

IX.—PHENOLOGICAL OBSERVATIONS MADE AT SEVERAL STATIONS
IN CANADA DURING THE YEAR 1895. — COMPILED BY
A. H. MACKAY, LL. D., *Halifax.*

(*Read 11th May, 1896.*)

The phenological observations made under the auspices of the Botanical Club of Canada during the year 1895, are more extensive and more complete than those made during the previous three years. Among the observers there are some who have made (as will be seen in the following tables) valuable zoological and meteorological observations as well as the botanical ones. It was distinctly stated in the directions given observers, that sports out of season or due to narrowly local conditions of shelter, &c., which would affect less area than a small field, should not be recorded except parenthetically. As far as possible the observations recorded were the appearances of the *first* which was immediately followed by the *many* of the same kind. When phenomena are not very common in any specified locality, it can be readily understood that the first arrival may not be seen for some days after. This is a source of error which cannot well be guarded against; as is also the impossibility of an observer's sometimes being able to make his complete tour of observation every day. Whatever defects may characterise any of these observations, I have reason to believe that on the whole they are becoming more accurate from year to year. It is to be regretted that there are still very many blanks at many stations; but a blank is infinitely better than a wrong figure. With reference to thunderstorms, it will be seen that many observers were not mindful of noting even those which occurred during hours when, not being asleep, they must have noticed them. However, as in the other cases, we must be content with such facts as have been recorded, remembering that there is no pretence to say that all have been recorded.

In connection with every school there should be such records kept and pasted into the Register for each year, or kept in a

special book,—all the pupils in the school, under the direction of the teacher, being utilized to their amusement and edification in observing throughout the whole school section each day when going to and returning from school. From such complete, well-checked and numerous observations, most valuable inductions might be made in the near future.

STATIONS AND OBSERVERS.

NOVA SCOTIA.

- Yarmouth*.—Miss Antoinette Forbes, B. A.
 " Miss Beth Lovitt.
Berwick.—Miss Ida Parker.
Halifax.—Mr. Harry Piers, Stanyan.
 " Mr. Johnstone MacKay, 32 Morris Street.
Musquodoboit Harbor.—Rev. James Rosborough.
Port Hawkesbury.—Mrs. Louise Paint Forsyth.
Pictou.—Mr. Charles B. Robinson, B. A., Academy.
Wallace.—Miss Mary E. Charman.
Amherst.—Grades VIII. and IX., Public Schools.

PRINCE EDWARD ISLAND.

- Charlottetown*.—Mr. John MacSwain, Prin. Public Schools.

NEW BRUNSWICK.

- Grand Harbor*.—Mr. Henry F. Perkins, Grand Manaan.
St. Stephen.—Mr. J. Vroom.
St. John.—Students, Victoria High School.
Hammond River.—Miss Edith Darling.
Kingston.—Miss Mary F. McLean.
Richibucto.—Miss Isabella J. Caie.

ONTARIO.

- Niagara Falls Park*.—Mr. Roderick Cameron.
Ottawa.—Mr. James Fletcher, F. R. S. C.
Muskoka.—Miss Alice Hollingworth, Beatrice P. O.

MANITOBA.

Winnipeg.—Rev. W. B. Burman, B. D.

" Mr. E. A. Garratt.

ASSINIBOIA.

Pheasant Forks.—Mr. Thomas R. Donnelly.

ALBERTA.

Olds.—Mr. T. N. Willing.

BRITISH COLUMBIA.

Vancouver.—Mr. J. K. Henry, B. A., High School.

FULL LIST OF PHENOMENA ASKED TO BE OBSERVED.

BOTANICAL.

[E. C. & W. mean Eastern, Centre and Western Canada, respectively.]

1. ALDER (*Alnus incana*). Catkins shedding pollen.
2. ASPEN (*Populus tremuloides*). Catkins shedding pollen.
3. " " " Leafing out.
4. Spring Anemone (*A. patens*, var. *Nuttalliana*). Flowering.
5. Red Maple (*Acer rubrum*). Flowering. (E.)
6. Hepatica (*Hepatica*, & *H. triloba-acutiloba*). Flowering.
7. Adder's-tongue Lily (*Erythronium Americanum*). Flow'g.
8. Mayflower (*Epigaea repens*). Flowering. (E.)
9. DANDELION (*Taraxacum officinale*). Flowering.
10. Salmon-berry (*Rubus spectabilis*). Flowering. (W.)
11. " " " Ripe fruit. (W.)
12. Ash-leaved Maple (*Acer Negundo*). Flowering. (C. & W.)
13. STRAWBERRY (WILD.) (*Fragaria Virginiana* & *Chilensis*). Fl.
14. " " " " Ripe fruit.
15. Wild Plum (*Prunus Americana*). Flowering. (E.)
16. CHERRY (CULTIVATED). Flowering.
17. " " " Ripe Fruit.
18. WILD RED CHERRY (*Prunus Penn. & emarg.*) Flowering.
19. INDIAN PEAR, JUNE-BERRY, (*Amelanchier*). Flowering.
20. " " (*Amelanchier*). Ripe fruit.
21. BLACKBERRY (*Rubus occidentalis* & *leucodermis*). Flow'g.

22. APPLE (CULTIVATED.) Flowering.
23. Western Dog-wood (*Cornus Nuttallii*). True flowers open.
24. OAKS (RED, BLACK or WHITE). Flowering.
25. HAWTHORN (*Crataegus*). Flowering.
26. LILAC (CULTIVATED) (*Syringa vulgaris*). Flowering.
27. RASPBERRY (WILD). First ripe fruit.
28. WHEAT (WINTER). First sowing.
29. " " Flowering.
30. " " Harvest.
31. " (SPRING). First sowing.
32. " " Flowering.
33. " " Harvest.

METEOROLOGICAL.

34. LAST SPRING FROST, date with note explaining particulars.
35. FIRST AUTUMN FROST, " " "
36. OPENING OF LAKES Devoid of Current in SPRING, date.
37. CLOSING " " " FALL, "
38. OPENING OF RIVERS IN SPRING, date.
39. CLOSING OF RIVERS IN FALL, date.
40. NUMBER OF THUNDER STORMS IN YEAR, (with dates of each).
 Jan.....Feb.....March.....Apr.....
 May.....June.....July.....
Aug.....Sept.....
Oct.....Nov.....Dec.....
41. DATES AND DURATIONS OF DROUGHTS AFFECTING VEGETATION.

ZOOLOGICAL.

42. Song Sparrow (*Melospiza fasciata*). First appearance.
43. Sparrow (*M. montana, guttata, and rufina*). First app.
44. Robin (*Merula migratorius*). (E. & C.)
45. " (*M. propinqua*). (W.)
46. Blue Bird (*Sialia sialis*). (E. & C.)
47. " (*S. arctica and Mexicana*). (C. & W.)
48. Junco, slate colored snow-bird (*J. hiemalis*). (E. & C.)
49. " (*J. annectens and Oregonus*). (W.)
50. RED-WINGED BLACKBIRD (*Agelaius Phoeniceus*).

51. SPOTTED SANDPIPER (*Actitis macularia*).
52. SWALLOW (*Tachycineta bicolor*).
53. Meadowlark (*Sturnella magna*). (E.)
54. KINGFISHER (*Ceryle Alcyon*).
55. Hummingbird (*Trochilus colubris*). (E. & C.)
56. " (*T. rufus and Calliope*). (W.)
57. Nighthawk (*Chordeiles Virginianus*). (E. & C.)
58. " (*C. Henryi*). (W.)
59. WILD DUCKS, First birds.
60. " First flock.
61. " Flocks migrating south.
62. " Last birds.
63. WILD GEESE, First birds.
64. " First flocks.
65. " Flocks migrating southward.
66. " Last birds.
67. First date at which "Frogs" are heard whistling.

TABLE A.—Continued.

PHENOLOGICAL OBSERVATIONS, CANADA, YEAR 1895.

Number.	Charlottetown.	Grand Harbor.	St. Stephens.	St. John.	Hammond River.	Kingston.	Richibucto.	Average, New Brunswick.	Niagara Falls.	Ottawa.	Muskoka.	Average, Ontario.	Winnipeg, B.	Winnipeg, G.	Pheasant Forks.	Olds, Alberta.	Average, Central Provinces.	Vancouver.
1	124	108	103	110	...	...	...	107.0	107	105	111	107.7	...	...	...	...	...	61
2	123	...	...	...	...	...	...	...	...	102	114	108.0	114	105	...	111	110.0	...
3	...	...	124	...	...	...	124	124.0	...	...	...	...	130	121	...	122	124.3	...
4	...	...	...	131	...	...	...	131.0	121	...	...	...	100	102	105	97	101.0	...
5	...	130	118	119	...	...	126	123.2	111	109	126	115.3	...	...	...	...	...	...
6	...	...	...	124	...	...	...	124.0	109	...	128	118.5	...	...	...	...	...	...
7	...	...	...	124	120	...	...	122.0	111	...	114	112.5	...	...	...	...	...	...
8	125	...	...	118	...	122	112	117.3	...	...	...	...	...	...	...	...	...	...
9	139	126	127	...	130	139	132	131.0	111	...	126	118.5	123	123	...	143	129.7	99
10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	82
11	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	154
12	...	...	...	...	...	...	...	...	127	119	...	123.0	112	105	...	...	108.5	...
13	139	124	128	124	117	142	126	126.8	...	...	126	126.0	128	130	...	136	131.3	110
14	...	163	157	171	...	...	166	164.2	...	...	165	165.0	158	166	...	172	165.3	159
15	...	...	...	...	...	...	...	...	139	...	135	137.0	...	...	...	...	...	...
16	...	...	135	...	...	...	143	139.0	124	...	...	124	...	...	...	...	...	112
17	...	...	...	...	...	...	188	188.0	...	...	...	...	...	...	...	...	...	174
18	145	...	...	138	...	141	...	139.5	...	130	126	128.0	128	...	...	...	128.0	124
19	...	136	130	131	134	...	133	132.8	126	129	126	127.5	130	125	...	137	130.7	...
20	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	207	207.0	...
21	...	...	...	...	...	...	...	...	...	...	160	160.0	...	...	...	...	...	...
22	...	155	135	...	...	145	145	145.0	129	...	...	129.0	...	128	...	...	128.0	...
23	...	...	...	...	...	...	...	...	...	...	126	126.0	...	145	...	...	145.0	123
24	...	...	...	...	...	...	134	134.0	...	...	...	...	...	127	...	...	127.0	...
25	158	...	...	...	...	149	158	149.5	...	...	139	139.0	140	135	...	...	137.5	146
26	...	...	...	...	...	150	150	150.0	139	136	...	137.5	140	132	...	...	136.0	125
27	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
31	123	...	...	...	...	128	128	128.0	...	...	...	...	94	95	96	94	94.7	...
33	...	...	...	...	...	...	239	239	...	...	...	...	...	...	234	...	234.0	...

TABLE B.
PHENOLOGICAL OBSERVATIONS, CANADA, YEAR 1895.

Number.	Last day of Jan., 31 of year. " " Feb., 59 " " " Mar. 90 " " " Apl., 120 " " " May, 151 " " " June, 181 " " " July, 212 " " " Aug., 243 " " " Sept., 273 " " " Oct., 304 " " " Nov., 334 "	Yarmouth, F.	Yarmouth, L.	Berwick.	Halifax, P.	Halifax, M.	Musquodoboit Harbor.	Port Hawkesbury.	Pictou.	Wallace.	Amherst.
		METEOROLOGICAL.									
34	Spring frost, last	.....	.....	.....	.....	.....	.....	.....	.....	.....
35	Autumn " first	.....	.....	259	284	.....	.....	294	276	283
36	Lakes open	.....	.....	.....	110	.....	.....	110	.....	110
37	Lakes close	.....	.....	.....	.....	.....	.....	.....	.....	347
38	Rivers open	.....	.....	.....	.....	.....	.....	110	.....	.....
39	Rivers close	.....	.....	.....	.....	.....	.....	.....	.....	103
		{ Jan. . . . .	.....	.....	.....	.....	.....	22	.....	.....
		{ April ..	115	115	115	115	.....	110	.....	.....
		{ May . . .	150	.....	.....	.....	138	130	130	130
		{ June. . .	.....	.....	.....	.....	179	.....	.....	.....
40	Thunderstorms	{ July . . .	207	.....	188	.....	.....	.....	.....	.....
		{ July . . .	.....	.....	197	.....	196	.....	.....	.....
		{ July . . .	.....	.....	207	.....	.....	.....	.....	206
		{ Aug . . .	.....	.....	216	.....	.....	.....	226	.....
		{ Aug . . .	230	230	230	.....	.....	.....	232	.....
		{ Aug . . .	.....	.....	236	.....	.....	.....	233	233
		{ Sept . . .	254	268	269	.....	273	.....	.....	269
		{ Sept . . .	269	.....	.....	.....	.....	.....	.....	.....
		{ Oct .. .	.....	.....	301	.....	278	298	298	298
		{ Nov.. .	308	.....	.....	.....	.....	.....	.....	.....
		{ Dec. . .	336	.....	.....	.....	.....	.....	.....	.....
41	Droughts	{ .. . . .	.....	.....	.....	.....	152	.....	.....	157
		{ .. . . .	.....	.....	.....	.....	177	.....	.....	170
		{ .. . . .	.....	.....	.....	.....	182	.....	.....	182
		{ .. . . .	.....	.....	.....	.....	197	.....	.....	197

TABLE C.

PHENOLOGICAL OBSERVATIONS, CANADA, YEAR 1895.

Number.	Last day of Jan., " " Feb., " " Mar., " " Apl., " " May, " " June, " " July, " " Aug., " " Sept., " " Oct., " " Nov.,	31 of year.		Yarmouth, F.	Yarmouth, I.	Berwick.	Halifax, P.	Halifax, M.	Musquodoboit Harbor.	Average, South Nova Scotia.	Port Hawkesbury.	Pictou.	Wallace.	Amherst.	Average, North Nova Scotia.
ZOOLOGICAL.															
42	Song Sparrow, arrived.					97	92	97		95.3	98				98.0
43	Mt " "														
44	Robin, " "					94	94	97		95.0	95	105		111	103.6
45	Western Robin, " "														
46	Blue Bird, " "														
47	Western B. Bird, " "														
48	Junco, " "					102	100			101.0					
49	Western Junco, " "														
50	Red-Winged B. B. " "														
51	Sandpiper, " "					122	149			135.5					
52	Swallow, " "					127	112			119.5			132		132.0
53	Meadowlark, " "														
54	Kingfisher, " "					128	127			127.5					
55	Hummingbird, " "					137	144			140.5	140	124		138	134.0
56	Western H. B., " "														
57	Night Hawk, " "					147	153			150.0	182			110	146.0
58	Western N. H., " "														
59	Wild Duck, 1st B.													76	76.0
60	" 1st Fl.					84	56			70.0				111	111.0
61	" Fl. S.														
62	" B. S.														
63	Wild Geese, 1st B.														
64	" 1st Fl.						71			71.0				85	85.0
65	" Fl. S.													305	305.0
66	" B. S.													334	334.0
67	Frogs Whistle					109	110	113		110.6	111		110		110.5

TABLE C.—Continued.

PHENOLOGICAL OBSERVATIONS, CANADA, YEAR 1895.

Number.	Charlottetown.	Grand Harbor.	St. Stephens.	St. John.	Hammond River.	Kingston.	Richibucto.	Average, New Brunswick.	Niagara Falls.	Ottawa.	Muskoka.	Average, Ontario.	Winnipeg, B.	Winnipeg, G.	Pheasant Forks.	Olds, Alberta.	Average, Central Provinces.	Vancouver.
42	97	82	..	..	..	..	..	82.0	83	..	..	83.0	..	..	..	..	..	..
43	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
44	103	81	98	..	..	108	98	96.2	91	..	93	92.0	..	..	..	91	91.0	..
45	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
46	..	..	..	..	..	..	..	..	97	..	..	97.0	..	..	100	91	99.2	..
47	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	92	92.0	..
48	103	W	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
49	..	..	..	..	..	..	..	..	..	..	..	..	94	..	..	..	94.0	..
50	..	..	..	..	..	..	..	..	106	..	..	106.0	102	..	95	..	97.5	..
51	145	..	..	..	..	..	..	..	123	..	..	123.0	..	..	..	..	..	..
52	132	108	..	..	..	..	112	110.0	..	..	..	..	123	123	..	..	123.0	..
53	..	..	..	..	..	..	..	..	111	..	..	111.0	101	..	94	..	97.5	..
54	..	..	..	..	..	..	116	116.0	91	..	..	91.0	..	..	..	..	..	..
55	..	..	..	..	..	..	138	138.0	128	..	..	128.0	..	..	..	..	..	..
56	..	..	..	..	..	..	..	..	..	..	..	..	..	..	221	..	..	..
57	203	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
58	..	..	..	..	..	..	..	..	..	..	..	..	..	127	146	..	136.5	..
59	..	W	..	..	..	..	..	..	83	..	..	83.0	89	..	88	86	87.7	..
60	110	..	..	..	..	..	..	..	83	..	..	83.0	95	..	92	..	93.5	..
61	..	..	..	..	..	277	..	277.0	..	..	..	..	..	..	..	..	..	..
62	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	323	323.0	..
63	76	..	..	..	..	98	..	98.0	83	..	..	83.0	79	..	79	..	79.0	..
64	85	85	96	..	..	103	..	94.6	83	..	..	83.0	91	127	90	90	99.5	..
65	260	..	..	..	..	..	..	..	..	..	..	..	230	..	..	314	297.0	..
66	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
67	113	..	..	..	..	117	123	120.0	102	..	111	106.5	95	90	98	..	94.3	53

"W" above = winters.

It will be noticed that the averages of some phenomena in northern Nova Scotia appear to be more advanced than in the southern stations this year. Last year it was noticed that, taking ten common plants, the average season in the south was over eight days earlier than in the north. Whether this announcement stimulated the northern observers to be more constantly watchful than usual in the interests of their climate, or whether it is to be accounted for otherwise, there need not be the slightest suspicion that any of the observers, who are well known to me, put a single figure down in the "interest of any particular climate." They may have made a greater effort to get at the exact facts, which would tend to bring phenomena more promptly to their notice.

The following table shows another manner of treating these statistics, in order to draw general inferences, which were the figures exactly true and the stations fairly arranged, must be correct :

Average Date of Flowering of TEN Common Plants, at the Stations in Nova Scotia, in 1892, 1893, 1894, and 1895.

NAME.	1892.	1893.	1894.	1895. } Average of these years.	
<i>Early Spring Flowers.</i>					
Mayflower.....	98	108	104.7	108.5	104.8
Aspen.....	131	123	122.2	117.5	123.4
Red Maple.....	123	130	126.3	123.9	125.8
Strawberry.....	129	133	131.6	123.5	130.5
<i>Late Spring Flowers.</i>					
Cherry (Cult).....	146	142	146.3	136.6	142.7
Indian Pear.....	145	144	146.0	138.3	143.3
Cherry (Wild).....	150	144	147.0	138.1	144.8
Apple.....	146	146	152.1	143.7	146.9
Hawthorn.....	163	160	160.3	154.0	159.3
Lilac.....	163	160	162.3	153.5	159.7
Average date of the <i>ten</i> plants.....	139.4	139.0	139.9	134.3	138.1
Days, season in advance (+), or behind (-) on the aver- age, taking the <i>ten</i> plants.	1 - .3	- 0.9	- 1.8	+ 3.8	

Taking these ten plants whose times of flowering range from April to June, it will be seen that the spring season of 1895 was, in Nova Scotia, nearly *four* (3.8) days in advance of the average for the four years, while that of 1894 was nearly *two* (1.8) days behind. But, dividing the spring season into two divisions, before and after the middle of May, the first *four* plants belong to early spring and the last *six* to late spring. The average dates of blooming, and the differences from the average of the four years, are shown in the following table :

	1892.	1893.	1894.	1895.	Aver- age.
First <i>four</i> plants above .. { (Early Spring Fl.)	120.2 +0.9	123.5 -2.4	121.2 -0.1	119.6 +1.5	121.1
Last <i>six</i> plants above { (Late Spring Fl.)	152.2 -2.7	149.3 +0.2	152.3 -2.8	144.0 +5.5	149.5

This means, that the early spring of 1892 was nearly a day, (0.9), in advance of the average, but the late spring was retarded nearly three (2.7) days. Was the latter part of May in 1892, colder than the average? And so forth with the other items.