DECEMBER, 1908

VOL. XXII, No. 9

THE OTTAWA NATURALIST

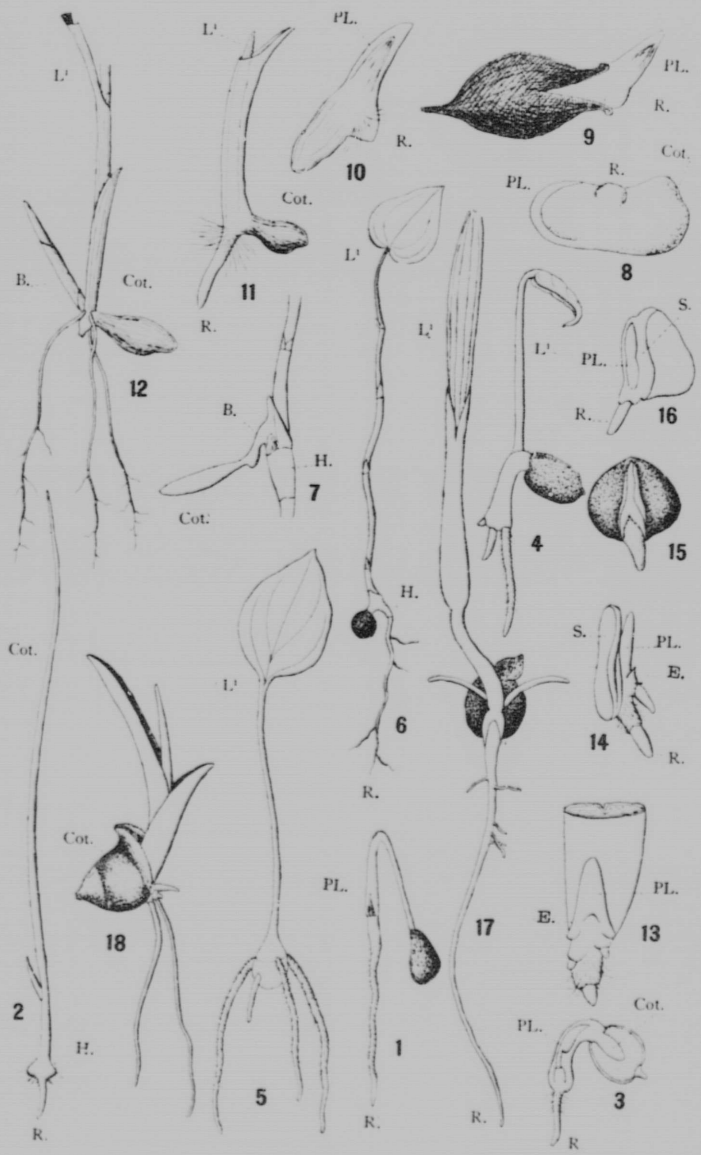
Published by The Ottawa Field-Naturalists' Club.

CONTENTS.

ISSUED DECEMBER 8, 1908.

OTTAWA, CANADA:
THE ROLLA L. CRAIN CO. LIMITED
WELLINGTON ST.

Entered at the Ottawa Post Office as second class matter.



SEEDLINGS OF PHENOGAMOUS PLANTS.

THE OTTAWA NATURALIST

VOL. XXII. OTTAWA, DECEMBER, 1908 No. 9.

OBSERVATIONS ON SEEDLINGS OF NORTH AMERICAN PHÆNOGAMOUS PLANTS.

By THEO. HOLM, Brookland, D.C.

(With three plates, drawn from nature by the author.)

There was a time when botanists were deeply interested in the study of seedlings and the subsequent development of the plant-individual from a morphological point of view. This was during the first half of the nineteenth century when Bernhardi, De Candolle, Mirbel, Richard, Tittmann and some others published their fundamental works on the germination, soon followed by Buchenau, Caspary, Irmisch, Warming, and Winkler, while Klebs and Sachs, but several years later, extended these morphological researches to the equally important and very interesting physiological. However, the literature on this subject may be followed still further back, and Malpighi was actually the first author who contributed to the knowledge of the germination of phænogamous plants; this may be seen from his works: Anatome plantarum (1675), Opera omnia (1687), and Opera posthuma (1697). To Ray we are indebted for dividing the plants into *Monocotyledones* and *Dicotyledones*, names invented by him, and described in his Methodus plantarum (1703). But, as stated above, it was not until the beginning of the nineteenth century that the study of seedlings became undertaken more generally and by some of the ablest writers on botany. In recent years, or let us say the last decennia, very few botanists have paid much attention to this particular question, and it is extremely little that has been brought to light by American writers. This is the more surprising since the American plants are exceedingly interesting from this point of view; moreover, it appears to the writer that the mere systematic treatment of the American flora is not sufficient so long as the younger stages of our plants remain ignored; the sad consequence is that the study of the organs of vegetative reproduction has been neglected to the same extent. It is only, at least in a number

of instances, through following the development of the individual from seedling to mature plant that the real structure of the subterranean stem-portions may be ascertained. The beginning of the formation of the rhizome, the location of the overwintering buds, the numerous modifications observable in the root-system, the structure of the foliage, etc., all these points deserve equally as much attention as the floral organs; they really deserve a place in the general diagnosis of the species. But it is a slow process to study and follow these various phases of plant life in nature, besides much literary research is involved.

Having been called upon to contribute a paper to the OTTAWA NATURALIST, I thought that it might be appropriate to present a brief sketch of some of the various types of seedlings which I have observed in this country, in the hope that some of the Canadian botanists might take the matter up and continue. At the same time I take the opportunity to insert some drawings which might serve to illustrate some of the characteristics of these seedlings; if sometimes too elementary, the text as well as the figures, I must ask for indulgence on the part of the reader.

Of the two large classes, of phænogamous plants, *Monocotyledones* and *Dicotyledones*, as proposed by Ray, the former germinate with a single, the latter mostly with two cotyledons; there are, however, several exceptions. In certain plants the seedling resembles a thallus, consisting merely of a globular mass of cellular tissue with no root, stem or leaf, as for instance in *Orchideæ*, *Monotropa*, *Orobanche*, etc., and finally among the *Dicotyledones* there are some cases where only one cotyledon becomes developed, the other being either rudimentary or totally wanting. But, common to both classes, when the germination begins the primary root is generally the first organ which appears, then follows the hypocotyl, and after this the cotyledons. Moreover, we find in both classes two types of cotyledons: above ground or epigeic, and subterranean or hypogeic; in the former of these, which is the most frequent, the cotyledons are leaf-like, green and thin, provided with stomata, and are thus able to assimilate: in the latter the cotyledons remain mostly enclosed by the seed; they are pale, fleshy, thick, and frequently grown together. These hypogeic cotyledons, especially characteristic of seeds without endosperm, are the bearers themselves of the reserve food-substance. In *Pinus* the cotyledons combine both types, since they at first serve as organs to absorb the endosperm, and subsequently become organs of assimilation; or the cotyledons contain some food-material and begin the function of assimilation as soon as

the reserve food is assimilated (several *Cruciferæ*). Very peculiar is the structure of the cotyledon in several *Monocotyledones*, for instance the *Gramineæ*, where a part of the cotyledon is developed as a flat, shield-shaped organ, the so-called scutellum, whose function it is to absorb the food-substances of the endosperm; a similar organ occurs, also, in Palms, *Commelinaceæ*, *Canna*, etc., where it represents the apex of the cotyledon.

It is, therefore, very natural that the cotyledons exhibit a number of forms depending upon their function; beside that their varied position in the seed necessarily exercises some influence upon the outline of their leaf-blades. However, the cotyledons are not the only part of the seedling in which modifications as to structure and function may be observed; the primary root and the hypocotyl exhibit, also, some certain types of development, which are of no small interest. The root, for instance, may develop as a nutritive or a storage-root; or it may be the only organ by which the vegetative reproduction takes place in the first season, as in *Rhexia*. Finally, the hypocotyl may persist during the whole life of the plant or die off after the first season; it may persist as an ordinary stem, or develop as an organ for storing nutritive matters. It is, also, important to notice the position and vitality of the plumule; most frequently it gives rise to the main stem above ground, but not a few cases are known, where it stays under ground during the first year, developing into a rhizome; or, it lives only one season, after which it becomes replaced by buds from the axils of the cotyledons. In this way we must expect to find a rich illustration of biologic plant-types by merely examining seedlings; and, if we follow the successive development of these same seedlings, we are gradually led into that most interesting chapter of botany, which teaches us about the morphology of the shoot with its innumerable variations in respect to position and form of the vegetative and floral organs.

In the present paper I intend only to describe some types of seedlings during the first year of their growth, and we might begin with the *Monocotyledones*.

Characteristic of the seedlings of this class of plants is the presence of a single cotyledon, which may be epigeic or hypogeic, and the short duration of the primary root.

A very simple type is represented by *Agave* (Fig. 1). We notice in this that the primary root does not become arrested in its development so early as in most of the other *Monocotyledones*, but that it attains quite a considerable length; the cotyledon is thread-like and forms a sharp knee for penetrating the soil, while the apex remains enclosed in the seed until the endosperm has become absorbed; after that the apex of the

cotyledon becomes freed from the seed and stretches itself towards the light. The plumule is located at the base of the cotyledonary sheath and develops mostly only one green leaf during the first season. This manner of germinating is known, also, in *Sisyrinchium* and several *Liliaceæ*, for instance many species of *Allium*.

Another type may be observed in *Alisma Plantago*, L. var. *Americana* R. et S. (Fig. 2). So far as concerns the structure of the cotyledon, the seedling does not differ from that of *Agave*, but if we examine the root we notice that this remains very short, and that it bears a dense tuft of root-hairs at the base, where it passes into the more or less distinct hypocotyl (H). We have, thus, in this type of seedling an indication of a hypocotyl, and among other plants that exhibit this manner of germinating, and in which the seeds have no endosperm, may be mentioned *Butomus*, *Typha*, *Triglochin*, etc.; in *Juncus bufonius* the seeds contain endosperm, but the seedling shows, nevertheless, this same structure, according to Mirbel (1810).

We now proceed to a type of seedlings which is very frequent, and much more so than those described above; in this, the third type, the apex of the cotyledon remains enclosed by the seed in order to absorb the nutritive matters stored in the endosperm. Moreover, the free portion of the cotyledon constitutes a sheath of various length, at the bottom of which the plumule is located; the primary root attains sometimes a considerable length (Fig. 6), or it ceases to grow shortly after the germination has taken place (Figs. 3 and 4). As shown in Figure 7, a hypocotyl is developed, and this stem-portion is more distinct in this type of seedlings than in the former. In *Arisæma triphyllum*, Torr. (Fig. 3), the apex of the cotyledon is readily visible in longitudinal section, and is surrounded by the endosperm; the plumule with its first leaf is yet enclosed within the sheath, while the primary root is free, and provided with hairs. A more advanced stage may be seen in Fig. 4, where the leaf has broken through the sheath, and where two secondary roots have developed. During the first season the rhizome becomes formed by the growth in thickness of the short primary axis (Fig. 5), and attains the shape of a round tuber bearing three secondary roots, which rapidly increase in length, but without ramifying. In *Smilax rotundifolia*, L. (Fig. 6), we notice a long primary root, which stays active for at least one season, and the hypocotyl (H) in Fig. 7) is very distinct; otherwise the cotyledon shows the same structure as in *Arisæma*. The foliage of *Smilax* consists at the seedling stage of several minute, scale-like leaves preceding the green ones, of which mostly only one appears during the first season. It is interesting to notice that a bud becomes

developed in the axil of the cotyledon, and that this bud develops into a small tuber (B in Fig. 7). So far as concerns the structure of the cotyledon, its apex and short sheath, this type of seedling is common to many, *Liliaceæ*, *Amaryllideæ*, *Palmæ*, *Dioscoreaceæ*, *Irideæ*, etc.

A fourth type is characteristic of *Commelinaceæ*, and it differs from the former by the prolongation of the free part of the cotyledon, which here represents a long, filiform organ between the apex and the sheath; moreover, the primary root is surrounded by a sheath, the so-called coleorhiza, which it has to penetrate.

These four types thus illustrate the most frequent structure of seedlings of *Monocotyledones* excl., *Cyperaceæ* and *Gramineæ*, and the principal distinction consists in the position of the cotyledon, being epigeic or hypogeic; moreover, in the varied development of the cotyledonary sheath. In regard to the hypocotyl we have seen this to be well differentiated in *Smilax*, while it is either obsolete or undeveloped in the others. The primary root may persist for a longer or shorter period, but the most important character derived from this organ is the presence of a coleorhiza as observed in *Commelina*.

A feature common to these types is, however, that the root is the first organ to appear when the seed germinates; then follows the cotyledonary sheath, and finally the first leaf of the plumule. In this respect the *Cyperaceæ* make a notable exception from all the other *Monocotyledones* with perfect embryos. We might examine *Cyperus vegetus*, Willd., as an example of this type of germination, illustrated on Plate IV, Figs 8 and 11.

When the seed germinates (Fig. 9) the plumule surrounded by the coleoptile is the first to appear, pushing out through the opened base of the achene, and carrying with it the small root, merely visible as a minute wart. If we remove the cotyledon from the seed (Fig. 10), we notice the very simple structure of the embryo: the large clavate cotyledon, the sheath of which (coleoptile) covers the plumule completely, and finally the small root with a wreath of hairs. All these organs are, also, readily to be observed in the still younger embryo (Fig. 8) just before germination. The further development of these organs may be observed in Fig. 11, where the root has commenced to grow out, and where the coleoptile has attained its final shape: as a tubular leaf with a small, blade-like apex; no such advanced development of the coleoptile was observed in the other types described above. In the *Cyperaceæ* the coleoptile thus develops into a long sheath raised high above the plumule, and it turns its back toward the absorbing portion of the cotyledon. Sometimes, as for instance in *Fuirena squarrosa*, Michx., a long stem-like organ develops between the coleoptile and the enclosed portion of the cotyledon,

thus the coleoptile becomes situated at some distance from the cotyledon, as if it represented the first leaf of the seedling. If this be really the case we would have two leaves (cotyledon and coleoptile) situated at the same side of the axis, above each other, and such arrangement of leaves would not be very probable. A like structure is exhibited by *Rhynchospora alba*, Vahl. (Fig. 12), but in this the primary root does not develop at all, being replaced by three secondary roots. The structure of the cotyledon, however, is the same as in *Cyperus;* inside the coleoptile is the first green leaf from the axil of which a long bud has developed, provided with a small, adorsed fore-leaf, thus representing the first ramification of the young plant.

In the *Cyperaceæ* we have thus the same structure of the absorbing portion of the cotyledon, while the coleoptile is much further developed than in the third and fourth type described above. The generally adopted explanation of the coleoptile is that it merely represents the sheath of the cotyledon, and in cases where a stem-like organ is developed, in *Fuirena*, for instance, this organ is defined as a node, but as a node that has become unusually stretched. It deserves notice, however, that a root sometimes develops from this "node," while roots evidently but very seldom develop from the nodes, but from above or below these. The greatest difficulty by considering the coleoptile as an independent leaf, the first of the seedling, depends of course upon its position, since it is placed on the same side of the axis as the cotyledon; to overcome this difficulty some authors have expressed the opinion that a leaf is lacking, and this leaf should then be the small, lobe-like organ "epiblast" so very characteristic of certain genera of *Gramineæ*; this organ is in these situated opposite the cotyledon, and below the coleoptile, thus the arrangement of these three organs would correspond very well with that of normal leaves. But, so far, the epiblast has not been detected in any member of the *Cyperaceæ*.

Now, in regard to the *Gramineæ*, the structure of the embryo is very complicated, and has been the subject of an extensive literature from the hands of a number of the most notable morphologists. But so different are the views expressed that the only point which seems settled beyond doubt is that the *Gramineæ* have at least one cotyledon; some authors think they have two.

Let us, however, examine a few of these embryos before we review the various explanations that have been offered. On the accompanying plate (Plate IV) I have figured some germinating grains of *Secale* and *Zea* (Figs. 13-17), and in these we notice the following organs: the primary root (R) with its sheath, the so-called coleorhiza, and frequently accompanied by one or

several pairs of secondary roots (Figs. 13, 14 and 17); the so-called "scutellum" (S), which is more or less shield-shaped, and closely appressed to the endosperm, which it absorbs; furthermore, the small lobe-like organ called "epiblast" (E), which is situated opposite the scutellum, and which is not developed in *Zea*; between the scutellum and epiblast is the plumule (PL.) covered by a sheath, the so-called "coleoptile," which in *Zea* is borne on a stem-like organ of quite considerable length. The first green leaf of the seedling (L.) is to be seen in Fig. 17, having broken through the coleoptile. Considering the position of these three organs, scutellum stands opposite the epiblast, and the coleoptile is not only situated on the same side of the axis as the scutellum, but, furthermore, it turns like this toward the plumule, or let us say toward the first green leaf. In other words, in cases where the epiblast is suppressed, which is very commonly the case, the scutellum and coleoptile appear as two organs situated above each other, on the same side of the axis. The question then arises to define whether the cotyledon is represented by one or several of these organs, and whether these organs are really leaves, parts of leaves or independent leaves.

Strange to say, but according to Richard, A. de Jussieu, Hofmeister, and Sachs, the coleoptile should represent the cotyledon, while the scutellum and epiblast should merely be parts of stem and root. Another view was held by Schleiden, and Decaisne, who identified the scutellum and the epiblast as the cotyledon, the coleoptile as the first leaf succeeding this. Or these three organs may be defined as constituting the cotyledon, as proposed by Gaertner, who has been followed by Hegelmaier, Klebs, Van Tieghem (1872), Celakovsky and Schlickum; thus the scutellum should represent the absorbing portion of the cotyledon, the coleoptile its sheath, while the epiblast should be a mere protuberance of the coleorhiza (Schlickum) or a part of scutellum (Van Tieghem, Celakovsky); to this may be added that Van Tieghem, by means of the anatomical method, reached the conclusion that the stem-like portion between the coleoptile and scutellum is not an internode, but a node which has become unusually stretched.

Depending more on the mutual position of these organs than on their structure and homologies Warming has made a very different suggestion, and he considers scutellum alone as the cotyledon, the epiblast as the first leaf succeeding this, and the coleoptile as the second, thus presuming that the epiblast should actually have become completely suppressed in the *Cyperaceæ*; hence the peculiar position of the sheath just above the cotyledon in these. According to this same author the stem-like portion necessarily becomes an internode. The reason why Van Tieghem

would not recognize the epiblast as an independent leaf, was because he found no vascular system in it; however, in *Avena sativa* Didrichsen observed the epiblast to possess a very regular lobation corresponding with the presence of several mestome-strands. So far as concerns the internode, which Van Tieghem has declared to show the structure of simply a node, I must say, that in *Coix* for instance, the structure is very different from that of a node, but identical with that of an internode, and especially of a subterranean. In order to settle this question, whether this stem-like portion, by Celakovsky called "mesocotyl," be a node or an internode it is necessary to examine the internal structure in a larger number of genera, when it is fully matured; in *Coix* it is an internode, but it may not be constantly so in *Gramineæ* and *Cyperaceæ*. Furthermore the presence of a bud in the axil of the coleoptile, or according to Warming, in the axil of the second leaf succeeding the scutellum, speaks in favor of defining this leaf as independent of epiblast and scutellum. Such axillary buds have been observed in a number of genera of *Hordeæ;* beside that Van Tieghem observed them in *Avena*, and Bruns in *Bambusa*. The explanation offered by Warming seems so simple and readily to be understood, that it is undoubtedly the most natural.

In revising these various views we notice that there is one point, however, in which all these authors agree, namely, that the *Gramineæ* have only one cotyledon. We shall see now that there were formerly some authors who attributed two cotyledons to this family, the scutellum and epiblast, thus the *Gramineæ* should possess one large and one small cotyledon; these authors were Mirbel, Poiteau and Turpin. Recently Van Tieghem (1897) has abandoned his former theory, and adheres now to the views of these authors; in his new system he thus removes the *Gramineæ* from the other *Monocotyledones*, and places them among his "*Inséminées*." How untenable this classification is has been shown by Celakovsky, who calls attention to a fact, known long since, that in some genera of *Gramineæ* the seed is not grown together with the pericarp, but is free as in *Eleusine*, *Sporobolus*, *Crypsis* and *Heleochloa*, and these genera should consequently in accordance with Van Tieghem's system be separated from the other *Gramineæ*, and referred to his "Seminées."

The last type of monocotyledonous seedlings which may be described here is exhibited by *Peltandra undulata*, Raf. (Fig. 18). In this plant the fruit is a berry with a thin, almost black pericarp, and contains mostly a single seed with no endosperm. The seed is globular, surrounded by a tenacious jelly which, according to Baillon and Engler, is the transformed exterior integument of

the seed. The plumule is green and located in a furrow formed by the large cotyledon, the margins of which tightly enclose the plumule. The germination commences while the seed is still floating upon the water, and the first sign of the young plant is the plumule breaking out through the mucilaginous envelope and separating itself from the clasping margins of the cotyledon; the first leaf succeeding the cotyledon is exactly opposite this, and represents merely an open sheath-like organ with two ribs. This rudimentary leaf-structure may be frequently observed also in the second and third leaf of the seedling, while in some seedlings I noticed that already the second leaf showed a distinct petiole and a small elliptic blade. In regard to the root system, the primary root does not develop, but secondary roots in pairs appear at an early stage, and attain a considerable length, though without ramifying.

Orontium aquaticum, L. germinates in the same way, but the plumule is here located in a shallow cavity of the cotyledon without being surrounded by this. The first leaf succeeding the cotyledon is terete, not bicarinate, and this form of foliage becomes repeated in several of the following leaves; the primary root stays rudimentary, but soon becomes replaced by several lateral.

We have thus in monocotyledonous seedlings several interesting types, in which quite a prominent variation is noticeable in respect to the structure of the cotyledon, the first leaf or leaves succeeding this, and the root system. In some of these the seed is exalbuminous, and the cotyledon epigeic, as in *Alisma*; or we have the peculiar, globular cotyledon in the exalbuminous seeds of the aquatic *Orontium* and *Peltandra*. Epigeic is, furthermore, the cotyledon of *Agave*, but not until it has absorbed the food-substances of the endosperm. The hypogeic cotyledon is much more frequent, but varies in regard to the structure of the absorbing portion, for instance, if we compare the scutellum of the *Gramineæ* with the club-shaped cotyledon of *Cyperaceæ*, *Smilax*, *Commelina*, *Arisæma*, etc. Sometimes the cotyledon possesses a distinct sheath which envelopes the plumule, as in *Arisæma*, *Smilax* and *Agave*; if the coleoptile of the *Gramineæ* and *Cyperaceæ* might prove to represent the sheath of the cotyledon, this would then frequently appear at some distance above the scutellum, separated from this by an internode or node, according to some authors. The cotyledon may subtend a bud as in *Smilax*, and we remember that in several *Gramineæ* a bud has been observed in the axil of the coleoptile, whether this be an independent leaf or merely a part of the cotyledon. The foliage of these seedlings is, also, characteristic; for instance, the epiblast and coleoptile in

Gramineæ, the bicarinate leaves in *Peltandra*, the small, scale-like in *Smilax*, and finally the large, green leaf in *Arisæma* with petiole and blade. However, the structure of the first leaf succeeding the cotyledon does not always depend upon the presence or absence of an endosperm, for instance in the *Araceæ*. A hypocotyl is, sometimes, developed, as for instance in *Alisma*, *Agave* and *Smilax*. In regard to the roots we have seen the development of a coleorhiza in *Gramineæ*, *Cyperaceæ* and *Commelinaceæ*; furthermore, the relative strong growth of the primary root in *Zea*, in *Agave* and *Smilax*, but most frequently the root system consists of secondary roots replacing the early fading primary.

(To be continued).

EXPLANATION OF PLATE IV.

In the figures the letters indicate as follows.—

R, the primary root; Cot., the cotyledon; L1, the first green leaf; PL, the plumule; S, the scutellum; H, the hypocotyl; B, bud in axil of cotyledon (Fig. 7), or of the first leaf (Fig. 12); E, the epiblast.

Figure 1. *Agave Americana*, L., natural size.
" 2. *Alisma Plantago*, L., var. *Americana*, R. et S., x 8.
" 3. *Arisæma triphyllum*, Torr., longitudinal section; x 4.
" 4. Same, a little older; x 4.
" 5. Same, still older, showing the first green leaf fully developed; natural size.
" 6. *Smilax rotundifola*, L.; natural size.
" 7. Same, part of the seedling, removed from the seed; x 5.
" 8. *Cyperus vegetus*, Willd., the embryo; x 75.
" 9. Same, germinating seed, surrounded by the pericarp; x 26.
" 10. Same, the seedling, removed from the seed; x 26.
" 11. Same, a more advanced stage; x 18.
" 12. *Rhynchospora alba*, Vahl., seedling; magnified.
" 13. *Secale cereale*, L., germinating grain, seen from the front, but upper half of grain cut of; magnified.
" 14. Same, seedling removed from the grain, side-view; magnified.
" 15. *Zea mays*, L., germinating grain; natural size.
" 16. Same, longitudinal section; natural size.
" 17. Same, a more advanced stage; natural size.
" 18. *Peltandra undulata*, Rafin., natural size.

BLUE BIRDS OF THE MARITIME PROVINCES.

By WM. H. MOORE, Scotch Lake, N.B.

As there seems to be a general misunderstanding among people in regard to our blue birds, *i.e.* birds having some blue in their plumage, it has occurred to me that a short paper on this subject might prove of considerable benefit, for at any meeting that the writer has addressed, about birds, this question has always come up. Especially among school teachers, and normal

school students, who are expected to take up Nature Study, and who have rare opportunities of observing the bluebird (*Sialia sialis*) there seems to be a trend of opinion that the blue jay (*Cyanocitta cristata*) may be the bluebird. At a recent meeting, when this subject was brought up, it was found that one normal student had seen an indigo bird (*Passerina cyanea*), one of our blue birds that is very rare in the Maritime Provinces. Another student knew of a bird that had blue upon the back, but had a brownish breast; as it was not blue all over, it was not thought to be the real bluebird. Others wished to know if the bluebird and blue jay were the same species. Without a doubt many people would be surprised to know that we have over a score of land birds with blue coloured plumage. In some of these the blue colour is decidedly noticeable, in others it is found only as bluish reflections in the breeding plumage. A number of the waders and water birds have blue in various hues, on different parts, but of these we shall not treat in detail. The birds we will refer to in comparing the size of the different species are the crow, robin, English or house sparrow, and the goldfinch or thistle-bird, all of which must be fairly well known to most Canadians.

SIALIA SIALIS, the real Bluebird. The male has the upper parts, wings and tail bright blue, tipped with rusty in the fall; throat, breast and sides chestnut or rufous; belly white. The female is paler throughout; the upper parts having a grayish tinge; the throat, breast and sides paler. Slightly larger than the house sparrow. The song of the male (if song it may be called) is a melodious *chee-er-ie* whistle. In the fall the call of both sexes is a soft and gentle *tur-wee*. For a nesting site a hole in a tree, or a hollow fence post is selected, and occasionally houses put up for martins are occupied by this species. The nest is composed of grasses, with the finer parts inside. Feathers are often used in the lining. The eggs are pale bluish, rarely pure white, and number from four to six. The period of incubation varies with the season; from fourteen to eighteen days. The food consists of insects of many kinds, which are sometimes caught in the air after the manner of the flycatchers. For a number of years the bluebird was very rare with us, but during the last five years it has become quite common. The principle enemies of the bluebird are small hawks, squirrels and domestic cats. This bird arrives from the south from early April until the last of May, and stays until well on into October.

SITTA CAROLINENSIS, the White-breasted Nuthatch. The adult male has top of head and fore part of back black; rest of upper parts bluish-gray; inner secondaries bluish-gray with black markings; middle tail feathers bluish-gray. Female similar but

the black of head and back is washed with bluish-gray. About same size as the house sparrow.

SITTA CANADENSIS, the Red-breasted Nuthatch. Adult male has upper parts and middle tail feathers bluish-gray; top of head and line through the eye black; a white line over the eye; throat white; underparts rufous. Female similar, but the top of head and stripe through the eye bluish-gray, like the back; under parts paler. Size smaller than the goldfinch.

These two species of nuthatch are similar in habits; their calls being the well known *yank*, *yank*, and various twitterings as they search for food among the tree-tops.

The erratic clamberings of these birds serve to distinguish them from any other of our feathered friends; creeping about on trees, head downwards, is characteristic of the species.

The nest is made in a cavity dug into a tree trunk, and is composed of fine shreds of bark, fur and feathers. The entrance to the cavity is always more or less smeared about with balsam gathered from fir trees. This is carried in the bird's bill and put in place, evidently to serve as a protection and keep out climbing mice and squirrels, as this substance would very much entangle the fur of these rodents. The eggs number from five to eight and are white with numerous brownish specks. The period of incubation is about ten to twelve days, and is engaged in by both birds. The food is chiefly insects, but probably seeds are also eaten to some extent. Both are permanent residents with us, and often come about buildings in search of flies hidden in crevices. They may also be seen about horse droppings along roads leading through wooded tracts.

Among the warblers we have several which show more or less blue in their plumage. In only one species, however, is the blue very noticeable.

DENDROICA CORONATA, the Myrtle Warbler, also known as Yellow-rumped Warbler. Adult male with a yellow patch on crown, rump and either side of the breast; upper parts bluish-gray with black streaks; two white wing-bars; throat white; breast and upper belly marked with black; lower belly white. Female similar, less plainly marked. About size of the goldfinch. This species is a common summer resident, frequenting mixed growths of young trees. This is our first warbler to arrive in spring, coming sometimes in April and staying until late September.

DENDROICA CÆRULESCENS, the Black-throated Blue Warbler. Adult male has upper parts grayish-blue; back sometimes blackish; wings and tail edged with blue; sides of head and throat black; breast and belly white; also a white spot on middle of closed wing. Female paler on upper parts; back olive-green,

the only blue being on the tail; underparts yellowish; white wing mark present though less noticeable than in male. This is our bluest warbler. Smaller than the goldfinch. Tolerably common in mixed woods, where its oft repeated *zee-zee-zee* song may be heard. They are present with us from early May until September.

COMPSOTHLYPIS AMERICANA, the Parula Warbler, or Blue Yellow-backed Warbler. Male with upper parts grayish; a yellowish patch on middle of back; throat and breast yellow; a black, or bluish black, or rufous, band across the breast. Female similar, but the band on breast sometimes lacking. The smallest of our bluish birds. A fairly common summer resident from early May until September. The nest is a beautiful hanging basket of Usnea moss.

HELMINTHOPHILA RUFICAPILLA, the Nashville Warbler. Male with bluish-gray on top and sides of head; a chestnut patch on crown; under parts bright yellow, whiter on belly. Female, colours rather duller than those of male. Tolerably common in moist, bush grown pastures and similar places. Smaller than the goldfinch. Nests upon the ground.

VIREO SOLITARIUS, the Blue-headed Vireo. Top and sides of the head bluish-gray; eye-ring and lores white; two white wing-bars; underparts white. Slightly larger than the goldfinch.

Probably more common than is generally supposed, the song being mistaken for that of the Red-eyed Vireo. There is no reason to be misled, however, as the songs are quite different, that of this blue-headed species being louder and clearer than that of his red-eyed relative. The vireos build hanging nests, thus gaining for themselves the name of hangbirds. This blue-headed, or solitary vireo, is with us from late April until October.

We come now to the swallows, a group of birds with blue in the plumage, but none of which need be mistaken for blue-birds. Excepting the tree swallow, this group of birds may all be found about buildings. Even that species sometimes nests in bird-houses supplied by mankind. All are insectivorous.

TACHYCINETA BICOLOR, the Tree Swallow, or White-bellied Swallow. Both sexes are alike; upper parts steel blue or steel-green; under parts white; outer tail feathers longer than middle ones. Between the goldfinch and the house sparrow in size, but having long wings, which make it appear larger when flying. A tolerably common summer resident from the middle of April until the middle of July. The nest is situated in bird-houses, holes in trees and hollow fence poles and is composed of fine grass blades, lined with feathers.

CHELIDON ERYTHROGASTER, the Barn Swallow, also called Forktail Swallow. Sexes similar; forehead, throat and upper

breast chestnut-rufous; rest of under parts washed with same colour; upper parts steel-blue, tail deeply forked. Body about the size of that of the goldfinch; the long tail feathers give a length to the bird greater than the sparrows. This swallow nests inside buildings, but in a few instances has been known to build outside. It is with us from late April until September.

PETROCHELIDON LUNIFRONS, Cliff or Eave Swallow. Adults with steel-blue crown, back and centre of breast; forehead whitish; throat and sides of head chestnut; tail feathers of nearly equal length. Midway in size between the goldfinch and the house sparrow. This is the swallow that builds nests under the eaves of buildings, and is our most abundant kind. It is with us from early May until the middle of September.

PROGNE SUBIS, the Purple Martin. Male shining bluish-black, with wings and tail duller. Female with upper parts bluish-black; throat, breast and sides grayish; belly white. Size between the house sparrow and the robin. Nests are made of straw and twigs built in small bird-houses. Least common of any of our swallows. It is here from late April until August.

PASSERINA CYANEA, the Indigo Bunting, or Indigo-bird. Male, rich blue, deeper on the head, brighter on the back; wings and tail black, edged with blue; lores blackish. Female of a grayish brown, the wings and tail only showing bluish. Slightly larger than the goldfinch. The size alone would serve to distinguish it from the bluebird. The song also is very different, it reminding one somewhat of the purple finch trying to sing like a goldfinch. Then the Indigo-bird is so rare with us that there is little likelihood of confounding the two species.

We come now to some species of black birds having bluish reflections none of which need be mistaken for the bluebird, as all are larger.

QUISCALUS QUISCULA ÆNEUS, the Bronze Blackbird, or Crow Blackbird. Larger than the robin. Very common from April to October.

SCOLEOCOPHAGUS CAROLINUS, the Rusty Blackbird. Male in spring plumage glossy bluish-black; at other seasons, feathers tipped with rusty. Female without bluish gloss; more rusty than male. Slightly smaller than the robin. Tolerably common from April to October.

CYANOCITTA CRISTATA, the Blue Jay. Upper parts blue; under parts white, washed with dusky on the sides; black patches on wings, tail and about the head and breast; head crested. Larger than the robin. A common permanent resident. Mimics other birds, as Broad-winged hawk and woodpeckers, in its calls. A beautiful bird, and one that is most cautious during the breeding season. The nest in this section is built in tall trees in the forest.

It is difficult to conceive of this bird nesting in the back yards of houses as it does in some localities. It is also quite as difficult for people of the south and west to realize the Blue Jay being so retiring during the breeding season, as it is here in the Maritime Provinces.

CERYLE ALCYON, the Belted Kingfisher. Male with upper parts bluish-gray; numerous white spots on the wings; throat and sides of neck and belly white; sides bluish-gray, also a band of same colour across breast. Female similar, but the band on breast and sides rufous. Both sexes crested. Larger than the robin. Tolerably common from April until October. One recorded at Sussex, N.B., as late as Christmas Day. As the name implies, this bird is a fisher, living upon small fish, crayfish and larvæ of various species of insects, that pass part of their lives in the water. This species nests in tunnels burrowed into banks of streams, and other suitable places. The eggs are beautifully white, four to seven in number; incubation beginning about when the first egg is laid, as broods of young show different sizes. The rattling call of the kingfisher is its most distinctive characteristic.

These are our birds having some blue in their plumage, none of which, however, need be mistaken for our real Bluebird, *Sialia sialis*, having, as Burroughs says, the blue of the sky on its back, and the brown of the earth below.

IS RHUS GLABRA IN CANADA?

By EDWARD L. GREENE, U.S. NATIONAL MUSEUM, WASHINGTON, D.C.

Certainly all the descriptive botanies, and almost all the lists and catalogues that have been written as for Canadian territory, affirm that *Rhus glabra*, Linn., grows there. But then, the affirmation may have been in every instance unwarranted. Despite all the books and catalogues, it may be that no such shrub as that name stands for, and must stand for, is found on Canadian territory. It is easily possible that every such book and catalogue may, in this particular, be wrong.

Now, let us permit no misunderstanding as to what our question really is. It is not doubted that in the Canadian flora there occurs in several places what all have called *Rhus glabra*. But, they write "*Rhus glabra*, Linn.," and that is saying that the particular kind and description of sumach to which Linnæus assigned that name is there. It is this often repeated assertion that Linnæus' *Rhus glabra* is in Canada, which is here

called in question, That is an affirmation which never could have been warranted, but as the result of a certain piece of phytographic investigation, which investigation it is probable no one, studying Canadian botany, has yet undertaken. For example: has any one with the so-called *Rhus glabra* before him betaken himself to the original Linnæan account of the shrub, to see if it answered to that account?

To come nearer home, I do not believe that any one in New England has ever yet gone into the history and description of *Rhus glabra* far enough to determine whether or not there exists in all New England any shrub answering to Linnæus' *Rhus glabra*. The easy thing to do is what the great majority of botanists do, whether of New England, of Canada, or elsewhere, and that easy thing is, simply to follow some one else's dictum; take the authority of some other author, and accept that, without a moment's thought as to whether it may be right or wrong; even never doubting that it is right.

Such a course as this is as far as possible from being scientific; yet, as I have said, it is the usual course. It is the easy way, albeit an utterly irresponsible way; a way that leads to the making of books and catalogues that, instead of being truthful, reiterate and disseminate and perpetuate a hundred errors, it may be, on every fifty pages.

I have taken up this case of *Rhus glabra* chiefly as being illustrative of the easy irresponsible way that many botanists—not those of Canada any more than those of a hundred other regions—accept and reprint old names as applied to new plants.

Linnæus did not himself describe his *Rhus glabra*, but cited a fine description that was already before the public, that of the great Dillenius. To this author, then, we must go, if we are to ascertain what the *Rhus glabra*, Linn., is like.

Dillenius (Hortus Elthamensis, p. 323, b. 243) has a folio plate, accompanied by almost a folio page of description, so that we have no great difficulty in ascertaining both what the original *Rhus glabra*, Linn., looks like, and what is its native region. He attributes to his shrub a foliage made up of from 21 to 25 leaflets, each leaflet nearly 2 inches wide and 6 inches long or more. This is making the individual leaf of real *Rhus glabra* to be more than two feet long. Neither in Canada, or in any part of New England adjacent to Canada, is there any Rhus heard of as having foliage of anything approaching such dimensions, or of such a great number of leaflets. And the originals of Dillenius—therefore of Linnæus—were from a very different region, namely southern Virginia. This, the genuine *Rhus glabra*, Linn., of which one of the specific marks is its very large foliage, is found all up and down the country lying south of

the Appalachian divide between Virginia and Long Island. If by any magic a clump of this shrub should be transferred to western New York, or across into Ontario, and set down adjacent to the so-called *Rhus glabra* of those regions, the first botanist who came upon it, seeing the wonderful contrast in foliage, would be likely to suspect that in this Rhus of such enormous foliage he had a new species. The shrub of the regions north of the Alleghenies has never two-thirds as many leaflets, and these never nearly as large, so that its leaf, as a whole, is not of half the size—certainly seldom as much as half as large—as that of the real Linnæan *Rhus glabra*. It is as common from Ithaca, New York, to the vicinity of Boston, Massachusetts, as *Rhus glabra* genuine is in Virginia, southern Pennsylvania and New Jersey; and these marks of the leaves are not all. Let us place the two shrubs in closer contrast descriptively. The one of the North, copious about Ithaca, and extending into Ontario, we will call *Rhus Ithacensis*.

Rhus glabra.	*Rhus Ithacensis*.
Leaf as a whole commonly 2 feet long.	Leaf as a whole usually 7-11 inches long.
Leaflets 17-25, rounded at base, 4-6 inches long, of hard firm texture.	Leaflets 11-17, abruptly tapering at base, 2½ or rarely 3 inches long, of thinner texture.
Fruiting panicle with very short, stout peduncle.	Fruiting panicle with long peduncle and not stout.
Panicle itself between fusiform and pyramidal, commonly 10 inches high; drupelets large.	Panicle oblong-fusiform 4½-6 inches high, the drupelets smaller.
Leafy branches of shrub quite blue with bloom.	Leafy branches much more slender, merely glaucescent.

If such marked distinctions exist between the northern smooth sumachs and the southern, then, in the name of science, not to say of common truthfulness, the expression "*Rhus glabra*, Linn." should early disappear from the books and lists of Canadian plants. No kind of procedure is more subversive of knowledge than that of transferring the name of one object, to another object very unlike that to which alone the name by right belongs.

I conclude by repeating it, that this *Rhus glabra* case is but illustrative of a certain principle. Under that revival of interest in North American botany that is now in progress, old and deeply rooted errors about the identity of things are being perfectly indicated, and the amendments of them made, by the score every year; but curiously, the botanists are of two classes, those who welcome the fuller knowledge, and those who deplore and oppose it.

ZOOLOGICAL NOTES FOR 1908.

BY J. F. WHITEAVES.

Among the additions to the zoological collections in the Museum of the Geological Survey for 1908, there are three specimens that seem to be of sufficient interest to warrant a permanent record. These are as follows:—

MAMMALIA.

(1) PUTORIUS RIXOSUS, Bangs.

(*Least Weasel*; *Bangs' Weasel*).

A weasel, that corresponds very well with Mr. Bangs' description of this diminutive species, was obtained by Mr. Joseph Keele in January, 1908, at Third Lake, on the Ross River, Yukon Territory, in Long. 131°W., and Lat. 62° 45'N. The specimen, which was caught in a marten trap, is in full winter fur, and was said by the trapper to be a male. It is remarkable for its extremely small size, its fur is pure white, and its tail is short and white at the tip. It was received in the condition of a well prepared skin, with the skull, and has since been mounted for exhibition. Following the curves of the head, neck, back and tail, it now measures roughly 172 mm, or slightly less than $6\frac{3}{4}$ inches, from the nose to the tip of the tail; or about $5\frac{3}{4}$ inches, if measured in a straight line.

The type of *P. rixosus*, Bangs, 1896 (Proc. Biol. Soc. Washington, Vol. x. p. 21), is an adult female from Osler, Saskatchewan; and the species is known to occur also at the mouth of the Porcupine River, Alaska; on the upper Yukon; at Fort Albany, and at Moose Factory.

This species is the smallest weasel known, and the only American one that lacks the black tip to the tail.

(2) SYNAPTOMYS (MICTOMYS) WRANGELI, Merriam.

(*The Alaskan Lemming* Mouse).

A specimen of this species, was presented to the Museum of the Survey by the Rev. J. H. Keen, of Metlakatla, B.C., in October, 1908. This interesting little rodent was caught by Mr. Keen at Metlakatla on the second of November, 1899, and is the first specimen of this species that has been received in Ottawa. The specimen is a skin, with the skull, and the label that accompanies it states that it is a male.

The exclusively North American genus *Synaptomys* was constituted by Dr. Spencer F. F. Baird, in 1857, in his "Mammalia

of North America," for the reception of two specimens of a small rodent which has all the external appearance of a field mouse or vole, but which has the teeth of a lemming. As its name implies (sūn-apto, to join together; and mūs, a mouse) the founder of the genus supposed it to be a connecting link between the field mice and the lemmings.

In 1896, in a paper on "The Genera and Subgenera of Voles and Lemmings," published by the U.S. Department of Agriculture, Mr. Gerrit S. Miller, Jr., says that *Synaptomys* is a true lemming, and that it differs from all the other genera of Microtinæ by its grooved incisors.

A little earlier in the same year, Dr. Merriam, in a "Revision of the Lemmings of the genus *Synaptomys*," published in the tenth volume of "Proceedings of the Biological Society of Washington," had divided the genus into two subgenera, viz.: (1) *Synaptomys* (proper), Baird, 1857; and (2) *Mictomys*, True, 1894. The first of these subgenera is said to be represented by "four fairly well defined forms," and the second by "at least four species."

The only species of the subgenus *Synaptomys*, as defined by Merriam, that has yet been found in Canada is *S. fatuus*, Bangs (the "Northern Lemming Mouse"). The type and eight cotypes of this species were collected "about Lake Edward," P.Q., by Mr. Bangs in 1895, and specimens of it are recorded as having been collected at Godbout, P.Q., by Mr. Napoleon Comeau in the same year; and at two localities in New Brunswick by Dr. J. A. Allen in 1894.

Of the subgenus *Mictomys*, two species are now known to occur in Canada. These are (1) *Synaptomys* (*Mictomys*) *innuitus*, True, which is the Lemming Mouse of Ungava; and (2) *Synaptomys* (*Mictomys*) *Wrangeli*, Merriam, which is the Lemming Mouse of Alaska. The first of these species was described in 1894, and was based upon a specimen collected by Mr. Lucien M. Turner at Fort Chimo, near Ungava Bay, which is still the only locality at which this species has been collected.

The second was described in 1896, from two specimens collected in 1895 by Mr. Clarke P. Streator at Wrangel, Alaska. Mr. Keen's discovery of specimens at Metlakatla extends the southern range of this species to the coast of British Columbia.

BIRDS.

(3) CERATORHINA MONOCERATA (Pallas) Cassin.

(*The Rhinoceros Auklet*).

A good specimen of the single egg of a pair of birds of this species, from Lucy Island, near Metlakatla, was presented to

the Museum of the Survey by the Rev. J. H. Keen in December, 1907, as stated in the OTTAWA NATURALIST of that date.

In October, 1908, Mr. Keen kindly presented the same museum with a fine specimen of a bird of this species, which is labelled as having been taken at Lucy Island on the 24th of April, 1907.

The specimen is a skin of an adult male, in spring plumage, which shows well the large upright and deciduous "horn" at the base of the upper mandible, and the two longitudinal series of long, narrow and acutely pointed white plumes, on each side of the head, as figured by Coues on page 1067 (fig. 722) of the second volume of his "Key to North American Birds."

This large and remarkable species of Auklet has long been known to have a very wide distribution in the north Pacific, but it was previously represented only by an egg, in the Survey collection.

DIOSCOREA VILLOSA AT SARNIA.

By W. A. DENT, Sarnia, Ont.

The surface of the land about the shores of Lake Huron in the vicinity of Sarnia is a succession of sand ridges parallel with the lake. Many of the depressions between these ridges were formerly swampy, or actually covered to a slight depth of water. Vegetable remains accumulated in these depressions in many places to a considerable depth, forming a soil almost as black as charcoal. This humus, mingled with the sand and receiving the drainage from the surrounding ridges, forms an almost ideal soil for the growth of many comparatively rare and interesting plants. The orchid family, renowned for the beauty of its flowers, was here formerly abundantly represented by many of its most beautiful members. *Arethusa*, for instance, *Calopogon* and *Pogonia*, that dainty trio, here grew in profusion, while the Cypripediums in millions made the swamps gorgeous. *Cypripedium spectabile* was formerly so abundant that men went with wagons, and gathered loads of the blossoms to ship to larger centres. *C. candidum* is still to be found in comparatively large numbers, while boquets of *C. arietinum* grace the teachers' desks regularly in several country school-houses.

That beautiful violet, *Viola pedata*, with flowers an inch across, and of the richest shade, grows beneath the pines on the sheltered banks of the sandy ridges.

In the thickets, which are abundant in these shallow ravines, many twining plants grow in tangled masses, sheltering partridge,

quail, woodcock and rabbit, and affording nesting sites to innumerable thrashers, veeries, chewinks, catbirds and rose-breasted grosbeaks. One of the most interesting of these twiners is the Wild Yam, *Dioscorea villosa*, whose knotted root-stocks in many places lie thickly matted a few inches below the surface. It is a graceful, slender twiner with heart-shaped, pointed leaves and small greenish-yellow flowers. The fruiting capsules are conspicuous in drooping racemes, persisting after the leaves have fallen. The plant seems to be restricted to a few of these block-soiled ravines, but, in those in which it does grow, it is the most abundant of the twiners. The soil in which it grows is so light that the root-stocks of the *Dioscorea*, as well as the roots of many shrubs and brambles, are readily removed without the aid even of a trowel. Its stems are frequently intertwined with those of *Celastrus*, *Smilax herbacea* and *S. rotundifolia*, while *Euonymus Americanus* covers the ground, its crimson pods with their scarlet arils being highly ornamental in the autumn.

Dioscorea villosa is reported as being rare in Ontario. The writer would be glad to hear through THE OTTAWA NATURALIST, or otherwise, of its occurrence elsewhere.

NOTES.

In the removal to Toronto of Dr. S. B. Sinclair, late Vice-Principal of the Normal School, the Club loses from the ranks of its active membership one who, for a number of years past, has taken a keen and enthusiastic interest in our work. It is almost entirely due to Dr. Sinclair that the happy and important relationship that exists between the Club and the students of the Normal School to-day, has been brought about. He has placed before each successive class the benefits to be derived from our excursions and lecture courses and taken no small part in helping the Executive to make these occasions of real value to his students. It would he hard to over-estimate his influence on these future teachers in our Public Schools, in thus awakening and encouraging in them a love for Nature Study.

It is not only in this good work that Dr. Sinclair has taken an active part. For many years he was our Librarian and for several terms our esteemed President, directing and assisting in a most helpful way in all matters that served to promote the objects of the Club in this city. We shall miss greatly his genial, stimulating presence from our gatherings, and it is with much regret that we part with him as our coadjutor. Our best wishes

go with him for a very large measure of his success in his new sphere of action.

ENTOMOLOGICAL SOCIETY OF ONTARIO. The 45th annual meeting of this important society was held at the Ontario Agricultural College, Guelph, on November 5th and 6th. The meeting was a most successful one and much interest was shown in the various papers read at the different sessions. The whole of the first afternoon was taken up in a discussion of the chief insect pests of the season, fruit insects being specially treated of. At the first evening meeting Dr. E. P. Felt, New York State Entomologist, of Albany, delivered a splendid lecture on "The Interpretation of Nature." This was illustrated with particularly good slides. At the second evening meeting Rev. Dr. Fyles, of Levis, Que., in his own charming manner, spoke on "The Farmers' Woodlot"; Prof. W. Lochhead, of Macdonald College, on "What the Fruit Grower and Farmer should know about Entomology" and Rev. Prof. Bethune on "Injurious Insects in Ontario in 1908." At this meeting too, a paper on "The Present condition of the work connected with the importation of foreign parasites of the Gypsy and the Brown-tail Moths," by Dr. L. O. Howard, of Washington, D.C., was read. Besides Prof. Lochhead and Rev. Prof. Bethune, other members of the Ottawa Field-Naturalists' Club who attended the meeting and contributed papers were: Messrs. C. W. Nash and J. B. Williams, of Toronto; H. H. Lyman, of Montreal; F. Morris, of Port Hope; and Arthur Gibson, of Ottawa. Mr. J. D. Evans, of Trenton, was unable to attend the meeting, but sent two very interesting papers which were read. The Entomological Society of Ontario is doing splendid work in Canada. It has five active Branches, viz : at Quebec, Montreal, Toronto, Guelph and Victoria. A full account of the proceedings of the above meeting will be found in the annual report of the Society which will soon be published.

THE OCCURRENCE OF THE AMERICAN WOODCOCK (PHILOHELA MINOR) IN MANITOBA.—On August 10th, while hunting insects in an old river-course—now a partially dried slough—near Westbourne, Manitoba, Mr H. E. Chaplin, of Roland, and I were surprised at flushing a bird which we instantly recognized as the Woodcock. A few minutes' search was rewarded by finding the characteristic holes made by the bird, but no other Woodcock was seen. On mentioning the incident to Mr. Fred Rhind, of Westbourne, he told me that some twenty years ago a number of Woodcocks had been shot about the same spot we had seen the bird, but that of late years they had not been noticed. He also stated that in 1902, or 1903, Woodcocks were

very plentiful near his ranch at Big Point on the south-west shore of Lake Manitoba, it being no uncommon thing to flush six or more from around any little damp spot in the woods.

J. B. WALLIS, Winnipeg, Man.

THE FLOWERING-RUSH. In reference to a very interesting communication by the late Dr. James Fletcher in THE OTTAWA NATURALIST for July (p. 80), I am glad to report that the Flowering-rush, *Butomus umbellatus*, grows in this locality also. It was seen in July, 1906, on the inlet from the Canal near the end of Bank Street, opposite the residence of Mgr. Sbarretti. I supposed it was merely an escape from cultivation, probably from the Experimental Farm, and did not report it. This year the number of plants had increased and were spread over a larger area.

E. H. BLACKADER, Ottawa.

A WOODPECKER AT A SHOW. During the progress of the Annual Provincial Exhibition at Victoria, B.C., in the last week in September, a Woodpecker, of the Flicker variety, took up his abode in the main exhibition building. Here he made himself fully at home, quite fearless apparently of the multitude of visitors who were continually passing through the building, flying from point to point with the utmost unconcern and in spite of the printed warnings, and without the fear of the watchful attendants, he distributed his favours most impartially by helping himself to the choicest apples, pecking holes in all and sundry, within a few feet of the hundreds who witnessed his depredations.

The propensity of this bird to forsake his natural food and take to fruit during the autumn in the Province of British Columbia is well known, but this is the first instance within my knowledge when he went so far as to visit a show to satisfy his appetite.

J. R. ANDERSON, Victoria, B.C.

THE EARLY WAKE-ROBIN. In the spring of 1907, a box of the Mayflower, *Epigæa repens* was sent here from Massey, Algoma, containing a few other plants one of which was a Trillium with root which was planted. On the 15th of March, 1908, it came into bloom with the earliest crocuses in the garden, and proved to be the Early Wake-robin, *Trillium nivale*, Riddell, the first record of its being found in Canada.

W. HERRIOT, Galt, Ont.

SQUIRREL EATING A BIRD. I observed last summer at Angers, Que., in a garden, a common squirrel eating a bird. I chased the animal from tree to tree, but it did not release its prey until it was struck with a long stick. The bird was a young sparrow, although I think it was old enough to fly. It was still warm when I picked it up and the inside of its body was completely eaten. The fact seems to be peculiar as it occurred at a season when fruits, and other squirrel food, are plentiful, and I have never noticed in any scientific reports at hand that squirrels become carnivorous. I would be interested to know if any other naturalist ever saw anything of this kind.

GEO. MICHAUD, Ottawa.

In the October number of the Ottawa Naturalist in his "Notes on the Species of Phæocyma found in Canada," Dr. J. B. Smith stated that he had just finished a revision of all the American forms. This monograph "A Revision of some species of Noctuidæ heretofore referred to the Genus Homoptera, Boisduval." has just been published, (Proc. U. S. Nat. Museum, Vol. XXXV, pp. 209-275). This treatise which deals with a group of moths, the members of which have been much confused in collections, will be welcomed with delight by lepidopterists. We are deeply indebted to Dr. Smith for this valuable publication.

It is with very great regret that we have to record the death of Dr. James Fletcher, Entomologist and Botanist of the Dominion Experimental Farms, which occurred at the Royal Victoria Hospital, Montreal, on November 8th, 1908, in his 57th year. The Ottawa Field-Naturalists' Club, of which he has been styled "The Father," loses, in his demise, one of its most brilliant and active members. The January issue of the OTTAWA NATURALIST will be a memorial number, and will contain articles on him and his work by prominent members of the Club.

The Ottawa Field-Naturalists' Club, 1908-1909

Patron:

THE RIGHT HONOURABLE EARL GREY,
GOVERNOR-GENERAL OF CANADA.

President:

A. E. Attwood, M.A.

Vice-Presidents:

A. Halkett. Rev. G. Eifrig.

Librarian:

C. H. Young.

Secretary:

T. E. Clarke, B.A.
(470 O'Connor Street).

Treasurer:

Arthur Gibson,
(Central Experimental Farm).

Committee:

Mr. J. M. Macoun.
Mr. H. H. Pitts.
Mr. E. E. Lemieux.
Mr. Alex. McNeil.
Mr. L. H. Newman.
Miss Q. Jackson.
Miss E. E. Currie.
Miss M. B. Williams.

Auditors:

R. B. Whyte. F. T. Shutt.

Standing Committees of Council:

Publishing: A. Gibson, J. M. Macoun, H. H. Pitts, L. H. Newman. Alex. McNeil, Miss Q. Jackson.

Excursions: G. Eifrig, E. E. Lemieux, T. E. Clarke, C. H. Young, A. McNeil, Miss E. E. Currie.

Soirées: A. Halkett, H. H. Pitts, J. M. Macoun, E. E. Lemieux, L. H. Newman, Miss M. B. Williams.

Leaders:

Geology: H. M. Ami, W. J. Wilson, W. H. Collins, M. F. Connor, M. Wilson.

Botany: J. Fletcher, John Macoun, D. A. Campbell, S. B. Sinclair, A. McNeil, L. H. Newman, T. E. Clarke.

Entomology: W. H. Harrington, J. Fletcher, A. Gibson, C. H. Young, J. W. Baldwin.

Conchology: J. F. Whiteaves, F. R. Latchford, J. Fletcher, S. E. O'Brien.

Ornithology: G. Eifrig, W. T. Macoun, A. G. Kingston, A. H. Gallup, H. F. Tufts.

Zoology: E. E. Prince, A. Halkett, W. S. Odell, E. E. Lemieux.

Archæology: T. W. E. Sowter, J. Ballantyne.

Meteorology: Otto Klotz, A. E. Attwood, D. A. Campbell, A. McNeil.

THE OTTAWA NATURALIST

Acting Editor:

ARTHUR GIBSON, (Central Experimental Farm.)

Associate Editors:

DR. H. M. AMI, Geological Survey of Canada.—Department of *Geology*.

DR. J. F. WHITEAVES, Geological Survey of Canada.—Dept. of *Palæontology*.

DR. JAS. FLETCHER, Central Experimental Farm.—*Botany & Nature Study*.

HON. F. R. LATCHFORD.—Department of *Conchology*.

MR. W. H. HARRINGTON, Post Office Department.—Dept. of *Entomology*.

REV. G. EIFRIG, 210 Wilbrod St.—Dept. of *Ornithology*.

PROF. E. E. PRINCE, Com. of Fisheries for Canada.—Dept. of *Zoology*.

DR. OTTO KLOTZ—Dept. of *Meteorology*.

Membership Fee to O.F.N.C., with "Ottawa Naturalist," $1.00 per annum