129.1	129.7	.....	136.6	137.0	136.8	133.25	14 May.
.....	125.7	124.0	124.8	.....	134.3	130.4	132.4	128.60	9 May.
.....	132.1	136.7	134.4	.....	138.5	143.7	141.1	137.75	18 May.
.....	134.3	133.7	134.0	.....	142.3	142.6	142.4	138.20	19 May.
.....	149.9	149.9	149.9	.....	155.2	152.4	153.8	151.85	1 June.
.....	150.1	152.0	151.1	.....	156.4	155.6	156.0	153.55	3 June.
.....	152.3	154.0	153.1	.....	156.4	158.6	157.5	155.30	5 June.
.....	151.8	152.7	152.3	.....	157.1	155.6	156.4	154.35	4 June.
.....	159.2	161.4	160.3	.....	162.4	166.0	164.2	162.25	12 June.
.....	138.50	140.05	139.28	.....	145.25	145.86	145.56	142.42	25 May.

HALIFAX COUNTY, 1900.

103.9	104.3	105.2	104.5	118.1	117.0	120.0	118.4	111.45	22 April.
133.9	126.7	134.0	131.5	141.8	136.5	145.2	141.2	136.35	17 May.
132.2	124.0	127.8	128.0	141.6	131.0	136.0	136.2	132.10	13 May.
130.1	134.4	135.3	133.3	143.0	140.8	142.0	141.9	137.60	18 May.
132.0	128.6	132.7	131.1	144.0	141.4	145.6	143.7	137.40	18 May.
154.1	150.9	146.6	150.5	158.4	152.3	151.5	154.1	152.30	2 June.
143.7	147.3	145.9	145.6	153.3	153.0	153.2	153.1	149.35	30 May.
156.4	153.9	152.7	154.3	162.6	160.0	162.0	161.5	157.90	7 June.
155.2	153.4	152.0	153.5	160.8	158.5	160.8	160.0	156.75	6 June.
162.1	162.6	156.7	160.5	169.0	166.5	163.1	166.2	163.35	13 June.
140.36	138.61	138.89	139.28	149.26	145.70	147.94	147.63	143.45	24 May.

PHENOLOGICAL OBSERVATIONS—*Continued.*

GUYSBORO COUNTY, 1900.

First Seen.				Becoming Common.				General Phenochrons.	
Coast.	Low-lands.	High-lands.	Average.	Coast	Low-lands.	High-lands.	Average.	Annual date.	Mensua date.
.....	.....	.....	109.1	.....	.....	.....	120.5	114.80	25 April.
.....	.....	.....	134.1	.....	.....	.....	142.1	138.10	19 May.
.....	.....	.....	135.6	.....	.....	.....	139.0	137.30	18 May.
.....	.....	.....	137.1	.....	.....	.....	145.1	141.10	21 May.
.....	.....	.....	139.7	.....	.....	.....	149.7	144.70	25 May.
.....	.....	.....	153.8	.....	.....	.....	159.0	156.40	6 June.
.....	.....	.....	155.9	.....	.....	.....	162.0	158.95	8 June.
.....	.....	.....	157.1	.....	.....	.....	164.2	160.65	10 June.
.....	.....	.....	160.1	.....	.....	.....	165.9	163.00	12 June.
.....	.....	.....	167.9	.....	.....	.....	173.7	170.80	20 June.
.....	.....	.....	145.04	.....	.....	.....	152.12	148.58	29 May.

CUMBERLAND COUNTY, 1900.

116.6	110.9	119.0	115.5	122.2	121.1	129.5	124.3	119.90	30 April.
134.7	131.4	137.3	134.5	142.2	138.3	146.7	142.4	138.45	19 May.
132.7	127.3	130.6	130.2	138.9	135.0	135.2	136.4	133.30	14 May.
138.7	140.0	142.2	140.3	144.9	144.6	150.1	146.5	143.40	24 May.
137.0	133.9	138.0	136.3	142.8	141.7	148.6	144.4	140.35	21 May.
148.3	147.5	148.4	148.1	154.1	152.3	154.7	153.7	150.90	5 June.
150.9	146.9	148.0	148.6	154.4	153.8	155.9	154.7	151.65	1 June.
156.5	152.2	158.1	155.6	162.2	159.5	162.9	161.5	158.55	8 June.
154.0	153.0	154.8	153.9	160.4	157.6	159.9	159.3	156.60	6 June.
160.9	160.6	160.9	160.8	166.1	164.3	166.3	165.6	163.20	13 June.
143.03	140.37	143.73	142.38	148.82	146.82	150.98	148.88	145.63	26 May.

COLCHESTER COUNTY, 1900.

111.0	106.5	115.3	110.9	120.5	114.5	121.8	118.9	114.90	25 April.
131.5	127.0	132.9	130.5	138.3	138.0	139.2	138.5	134.50	15 May.
127.9	124.2	126.5	126.2	133.5	133.2	136.3	134.3	130.25	11 May.
133.4	130.9	137.6	134.0	141.3	138.0	143.1	140.8	137.40	18 May.
130.1	133.4	136.8	133.4	140.2	141.1	147.0	142.8	138.10	19 May.
146.7	146.7	147.7	147.0	152.7	151.3	154.1	152.7	149.85	30 May.
151.7	148.7	153.8	151.4	156.3	155.3	159.7	157.1	154.25	4 June.
153.1	155.4	156.4	155.0	158.4	161.6	161.5	160.5	157.75	7 June.
154.7	154.8	156.2	155.2	159.3	159.0	159.6	159.3	157.25	7 June.
164.0	162.3	163.9	163.4	168.4	166.4	168.2	167.7	165.55	15 June.
140.41	138.99	142.71	140.70	146.89	145.84	149.05	147.26	143.98	24 May.

PHENOLOGICAL OBSERVATIONS—*Continued.*

## PICTOU COUNTY, 1900.

First Seen.				Becoming Common.				General Phenochrons.	
Coast.	Low lands.	High-lands.	Average.	Coast.	Low-lands.	High-lands.	Average.	Annual date.	Mensual date.
112.1	112.5	121.2	115.3	122.3	122.7	129.1	124.7	120.00	30 April.
132.9	133.4	133.1	133.1	137.8	142.6	139.9	140.1	136.60	17 May.
135.7	122.7	126.9	128.4	138.0	128.7	131.0	132.6	130.50	11 May.
141.7	135.6	139.4	138.9	146.9	141.5	144.4	144.2	141.55	22 May.
138.7	135.4	138.7	137.6	147.1	147.1	145.5	146.7	142.15	23 May.
146.5	151.7	149.7	149.3	153.7	160.1	154.3	156.0	152.65	2 June.
151.6	151.1	153.0	151.9	159.4	160.2	158.2	159.2	155.55	5 June.
154.3	152.8	155.8	154.3	160.4	159.9	161.7	160.7	157.50	7 June.
153.9	156.5	155.5	155.3	158.3	159.3	160.0	159.2	157.25	7 June.
160.8	162.2	161.5	161.5	165.7	166.9	165.7	166.1	163.80	13 June.
142.82	141.39	143.48	142.56	148.96	148.90	148.98	148.95	145.75	26 May.

## ANTIGONISH COUNTY, 1900.

.....	.....	.....	118.1	.....	.....	.....	124.9	121.50	2 May.
.....	.....	.....	135.5	.....	.....	.....	141.1	138.30	19 May.
.....	.....	.....	131.8	.....	.....	.....	140.7	136.25	17 May.
.....	.....	.....	136.1	.....	.....	.....	143.6	139.85	20 May.
.....	.....	.....	136.1	.....	.....	.....	149.0	142.55	23 May.
.....	.....	.....	149.8	.....	.....	.....	156.8	153.30	3 June.
.....	.....	.....	155.9	.....	.....	.....	162.9	159.40	9 June.
.....	.....	.....	157.7	.....	.....	.....	163.2	160.45	10 June.
.....	.....	.....	157.1	.....	.....	.....	162.2	159.65	9 June.
.....	.....	.....	161.2	.....	.....	.....	167.0	164.10	14 June.
.....	.....	.....	143.93	.....	.....	.....	151.14	147.53	28 May.

## RICHMOND COUNTY, 1900.

.....	.....	.....	119.1	.....	.....	.....	128.9	124.00	4 May.
.....	.....	.....	139.4	.....	.....	.....	147.6	143.50	24 May.
.....	.....	.....	138.5	.....	.....	.....	145.6	142.05	23 May.
.....	.....	.....	144.2	.....	.....	.....	152.4	148.30	29 May.
.....	.....	.....	142.2	.....	.....	.....	153.9	148.05	29 May.
.....	.....	.....	159.7	.....	.....	.....	165.1	162.40	12 June.
.....	.....	.....	163.6	.....	.....	.....	170.3	166.95	16 June.
.....	.....	.....	163.0	.....	.....	.....	168.5	165.75	15 June.
.....	.....	.....	168.5	.....	.....	.....	175.0	171.75	21 June.
.....	.....	.....	178.3	.....	.....	.....	183.9	181.10	1 July.
.....	.....	.....	151.65	.....	.....	.....	159.12	155.38	5 June.

PHENOLOGICAL OBSERVATIONS—*Continued.*

CAPE BRETON COUNTY, 1900.

First Seen,				Becoming Common.				General Phenochrons.	
Coast.	Low-lands.	High-lands.	Aver- age.	Coast.	Low-lands.	High-lands.	Aver- age.	Annual date.	Mensual date.
.....	.....	.....	110.1	.....	.....	.....	116.2	113.15	24 April.
.....	.....	.....	135.7	.....	.....	.....	140.0	137.85	18 May.
.....	.....	.....	136.2	.....	.....	.....	139.4	137.80	18 May.
.....	.....	.....	135.6	.....	.....	.....	140.0	137.80	18 May.
.....	.....	.....	135.7	.....	.....	.....	141.0	138.35	19 May.
.....	.....	.....	151.3	.....	.....	.....	156.3	153.80	3 June.
.....	.....	.....	158.3	.....	.....	.....	162.7	160.50	10 June.
.....	.....	.....	158.3	.....	.....	.....	164.8	161.55	11 June.
.....	.....	.....	162.3	.....	.....	.....	166.1	164.20	14 June.
.....	.....	.....	168.3	.....	.....	.....	172.2	170.25	20 June.
.....	.....	.....	145.18	.....	.....	.....	149.87	147.62	28 May.

INVERNESS COUNTY 1900.

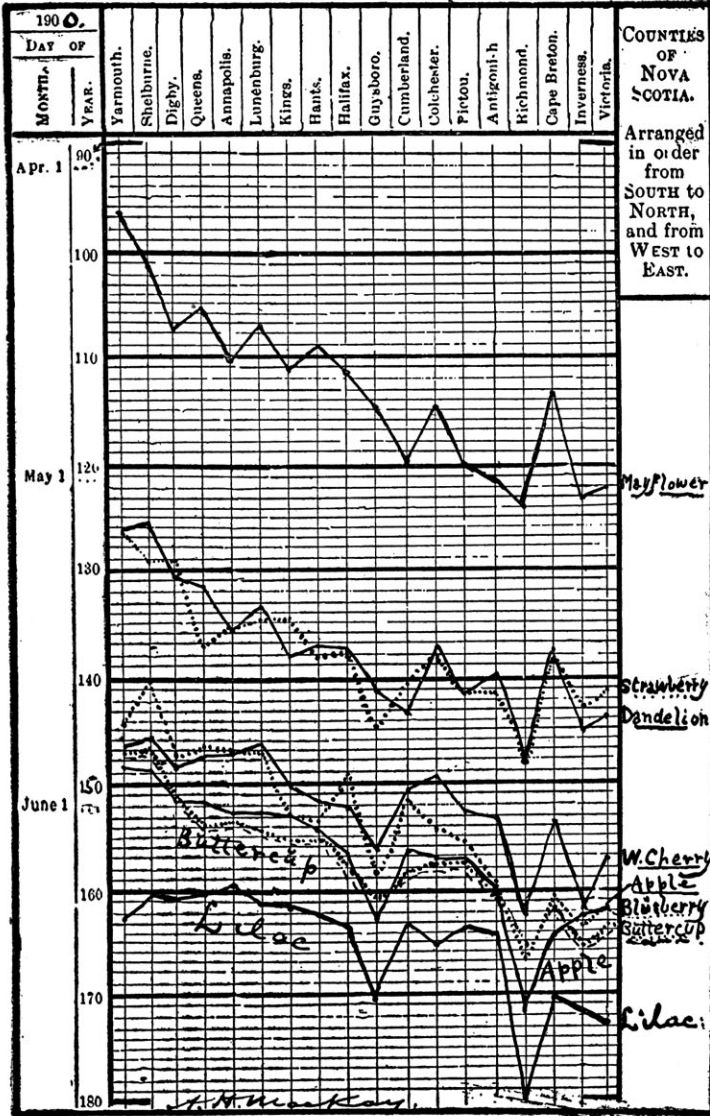
.....	.....	.....	117.8	.....	.....	.....	128.4	123.10	4 May.
.....	.....	.....	134.7	.....	.....	.....	142.1	138.40	19 May.
.....	.....	.....	145.0	.....	.....	.....	153.2	149.10	30 May.
.....	.....	.....	141.6	.....	.....	.....	148.7	145.15	26 May.
.....	.....	.....	137.4	.....	.....	.....	148.4	142.90	23 May.
.....	.....	.....	158.9	.....	.....	.....	164.6	161.75	11 June.
.....	.....	.....	159.6	.....	.....	.....	167.1	163.35	13 June.
.....	.....	.....	163.0	.....	.....	.....	168.1	165.55	15 June.
.....	.....	.....	159.7	.....	.....	.....	165.3	162.50	12 June.
.....	.....	.....	162.8	.....	.....	.....	170.3	166.55	16 June.
.....	.....	.....	148.05	.....	.....	.....	155.62	151.83	1 June.

VICTORIA COUNTY, 1900.

.....	.....	.....	119.5	.....	.....	.....	125.1	122.30	3 May.
.....	.....	.....	137.0	.....	.....	.....	142.1	139.55	20 May.
.....	.....	.....	139.3	.....	.....	.....	144.4	141.85	22 May.
.....	.....	.....	140.9	.....	.....	.....	146.9	143.90	24 May.
.....	.....	.....	136.1	.....	.....	.....	146.5	141.30	22 May.
.....	.....	.....	154.4	.....	.....	.....	159.9	157.15	7 June.
.....	.....	.....	158.9	.....	.....	.....	164.6	161.75	11 June.
.....	.....	.....	161.1	.....	.....	.....	165.6	163.35	13 June.
.....	.....	.....	160.7	.....	.....	.....	162.9	161.80	11 June.
.....	.....	.....	170.5	.....	.....	.....	175.4	172.95	22 June.
.....	.....	.....	147.84	.....	.....	.....	153.34	150.59	31 May.

PHENOCHRON CURVES OF FLOWERING.

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



## 3.

## REMARKS ON THE NOVA SCOTIAN PHENOCHRONS.

The Nova Scotian phenochrons are based on observations made in from ten to thirty observation stations in each county, on the 100 phenomena briefly indicated on pages 386 to 391—preceding “Phenological Observations in Canada, 1900.”

The observations, as a rule, are carried on by the pupils of the public schools, who are in competition with each other as to who will be the first observer of each phenomenon each year. As these pupils often radiate as many as two miles from the school house each day, the observations “when first seen” are likely to be as early as the most favorable spot in each school section will allow. The second date recorded—“when becoming common”—is more a matter of judgment; but must practically be as near the date “when first seen” in the most unfavorable spots of each school section as can be determined.

The average differences between these two dates of flowering—“when first seen” and “when becoming common”—in each county of the Province for the ten plants selected for our study are as follows:

	Days.		Days.
Yarmouth .....	11.24	Guysboro .....	7.08
Shelburne .....	7.50	Cumberland ....	6.50
Digby .....	7.81	Colchester .....	6.56
Queens .....	8.06	Pictou .....	6.39
Annapolis .....	6.79	Antigonish . ....	7.21
Lunenburg . ....	6.74	Richmond .....	7.47
Kings .....	7.41	Cape Breton ...	4.69
Hants .....	6.28	Inverness. ....	7.57
Halifax .....	8.35	Victoria .....	5.50

The average difference between the two dates for the Province is 7.175 days—about one week and four hours.

Owing to the mild winter weather in Yarmouth, some plants flower very early in sunny spots; but the general flowering is so retarded as to be less in advance of the rest of the Province than the “first” flowering. On the average, it appears that flowering becomes common about one week after the first blossoms are seen.

ORDER OF FLOWERING (MEAN OF "WHEN FIRST SEEN" AND "WHEN BECOMING COMMON") IN THE PROVINCE AND IN EACH COUNTY.

Mean flowering phenochrons for whole Province of Nova Scotia.	Order of flowering in each County.																		
	Order of flowering for Nova Scotia.	Yarmouth.	Shelburne.	Digby.	Queens.	Annapolis.	Launenburg.	Kings.	Hants.	Halifax.	Guysboro.	Cumberland.	Colchester.	Pictou.	Antigonish.	Richmond.	Cape Breton.	Inverness.	Victoria.
113.01 Mayflower .....25 Apr.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
133.69 Red Maple .....14 May	2	4	4	3	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3
135.33 Blue Violet.....16 "	3	5	5	5	4	3	4	3	3	3	3	3	3	3	3	3	4	5	5
137.53 Dandelion.....18 "	4	2	3	4	3	5	3	5	4	5	4	5	4	4	4	5	3	4	2
137.86 Strawberry .....18 "	5	3	2	2	5	4	5	4	5	4	5	4	5	5	5	4	5	2	4
151.96 Wild Red Cherry.... 1 June	6	7	7	7	7	7	6	6	6	7	6	7	6	6	6	6	6	6	6
153.39 Blueberry ..... 3 "	7	6	6	6	6	6	7	7	7	6	7	6	7	7	7	9	7	8	7
156.93 Apple ..... 6 "	8	8	8	8	8	9	9	9	9	9	8	9	9	9	9	8	8	9	9
157.05 Buttercup..... 7 "	9	9	9	9	8	8	8	8	8	8	9	8	8	8	8	7	9	7	8
165.05 Lilac .....15 "	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10

We see from the above that the *order* of the *ten* plants in our schedule and the tables, is not the exact order of flowering in the Province as a whole. The Red Maple and Blue Violet change places, as do also the Apple and the Buttercup. And the *order* for the Province is not that for each county. In Yarmouth and Shelburne, the Dandelion (4) and Strawberry (5) come ahead of the Red Maple and the Violet. The Blueberry (7) in the five South Southwestern counties comes ahead of the Wild Cherry (6); while in the case of the Apple (8) and Buttercup (9) they are in normal order while in the following counties they are mostly reversed.

The plate (page 392) of curves of the "mean" flowering phenochrons for 1900 of eight plants (two, the Maple and Violet, omitted because they would crowd 4 and 5) throughout the eighteen counties of the Province, which represent the "general



phenochrons" given in the last two columns of the tables preceding, show to the eye the general trend as well as several peculiarities of the time of flowering.

The general trend is seen in the later flowering as the counties lie north and east. There is a general conformity in this trend between the eight plants which fall into four groups, the Mayflower averaging 113.01 (24th April), the Dandelion and Strawberry 137 + (18th May), the Wild Cherry, Blueberry, Buttercup and Apple 154 + (4th June), and the Lilac 165 + (15th June).

A general trend is also seen in passing from Guysboro in the east back to Cumberland in the west; although moving on the whole northward, the flowering becomes earlier. A similar change takes place in passing from Richmond to Cape Breton. This latter is more remarkable, for Cape Breton is not only north but also east of Richmond. This seems to suggest that the observers in Guysboro and particularly in Richmond, might not have been so keen in the search for the first flowering as those in Cumberland and Cape Breton. The small number of observers in these counties also suggests such a possibility. But by reference to the table, it will be seen, that as a rule, in counties where the observation stations are so numerous that ten could be selected from the coast, ten from the low inlands, and ten from the high inlands, the earliest flowering is on the low inlands, then on the coast, and latest on the highlands. It must be remembered, that there is a very great difference in the altitudes of what are called the low and high inlands in the different counties.

From such considerations, it is proposed in future to divide the Province into meteorological districts and sub-districts, instead of counties—the sub-districts being the coast belt, low inland belt and highland belt of each district; each district including a simple meteorological region or geographical slope.

Among the peculiarities shown by these curves are, for instance, the lateness of the Strawberry as compared with the

Dandelion in Shelburne, Queens and Guysboro; and its advanced appearance in Kings, Cumberland, Inverness and Victoria. Does the breath of the Atlantic retard the flowering of the Strawberry as compared with the Dandelion?

It also appears that the southern and sea surrounded Yarmouth is favorable to the early flowering of the Mayflower, but comparatively not so favorable to the Lilac. The manner in which the other curves intersect each other have also their explanations. But we are not yet in a position to be able to state them.

The stations of observations are, necessarily, not the same in each county each year. It is therefore possible that the phenochrons might be affected by a change in the relative number of coastal, inland and highland stations.

As all these observations are bound carefully into a large volume for each year, anyone having the time can use the facts recorded in any combination promising the most useful results. The present selection of ten plants, and the comparison of their flowering phenochrons in each county is merely a sort of preliminary or provisional testing of the possibilities and probable value of such observations—sufficient to interest the observers while they are developing accuracy—and a record of facts for future generalization.

In the second plate (page 397) there is a comparison of the "mean" flowering phenochrons of the Mayflower, Strawberry, Apple and Lilac, for the years 1898, 1899 and 1900.

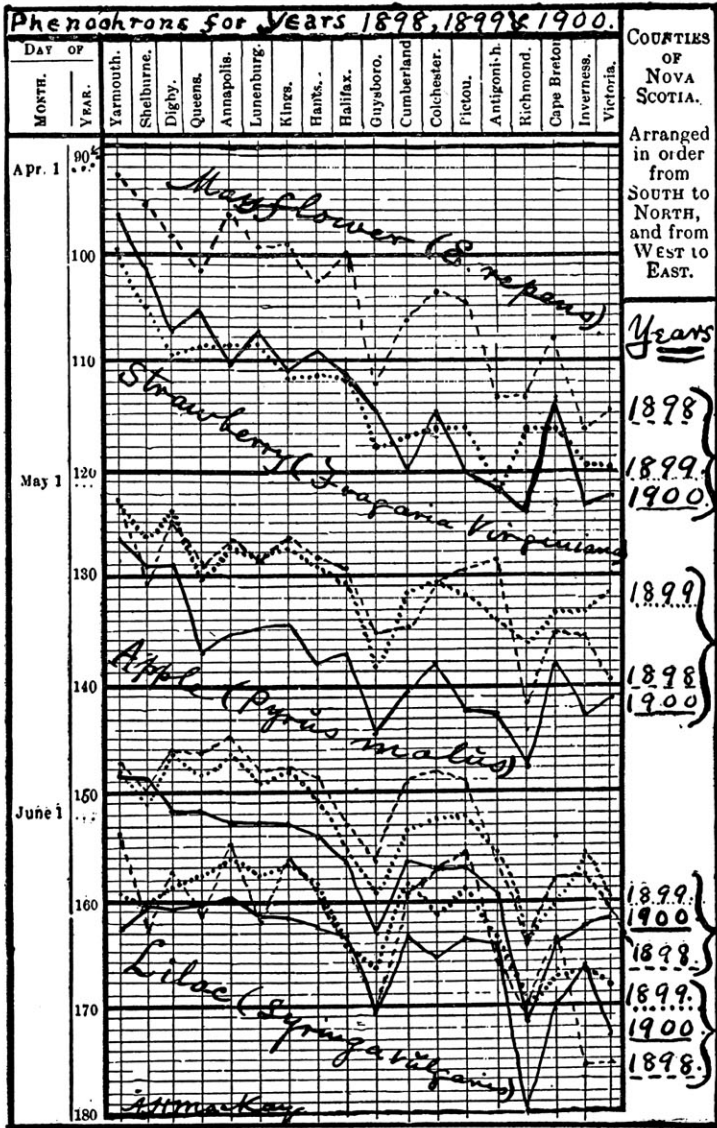
It indicates that the Spring of 1898 gave early promise, while those of 1899 and 1900 were later as measured by the Mayflower. The averages of these two years over the whole Province are nearly the same, the differences in the different counties being explicable as due to prevalent winds and degrees of sunshine.

As measured by the Strawberry, the first half of May 1900, was nearly a week more backward than in 1898 and 1899.

As measured by the Lilac, there was not much difference

PHENOCHRON CURVES OF FLOWERING.

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



between the three seasons in the state of vegetation during the first week or two of June.

But the continuous black line of 1900 is the lowest and latest for the Strawberry, Apple and Lilac; so that generally the month of May and the first week in June of this year was later from the "flowering" or estivation point of view.

It will be noticed on this table that the curves for the three years are to a great extent conformable, which demonstrates the important effect of the position of each county. The variations from conformability, are probably due to the differences in the winds and sunshine.

In the meantime we can make no mistake in recording and preserving as many accurate local phenological facts as possible. In a few years we shall be better able to estimate their value for many purposes.

In the future arrangements may be made for the publication of the observations of each year, as Dr. Ihne of Darmstadt is now doing for Europe. Our observations are more voluminous, however, and the cost of full publication would be great.