FEBRUARY, 1915

VOL. XXVIII, No. 11

# THE OTTAWA NATURALIST

Published by The Ottawa Field-Naturalists' Club



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THE ROLLA L. CRAIN CO., LIMITED

ISSUED FEB 27, 1915

*Entered at Ottawa Post Office as second class matter*

# THE OTTAWA NATURALIST

VOL. XXVIII. FEBRUARY, 1915. No. 11.

## HYBRIDIZATION IN THE GENUS VIOLA.

By M. O. Malte and J. M. Macoun.

Certain sections of the genus *Viola*, as is well known, are characterized by that wonderful biological peculiarity, generally termed cleistogamy. The showy flowers of our spring violets generally live but a short time. Although being sexually perfect, i.e., having stamens and pistils normally developed, they generally wither down without producing any seed and the propagation of the individuals and the maintenance of the species are secured through the cleistogamous flowers. These generally appear comparatively late in the season and reach their fullest development after the showy spring flowers have disappeared. As a rule, the cleistogamous flowers are without petals or have them incompletely developed, for which reason they are often in descriptive botany, termed apetalous. The whole flower has the appearance of a half-grown bud arrested in its development. It is often inconspicuous to the eye because of its lack of attractive colours, or even wholly invisible to the casual observer because not rarely it reaches its full development hidden among the decomposed or half-decomposed remnants of plants which cover the ground, or it even flourishes beneath the surface of the soil.

These cleistogamous flowers, however, play the most important part in the life history of the individual as well as of the species. In spite of their seeming incompleteness, they produce, without being aided by outer agencies, all the seed needed for the maintenance of the species. Their pistils are automatically fertilized by the pollen shed from their stamens, the result being the production of an abundance of seed.

This mode of seed production, so different from the ordinary way, did not fail to attract the attention of botanists at least as far back as the 18th century. It was thought to be strange and inexplicable in times when sexuality in plants was still disputed and when the importance of sexual organs as foundations for a scientific plant system was first being discussed.

Linnaeus, in his *Species Plantarum*, described dozens of violets, giving their characters from the shape of the leaves and their general appearance. In only one case, however, did he mention the flower and fruit, and this was done solely because of the extraordinary biological feature encountered in a species which he called *V. mirabilis*. This species, which is found from Southern Sweden to the Alps of Switzerland, was described as follows:— "Viola caule triquetro, foliis reniformi cordatis, floribus caulinis apetalis." To this description was added especially: "Viola floribus radicalibus corollatis abortienatibus, caulinis apetalis seminiferis."[1] The mere description of this violet, which is now known as *V. mirabilis* L. indicates that Linnaeus considered it one of the wonders of the plant kingdom just because of its peculiar mode of fructification. Its showy spring flowers, proving themselves perfectly useless for the propagation of the species, contrasted singularly with the inconspicuous and seemingly imperfect flowers, which were developed later in the season from special shoots. But these inconspicuous flowers, although in their general aspect not betraying their importance, proved themselves capable of safeguarding the existence of the species. Small wonder that the name *V. mirabilis*—The Wonderful Violet—was given to this species.

In North America little attention seems to have been paid to the morphology and the biological and systematical importance of cleistogamy in violets by the early botanists. Its general occurrence in acaulescent violets, as far as the authors have been able to ascertain, was first accentuated by Dr. Edward L. Greene, whose observations dating from 1896, shed much greatly needed light on the morphology and biological relationships of North American violets. In the year 1896 Dr. Greene stated (according to extracts from *Cybele Columbiana* Vol. I, No. 1, 1914, p. 7) that "the very most common of our so called acaulescent violets, continued long after their short season of showy vernal flowering to put forth apetalous flowers from which are produced all or nearly all the seeds by which individuals are multiplied and the species perpetuated."

As the production of seed in the capsules of the apetalous flowers is the result of a process of self-fertilization and as furthermore the flowers in which this takes place, never open, it is evident that the seed developed in the cleistogamous flowers necessarily is perfectly pure, i.e., that it gives when sown a progeny of plants having the characters of the parent plants. In other words, through cleistogamy the pure lineage of the various species is infallibly upheld.

[1] Linnaeus, Sp. Plant. 2, 936. 1753.

Although much more conspicuous and pretentious in aspect the ordinary showy petaliferous flowers of our violets are of far less importance for the propagation of the individuals than are the cleistogamous ones. This is evident from the fact that only in few cases do they produce any seed. Their life generally ends with the withering of their petals, shortly after which all traces of the whole flower are gone. In most cases, there is no postfloral maturing of capsules because the ovules are incapable of developing into germinable seeds. The reason for this sterility is simply that, as a rule, the petaliferous flowers are not fertilized. They lack the ability of self-fertilization and are consequently dependent for their fertilization on outer agencies. Furthermore, special arrangements and morphological peculiarities of the sexual organs, the nature of which need not be described in this connection, tend to make self-fertilization extremely difficult, if not wholly impossible.

Under these circumstances it is evident that when seed is found developed in the capsule of a petaliferous violet flower, it must be regarded as the result of a cross-fertilization between two flowers. These two flowers may belong to the same individual, to two different individuals of the same species or to two individuals of distinct species. To which one of these three possibilities the development of seed in the capsules of petaliferous flowers is to be attributed in individual cases can only be determined by a study of the progeny raised from this seed.

That the capsules of petaliferous flowers in most species of our violets frequently produce germinable seed, is beyond doubt. Actual observation supporting this statement are, however, rather scant. Brainerd[2] states that though the infertility of the petaliferous flowers has often been observed, he has "during the past season (1903) found these capsules to be usually fertile." In the vicinity of Ottawa the same observations have been made on *V. Macounii* Greene and the writers believe they could be easily made on practically all species of acaulescent violets were these more closely observed.

That fertilization of petaliferous flowers really often takes place, is demonstrated beyond a doubt, by the frequent occurrence of hybrids between different species of violets. As the formation of hybrids through cross-fertilization of the cleistogamous flowers is wholly out of the question the mere fact of their occurrence must necessarily prove that fertilization of and seed formation from petaliferous flowers often occur.

[2]Rhodora, Vol. 6., p. 10.

In this paper the authors will endeavour to give a brief account of the general characteristics of violet hybrids and also a list of the hybrids recorded from the North American continent.

To the amateur botanist who has neither time nor inclination to study with earnest perseverance the multitude of violets occurring in our woods and meadows, the existence of intermediate forms between different species is at first apt to provoke confusion and discouragement. A closer study of those intermediate forms which at first may seem to blur the systematic boundaries between well defined extremes belonging evidently to different specific units will, however, instead of causing confusion, help most comprehensively to avoid it. In other words, the recognition of certain intermediate forms as casual hybrids will prove one of the most helpful means to the botanist endeavouring to arrive at a well founded understanding of the systematic value and relationship of our violets.

The hybrid nature of puzzling forms, apparently intermediate between two species, can be most easily determined.

The general appearance of hybrid plants, their vigorous vegetative development, their bright and abundant flowers and, generally speaking, their air of strength and splendour is often very characteristic. When odd plants displaying these marks are found in violet colonies composed of two or more species, they very often prove to be typical hybrids between well defined species.

The vegetative superiority of hybrids in plants is, however, a too well known feature to warrant a lengthy discussion. It is sufficient to say for the sake of illustration, that for instance hybrids in the genus Epilobium and in grasses are always characterized by their conspicuously vigorous vegetative organs. Not only do they display a most luxuriant growth as far as foliage and profusion of shoots are concerned, but their ability to survive and hold the ground is far more pronounced than that of any of their parents. Several observations have thus been recorded to the effect, that hybrids between species of Epilobium, originating in a ditch or any other area of limited extension, are able on account of the superior strength of their vegetative organs, after a few years, to take possession of every inch of the ground, killing every plant of the species from which they originated. Similar observations have been made on violet hybrids. In botanic gardens, where several species of violets are grown in close proximity, it has been recorded that species, after a few years, often have been killed and replaced by more vigorous hybrid plants.

The conspicuous vegetative development of certain wild violet forms, the systematic value of which may at first seem difficult to understand, may therefore often indicate, to the student of violets, their hybrid value. It must be understood, though, that however helpful be the general characteristics briefly hinted at above for the recognition of hybrids, the decision as to whether a suspected form be really a hybrid or not can be satisfactorily reached only through a minute study of its morphological and sexual characteristics. This means not only that a violet in order to be classified as a hybrid, should be intermediate between supposed species as far as vegetative characters are concerned, but also, and particularly, that the morphological and cytological development of its sexual organs should most strongly support its supposed hybrid nature. In doubtful cases, the functional capacity of the pollen and the ovula must really furnish the final decision on the question whether a certain individual should be regarded as a hybrid or not. Space will not permit that in this article European literature bearing upon the subject of hybridization as influencing the development of sexual organs in violets be quoted. This is also, in fact, unnecessary as numerous observations relating to the subject have been recorded in North America. This is especially true as far as the development of seeds in hybrid violets are concerned, in other words, as far as the development of, or rather the failure of development of the female organs is concerned.

Strangely, but as a matter of fact most naturally, contrasting with the luxuriant growth of the vegetative organs of a violet hybrid stands its more or less marked sexual impotence, i.e., its incapability, to a greater or less degree, of reproducing itself sexually. Generally a violet hybrid is markedly barren and although developing numerous capsules and ovules fails to produce an adequate number of germinable seeds.

A few quotations from one of the excellent papers of Dr. E. Brainerd[3] on the subject will suffice. Thus, describing the hybrid plants between *V. septentrionalis* and *V. fimbriatula* Dr. Brainerd says that "in the late summer they produce numerous cleistogamous flowers and fruit, but nine-tenths of the ovules remain unfertilized."[4] Observations on hybrid plants of the combination *V. cucullata* x *fimbriatula* also reveal the fact that specimens of the same in their cleistogamous flowers, develop capsules which either contain only a few ripened seeds or even become "brown and withered as though

[3] Rhodora, Vol. 6. pp. 213–223.

[4] l.c. 216.

entirely unfertilized."[5] The hybrid *V. fimbriatula* x *sororia*, according to Dr. Brainerd, is less sterile than most hybrids, but never was a capsule found that contained more than half the normal number of seeds.[6] Also in other hybrids, the characteristic sterility of the capsules is most typical. Thus, *V. cucullata* x *septentrionalis* was found to bear only from one to six seeds[7] and, in the hybrid *V. septentrionalis* x *sororia*, "the uniformly stunted and often distorted capsules containing mostly aborted ovules"[8] clearly betrayed its mongrel origin. In *V. affinis* x *sororia* the capsules of the cleistogamous flowers were found to be small and often one-sided and relatively infertile[9] and in *V. cucullata* x *sororia* although numerous, proved to be all small, imperfect and few seeded."[10]

The above quotation will suffice to substantiate what was stated without confirming evidence on a previous page, namely, that in a hybrid between two violet species, the faculty of producing the normal amount of germinable seed is most conspicuously reduced. To avoid misconception, it may be pointed out, especially, that the degeneration of the sexual organs mentioned above refers to the cleistogamous flowers, that is to say the flowers, which in specimens belonging to a "good" species normally produce an abundance of well developed seed. As the cleistogamous flowers are always self-fertilized this failure, in hybrid plants, to bear seed of normal reproductive vigour, cannot be explained by assuming that the pollen necessary for the fertilization of the ovules has not been available. It can be explained only by recognizing the fact that the mixing of and unnatural union of sexual units, belonging to distinct species, in the reproductive organs of the hybrids, is causing a disturbance of the functions of the sexual cells which manifests itself in partial or total sterility.

The inability of the cleistogamous flowers of hybrid plants to produce seed of normal vitality is thus very pronounced. This being the case, it is evident that when violet plants are found having sterile cleistogamous flowers they may be looked upon as possible hybrids. In fact, such plants in most cases are really hybrids. The sterility of the capsules of the cleistogamous flowers in violets is therefore a character which will prove most helpful for the identification of critical forms as hybrids.

[5] l.c. 217
[6] l.c. 218
[7] l.c. 220
[8] l.c. 221
[9] l.c. 222
[10] l.c. 222

(To be continued)

# FAUNA OTTAWAENSIS.*

## ORDER LEPIDOPTERA: FAMILY NOCTUIDÆ; SUBFAMILY PHYTOMETRINÆ.

BY ARTHUR GIBSON.

In a study of the species of moths of this subfamily occurring in Eastern Canada as classified by Hampson in Vol. XIII of the Catalogue of the Lepidoptera Phalaenæ in the British Museum (1914), I have been interested in listing the species which have been found in the Ottawa district. This list is presented herewith, together with some larval notes on certain species. These latter add to our knowledge of the early stages of these insects. Many of the moths in this subfamily were formerly classified under the generic name *Plusia* and more recently under the genus *Autographa*. The former generic name, however, has now gone into the synonomy, while only one species of the latter genus occurs in Canada, namely, *Autographa parilis*, which has been collected in British Columbia.

The letter "G" following the records indicates that the specimens were collected by me, the letter "F" by the late Dr. James Fletcher, and the letter "Y" by Mr. C. H. Young.

*Syngrapha falcifera* Kirby. 18, 30, 31 May, 1899; 1 June, 1900; 6 June, 1901; 7 June, 1899; 10 June, 1902; 12 June, 1901; 15 June, 1904; 16 Aug., 1900; 11 Sept., 1902; 25 Sept., 1899; 26 Sept., 1903; 1 October, 1900, (G).

In 1901, I secured eggs of this species from a living female and the larvæ were reared on common plantain. Some were mature and spun cocoons on June 27, and moths emerged on July 8, 10 and 12. During the same year I received a larva from Toronto which was found feeding on wild lupine, *Lupinus perennis* L. This specimen pupated on July 1, the moth emerging on the 18th idem.

*Syngrapha epigaea* Grt. 6 Aug., 1901, (Y); 22 Aug., 1904, (F); 27 Aug., 1902; 30 Aug., 1899, (G).

*Snygrapha selecta* Walk. 18, 22 Aug., 1900, (Y); 27, 28 Aug., 1902, (G).

*Syngrapha rectangula* Kirby. 30 July, 1902, (Y); 11 Aug. 1902, (G); 18 Aug., 1900, (G); 19 Aug., 1900, (Y).

*Syngrapha octoscripta* Grt. 26, 29 June, 1903, (Y); July, 1886, (F); 21 Aug., 1902, (G); 21 Aug., 1900, (Y); 23 Aug., 1902, (Y); 30 Aug., 1899, (G).

*Contribution from the Entomological Branch, Department of Agriculture, Ottawa.

*Eosphoropteryx thyatyroides* Gn. 2, 6, 19 Aug., 1905, (Y).

*Pseudeva purpurigera* Walk. 12, 19 July, 1902, (Y); 20 July, 1905, (G); 21 July, 1903, (Y); 28 July, 1904, (Y); 29 July, 1906, (Y).

*Phytometra brassicæ* Riley. 10 Aug., 1911, (G); 16 Aug., 1900, (G); 31 Aug., 1900, (Y); 3 Sept., 1900, (G); larva on cabbage 5 Sept., pupated 13 Sept., moth emerged in cellar 26 Sept., 1908, (F).

This is a common economic pest of cabbages in the United States, but fortunately it has not as yet appeared as a very destructive species in Canada. In 1907, the larvæ were found rather commonly in a large greenhouse in Toronto where lettuce was being grown. Specimens forwarded to me changed to pupæ on Jan. 27, the moths emerging at Ottawa on Feby. 23. In the Ottawa district I have occasionally found the larvæ on cabbage.

*Phytometra rubida* Ottol. 5 June, 1905; 13 June, 1906; 17 June, 1904, (Y).

*Phytometra putnami* Grt. 6, 12, 15 June, 1901, (G); 14, 21 June, 1899, (Y); 23 June, 1908, (G); 26 June, 1905, (F); 28 June, 1899, (G); 14 July, 1899, (G).

*Phytometra contexta* Grt. 1, 2, 5, 12 June, 1899, (G); 7, 12, 13 June, 1901, (G); 18 June, 1904, (G); 8 July, 1905, (F); 11 Aug., 1903, (Y); 12, 29 Aug., 1902, (G); 13 Aug., 1904, (G); 21 Aug., 1904, (Y); 25 Aug., 1899, (G); 23 Sept., 1911, (Beaulne).

In 1901 eggs were secured from a captive female. Oviposition took place June 14, and the larvæ hatched June 19, the egg stage being thus five days. The larvæ fed readily on Kentucky Blue Grass.

*Phytometra biloba* Steph. 29, 30 June, 1903, (Y); 2, 3 July, 1903, (G); 2 July, 31 Aug., (Y); 3 Sept., (G); 24 Sept., 1900, (F); 22 Oct., 1903, (G).

Mr. Young has found the larvæ at Ottawa on clover.

*Phytometra oo* Cram. 25 May, 1903, (G).

This specimen was named *rogationis* by Ottolengui. This however, is placed, by Hampson, as a synonym of *oo*.

*Phytometra precationis* Gn. 25, 30, 31 May, 1899, (G); 2, 7 June, 1899, (G); 5 June, 1894, (F); 10 June, 1902, (G); 18 June, 1904, (G); 25 July, 1900, (Y); 12 Aug., 1904, (G); 24, 26 Aug., 1899, (G); 30 Aug., 1900, (G); 10 Sept., 1908, (G); 15 Sept., 1899, (G); 24 Sept., 1900, (G).

Common around flowers in late May and June. Many specimens have been seen frequenting the flowers of *Cara-*

*gana* and other shrubs in the arboretum, Central Experimental Farm. In 1905, eggs were secured from a captured female. They were laid on July 1st and hatched on July 7th. The larvæ in Stage I were pale greenish, skin smooth and shiny, the segments rather deeply divided. Tubercles small, black, each bearing a blackish bristle. Head semi-translucent with a brownish tinge; mouth parts yellowish-brown; ocelli black. Thoracic feet concolorous with head; prolegs concolorous with body. Moulted 14 July. My note on Stage II reads: Length 6.5 mm., pale greenish cylindrical larvæ, with black tubercles, each with a rather long stiff black bristle—much the same as Stage I. Head paler than body. No further notes were taken owing to pressure of other work. The mature larva has been described fully by Chittenden.*

On July 8, 1901, specimens of the larvæ of this species were found at Ottawa feeding on common plantain, *Plantago major*. Pupation took place on July 12, and the moths appeared about a fortnight later. In 1912, I found a larva on cabbage, which changed to pupa on July 30, the moth emerging on Aug. 19. Mr. C. H. Young has found the larvæ feeding on grass and clover.

*Phytometra bimaculata* Steph. 30 July, 1906, (G); 23 July, 1904, (Y); 6 Aug., 1902, (Y); 11 Aug., 1901, (G).

*Phytometra mappa* G. & R. 26 June, 1904, (Y).

In addition to this specimen Mr. Young collected a female moth from which he secured eggs. The young larvæ were fed on dandelion and by autumn had grown to rather more than half an inch in length. They stopped feeding and acted as if they wanted to hibernate. They died, however, before winter.

*Phytometra ampla* Walk. 13 June 1899, (G); 19 June, 1901, (Y); 20, 29 June, 1903, (Y); 23 to 28 June, 1903, (Y); 23 June, 1908, (G); 7 July, 1903, (Y); 6, 9 Aug., 1901, (Y).

*Phytometra æreoides* Grt. 24, 30 June, 1904, (Y); 7 July, 1899, (G); 7 July, 1899, (Y); 7 July, 1902, (Y); 8 July, 1905, (F); 24 Aug., 1904, (Y).

On May 28, 1901, I found the larvæ fairly aeundant, on a hillside near the Rideau Canal, feeding on *Solidago canadensis*. The larvæ were nearly full grown and it was extremely difficult to see them on the food plant. They were nearly all collected by "beating." The following descrip-

*Bull. 33, U.S. Div. Ent., p. 71.

tion was taken: Length when mature 34 mm., cylindrical in shape, tapering towards the head, which is slightly smaller than segment 2. The whole of the body is pale green, the dorsal vessel a darker green. The dorsum is covered with short, whitish, crooked lines, which slope from about 1 mm. above the stigmatal band to a faint, whitish crooked line which borders the thin median skin through which the dorsal vessel is seen. Stigmatal band yellowish-white; spiracles whitish, ringed with black. All the feet concolorous with body. Head slightly paler than body, no markings; ocelli black; tips of mandibles blackened. The larvæ spun cocoons and pupated soon after collection, and the moths emerged on June 9 and 10.

A very brief description of this larva was published by Thaxter in 1876.*

*Phytometra ærea* Hbn. 18 July, 1899, (G); 18 July, 1899, (Y); 12, 19, 22 Aug., 1900, (Y); 16, 24, 30 Aug., 1900, (G); 15 Sept., 1899, (G); 1 Oct., 1902, (G).

A single larva of this species was found on mint at the Central Experimental Farm, on May 9, 1901, from which the following description was drawn: Length 31 mm. Head 2 mm. wide, rounded, slightly indented at vertex, lobes full; concolorous with body excepting antennæ, which are paler and slightly brownish at tips; mouth parts also slightly brownish; ocelli black; hairs on face slender. Body cylindrical, plump, tapering towards extremities, light green on dorsum, dark green on sides and venter, the whole body spotted with white dots. From centre of dorsum to spiracles are five stripes, all white with exception of spiracular stripe, which is yellow. Spiracles faintly orange, ringed with black. Tubercles normal, white, setae dark, tubercle IV in a line posterior to lower end of spiracle. Thoracic feet and prolegs concolorous with venter. On May 13 the larva began to spin its cocoon, and by the 16th had changed to pupa. The moth emerged on June 4. In 1899 a cocoon was found on a celery leaf, the moth emerging on Aug. 10.

*Phytometra balluca* Geyer. 7 July, 1899, (G); 7 July, 1903, (Y); 9, 14 July, 1900, (Y); 20 July, 1904, (G); 9 Aug., 1900, (G).

Mr. Young has found the larva on cabbage, from which he reared the moth on 13 Sept., 1906. Fletcher, in 1878, found the larva at Billings' Bridge feeding on Red

*Psyche, vol. 1, p. 188.

Raspberry, and in 1880 on mint. The pupa is a striking object, being of a cream colour beautifully marked with a wide, irregular, broken, black band on dorsum and a row of lateral black spots. In length it is about 20 mm.

*Palæoplusia venusta* Walk. 2 July, 1899, (Y); 24 Aug., 1900, (Y); 27 Aug., 1902, (G); 30 Aug., 1899, (G).

*Abrostola urentis* Gr. 19 Aug., 1900, (Y).

The moths have also been reared by Mr. Young from mature larvæ collected on 15 Aug., 1898, 15 Sept., 1899, and 8 June, 1905. The larvæ were found on nettle. I have recently had an opportunity of examining two inflated specimens. The caterpillar is a rather handsome one, being pale green in colour or pale brownish, with whitish V-shaped marks on dorsum, one on each abdominal segment, the sides of which inwardly are bordered with pale brown in the green specimens and darker brown in the pale brownish variety. On segments 5, 6 and 12, the lower portion of the V-shaped mark is filled with brown, an indistinct whitish dorsal stripe is present, and a wide white stigmatal band bordered above with brown. On either side of each abdominal segment is a wide oblique dark dash. Head pale green, reticulated with brown. Down the centre of each cheek is a darker band of brown and on either side a wide margin of the same colour. In the brownish larvæ the head is of a much darker brown, the reticulations being very distinct. The thoracic feet are pale brown, the prolegs being concolorous with the body. The posterior half of the anal feet are brown.

## RANDOM BOTANICAL NOTES FROM PORTNEUF COUNTY, QUE.

By BRO. M. VICTORIN, of the Christian Schools, Longueuil College, Que.

Botanically speaking, the Laurentian area of Quebec is very nearly untrodden ground. It has been the good fortune of the writer to spend a full week on the upper part of the River Ste. Anne, Portneuf Co., towards St. Raymond and the vicinity, and to observe some of its prominent floristic features.

As could be expected we find that the flora of the district, though not differing essentially from that of the Laurentian zone north of Montreal, exhibits, nevertheless, a somewhat more pronounced boreal aspect.

The whole valley is densely drifted with heavy sand and clay deposits, obliterating the underlying crystalline rocks.

Getting in the field at the end of July, we are at first impressed by the local abundance of *Habenaria clavellata* (Michx.) Spreng., an orchid very little known in this province. Evidently it is the leading *Habenaria*, thriving in every mossy corner. On the scanty sandy covering of the rocky slopes, it is interesting to note a peculiar grass, *Danthonia compressa* Aust., the range of which as given in Gray's Manual, "Maine to New York and southward" should be thus considerably extended.

Kneeling to drink from a drying spring we come by a tiny *Sparganium* which turns out to be *Sparganium acaule* (Beeby) Rydb., a critical species we will meet under various puzzling forms later in the season, in the Temiscouata region. The ponds swarm with *Sagittaria latifolia* Willd., and *Calla palustris* L., while *Carex trisperma* Dewey is a common sedge in sphagnum swamps. Characteristic enough of the open-ground flora are *Galium asprellum* Michx., *Comandra livida* Richards, *Veronica officinalis* L., and *Hieracium scabrum* Michx.

We notice with considerable displeasure very extensive patches, where the hirsute rosettes of *Hieracium Pilosella* L., check all other vegetation. We have elsewhere (1) drawn attention to this dangerous invader from the Maritime Provinces which spreads with alarming rapidity.

Going down the river to "Chute à Panet," where an important pulpmill dams the waters, we make a find of more than ordinary interest. *Aster linariifolius* L. was of doubtful record in Quebec, its supposed northern limit being latitude 45 degrees. It was therefore a surprise to see that beautiful blue-rayed Aster covering the exposed gneissic rocks in the river, just below the dam. But the plant, though belonging undoubtedly to *A. linariifolius* L., differed from the typical form in its less rigid leaves and shorter oblong-linear, mostly round-tipped, ascending leaves, and in having the oblong-linear obtuse bracts of the involucre more hebaceous. It then proves to be a well-pronounced geographic variety, which through the courtesy of Professor M. L. Fernald, of the Gray Herbarium, now stands thus: (2).

*Aster linariifolius* L., var. *Victorinii* Fernald (nov. var.) Humilis 1-1.6 dm. altus; foliis adscentidibus vel patentibus confertis viridibus oblongo-linearibus, longioribus 1.3-1.8 cm. longis 2-4 m.m. latis, apice rotundatis vel obtusis, Quebec:

(1) Naturaliste Canadien, XL : 86
(2) Rhodora, XVI : 192


Aster linariifolius L., var. Victorinii Fernald.

1. The plant—natural size
2. A leaf—x 4
3. Akene with pappus—x 4
4. Outer bract of the involucre—x 8
5. Inner bract of the involucre—x 8

On rocky banks of River Ste. Anne, St. Raymond, Portneuf Co., August, 1914, Bro. M. Victorin, No. 618. (Type in Gray Herbarium).

While travelling on the Canadian Pacific Railway between Montreal and Quebec, we noticed that a small blue-rayed Aster occupied an extensive tract of sandy ground between Trois-Rivières and Champlain. We are quite convinced it is *A. linariifolius* L., but whether it is the typical form or the variety *Victorinii*, or an intermediate between them, is yet to be determined.

Before leaving "Chute à Panet," *Gentiana linearis* Froel., a lover of the near-by moist thickets must be mentioned.

Some ten miles north of St. Raymond the country becomes thoroughly wild, and partly cultivated land gives way to fish and game territories, dotted with innumerable lakes.

If we go up the so-called main branch of the River Ste. Anne, we enter a most picturesque region, well-known to sportsmen under the self-explanatory name of *Pique-Mouche*. There begins the famous Tourili Club Territory. From the Club-House, a *Chemin de Portage* takes us to 1000 feet over a hill before we tramp to the grassy shores of the first of a magnificent series of lakes, Lake Ouastaouan. This small lake looks much as if artificially induced by the industry of beavers. It is quickly disappearing owing to the deposition of mud, and a vigorous growth of carices and water-lilies.

We were pleased to record here the presence of a much critical plant whose distribution is little known with us: *Nymphaea rubrodisca* (Morong) Greene, a probable hybrid between *N. Americana* (Prov.) Miller & Standley, and *N. microphylla* Pers. The numerous uprooted rhizomes indicate that the beavers of the Ouastaouan rely on this plant for food.

The shallow ends of the lake maintain a hydrophytic association of some interest: *Myriophyllum Farwellii* Morong, *Myriophyllum verticillatum* L., var. *pectinatum* Wallr., the loose submerged form of *Hippuris vulgaris* L., and *Utricularia macrorhiza* Le Conte.

Though very little attention was devoted to cryptogams, we noticed *Icmadophila ericetorum* (L.) Azahlbr., a crustose lichen expanding its thallus horizontally on tight dying sphagnum hummocks; *Dicranum longifolium* Ehrh., a frequent moss in the Laurentides grows in high situations.

Perhaps the most pleasant outing a nature lover can make in this part of the country is to take the "Little Saguenay" trip. You go up the Bras du Nord to a distance of about

fifteen miles, entering gradually into a canyon well deserving the name it bears: "Little Saguenay." The scope of these notes does not permit us to dwell on the most interesting remains of the glacial period to be observed there. Let it be sufficient to say that the glacier has passed through that narrow valley, has notched some of the peaks in odd fashion, and left numerous kames and moraines.

A relatively good *Chemin de Portage* begins on the right bank of the river, and ascends very quickly to a height of 1100 feet where Lake Hauteur sleeps on the edge of the cliff with a bald, notched and grim looking gneissic peak, sitting on its silent shores. A little vigorous paddling brings us to the opposite shore, where another *Chemin de Portage* starts. This, roughly laid on the rich humus carved by the royal hoof of the moose, winds for miles through the magnificent northern forest, until we reach another small sheet of water, Lake Epinette. Our aneroid now shows 1300 feet above the level of the river, and the herbaceous vegetation becomes more typically boreal, as it appears by the growth of *Luzula parviflora* (Ehrh.) Desv., nodding its dishevelled heads over cold springs, and especially *Galium Kantschaticum* Steller, an arctic-alpine species hitherto unknown from the Laurentian district. Very common is *Epipactis tessellata* (Lodd) A. A. Eaton, all along the *Chemin de Portage*.

Numerous mosses, lichens and hepatics thrive in these essentially mesophytic conditions. Sloping down damp rocks are thick cushions of *Sphagnum Girgensöhnii* Russ., and *Sphagnum quinquefarium* (Lindb.) Warnst., with stiffer groups of *Polytrichum Ohioense* R. & C. framing the reddish masses of *Scapania nemorosa* (L.) Dum., while the pallid *Trichocolea tomentella* (Ehrh.) Dum., creeps in magnificent attire.

In every fresh spot, *Mnium affine* Bland., *Plagiothecium Ruthei* Limpr., *Brachythecium rivulare* B. & S., *Drepanocladus uncinatus* (Hedw.) Warnst., are to be found.

The shallow margin of Lake Epinette is strewn with the black alga-like masses of the hydrophytic *Fontinalis Novae-Angliae* Sulliv. But much more interesting is the fact that the line brings from a bottom of fifteen feet a compound of *Drepanocladus capillifolius* Warnst., and a submerged form of *Sphagnum subsecundum* Nees., which, according to Dr. A. Leroy Andrews, has been made a Warnstorfian species, namely *Sphagnum obesum* Wils.

To close these notes we will only mention a visit to Lake Sept-Iles, which gave us *Glyceria Torreyana* (Spreng.) Hitch., with the usual *Eriocaulon septangulare* With., and *Lobelia Dort-*

*manna* L. Moreover in a corner of that lake which has developed into a peculiar type of peat bog, and has received the name of "Lac des Bouleaux," we find, extremely abundant, *Nymphaea rubrodisca* (Morong) Greene, already mentioned from Lake Ouastaouan. We are, therefore, led to the conclusion that this hybrid water-lilly is very common with us, and generally overlooked. We are satisfied also that, fragmentary as they are, these observations lead to extend considerably northward the range of such interesting species as *Aster linariifolius* L., *Galium Kamtschaticum* Steller, *Danthonia compressa* Aust., etc.

## BIRD NOTE.

The present winter, thus far, has been a comparatively mild and open one, the recent thaw having laid bare the hillsides and reduced the lower levels to small ponds. I covered eight miles to-day cross-country on Isle Jesus without the use of snowshoes.

In a farming district, where decayed vegetation and other refuse was lying about, I observed a flock of 25 crows, the birds passing and chasing one another as they moved in a southerly direction. The familiar caws reminded one of days in March when migration is at its highest. Crows seldom remain with us during the winter and whether their presence now indicates a continuance of mild weather and an early spring, remains to be seen.

WESTMOUNT, QUE.
January 17th, 1915. W. J. BROWN.

## ERRATA.

In the account of the meeting of the Botanical Branch, held on Nov. 14, 1914, published in the December issue of this volume two slight errors occurred which should be corrected.

On page 118, it is stated that "Dr. Malte dealt more particularly with forage roots such as mangels, turnips and sugar beets. He pointed out that the original wild form of such root crops consisted of a creeping form found on the sand of the coatal regions of Europe." The wild plant referred to, is *Beta maritima*, from which our cultivated mangels and sugar beets have been developed. This plant has, of course, nothing whatever to do with the turnip varieties which have been developed from species of *Brassica*.

On page 119, it is further stated that, in the district of Yarmouth, N.S., "eleven hundred pounds of seed per acre is about the average for mangels." This statement should not refer to mangels, but to turnips.

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