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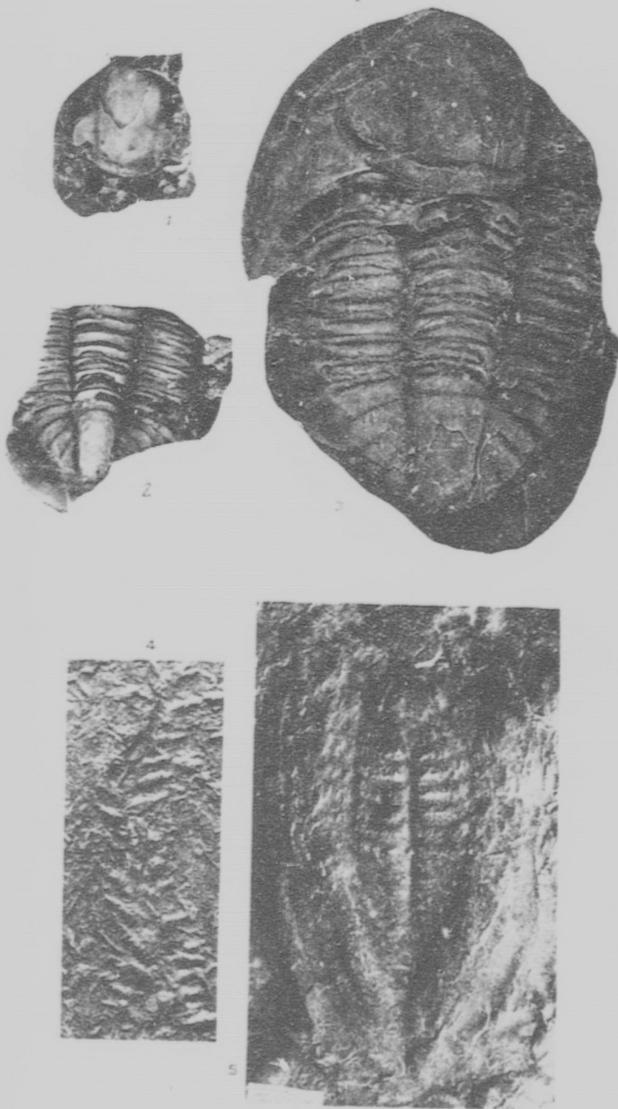
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NEW TRILOBITES FROM THE CHAZY NEAR OTTAWA.

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THE OTTAWA NATURALIST

VOL. XXIV. OTTAWA, NOVEMBER, 1910

No. 8

ON TWO NEW TRILOBITES FROM THE CHAZY NEAR OTTAWA.*

BY PERCY E. RAYMOND.

BATHYURUS SUPERBUS SP. NOV. PLATE II, FIGS. 1—3.

Entire test broadly oval in outline, the breadth varying from .6 to .8 of the length. Dorsal furrows deep on thorax and pygidium, but shallow on the cephalon. Axial lobe narrow and rather low, not being raised much above the general level of the surface.

Cephalon short and wide, surrounded by a very narrow concave border. Glabella nearly smooth, expanding slightly in front of the eyes; marked by two pairs of faint furrows. Eyes very large, low, extending back to the neck furrow and forward to the middle of the glabella. Free cheeks wide, convex, the genal angles drawn out into spines which extend back to the fifth or sixth segment of the thorax. Surface of the test smooth except for fine striae which are rather prominent on the inner margin of the free cheek.

Thorax of nine segments. Axial lobe narrow. Pleura with deep furrows.

Pygidium nearly semicircular in outline, with a broad concave border and a low, smooth axial lobe. The pleural lobes are marked by four pairs of wide, unfurrowed ribs which can be traced across the concave border. The axial lobe is crossed by one prominent ring, and two fainter ones. Behind the rings are a series of pairs of hardly visible pits. Test covered with faint irregular striae.

The hypostoma is about as broad as long, almost straight in front, semicircular behind; muscular attachments in front of the middle; side wings narrow. It is very similar to the hypostoma of *Bathyurus extans*, but broader in front.

Length of the largest specimen 74 mm., width 58 mm. A smaller specimen is 40 mm. long and 25 mm. wide. One pygi-

* Published by permission of the Director of the Geological Survey of Canada.

dium is 18 mm. long and 30 mm. wide, while another is 12 mm. long and 21 mm. wide. A very large cephalon is 27 mm. long and 58 mm. wide.

This species is closely related to *Bathyurus extans* (Hall), but differs from that species in being wider, in having a much less convex axial lobe, a depressed and rounded, instead of a very convex and subtriangular pygidium, and a much wider concave border on the pygidium. The surface of the glabella of *B. extans* is quite granulose, while the test in this species is smooth. The species also attains a much larger size than *B. extans* or any other species of the genus.

LOCALITY.—This species seems to be rather common in a layer of dark gray dolomitic limestone southwest of the outcrop of the Black River and Lowville at La Petite Chaudière, Mechanicsville, Ontario, and has not yet been observed in any other stratum. This layer is supposed to belong to the Chazy.

The entire specimen, which is probably the largest *Bathyurus* known, was collected by Mr. J. E. Narraway, and is in his collection. The other specimens figured were collected by the writer and are in the collection of the Geological Survey. Mr. Narraway has a pygidium of this species which he collected some years ago from a loose fragment of rock in Ottawa South.

The only other *Bathyurus* known from the Chazy is *B. angelini* Billings, a species which is peculiar in that the axial lobe of the pygidium extends across the border to the posterior margin.

ISOTELUS ARENICOLA SP. NOV.

For a number of years fragments of a large *Isotelus* have been found in the sandstone of the Chazy about Ottawa, but as the cephalon was unknown, it was not possible to determine what species was represented. It has usually been listed as *Asaphus* or *Isotelus canalis*. (See Sowter, T. W. E., OTTAWA NATURALIST, Vol. II., pp. 11-15, 1888; Ami, H. M., Appendix to Dr. Ells' "Geology of Ottawa and Vicinity" 1901). A free cheek recently found by the writer at Britannia supplies the missing information, and this, with the large headless specimen collected by Richardson at Deschenes, furnishes the material for the description which follows.

DESCRIPTION.—Cephalon, judging from the free cheek, nearly three-fourths as long as broad, surrounded by a wide concave border. Eyes large, situated less than their own length from the posterior margin of the cephalon. Free cheek broad, with the genal angle drawn out into a short, broad, flat spine. Thorax of eight segments, the axial lobe narrow for the genus— one-third the total width. Pygidium roughly triangular in out-



Fig. 1. *Isotelus arenicola*. Outline of free cheek and portion of cranium from Britannia. One-third natural size.

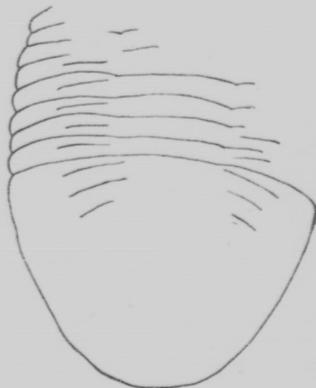


Fig. 2. *Isotelus arenicola*. Outline of the specimen collected by Richardson at Deschenes. One-third natural size.

line, three-fourths as long as wide; border concave. On the specimen described, which is a cast of the interior, there are two rather distinct ribs on each of the pleural lobes. The axial lobe is hardly distinguishable.

Width of thorax at back of fourth segment, 135 mm., width of axial lobe at same point, 45 mm.; length of pygidium, 98 mm., width, 130 mm. The specimen is only very slightly flattened. The total length of this specimen appears to have been about ten inches. Another specimen, described below, seems to have been at least four inches longer.

This species is more closely allied to *Isotelus gigas* than to any other species, the pygidia of the two forms being almost alike. The axial lobe of the thorax of the species here described is, however, much narrower than in either *I. gigas* or *I. maximus*. *I. gigas* has no genal spines at maturity, and *I. maximus* has a shorter and more nearly semicircular pygidium. *I. harrisi* has a wider and shorter cephalon, and *I. platymarginatus* has a much wider concave border around the pygidium.

A rather remarkable specimen of this same species was found by W. C. King, Esq., on the shore of Lake Deschenes at Britannia. This specimen is an impression of the lower surface of the trilobite, and shows a longitudinal ridge corresponding to the central furrow along the axis of the ventral side of the animal, 10 pairs of transverse furrows, and the impression of the hypostoma—first noticed by my friend, Mr. Narraway. The doublure of the pygidium has also left a wide smooth impression, but in the cephalic region the hypostoma is the only portion of which there are any traces remaining. The specimen was found by Mr.

King on a waterworn surface of the beach, partially covered by the shingle, and many details of the structure have doubtless been removed since it was first exposed to the action of the elements. The outline of the hypostoma is rather faint on the specimen, but the excellent photograph made by Miss Bentley brings it out clearly. The forks are rather short and far apart, and the anterior portion is narrow, so that the general form of the hypostoma is more like that of *Isotelus harrisi* than *I. gigas*. The total length is 75 mm., the greatest width, 65 mm.; length of the body portion, 53 mm., width, 50 mm.

The transverse furrows are the impressions left by the gnathobases of the basal joints of the legs. These gnathobases were evidently long and very heavy, but the specimen has been so abraded that all details are obscured. The first six pairs of impressions are longer and deeper than the four behind. The first eight pairs seem to belong to the thoracic appendages, while the last two belong to the pygidium. From the posterior tips of the hypostoma to the first gnathobases of which traces are present there is a distance of about 22 mm. without impressions. In *Isotelus gigas* the hypostoma normally extends back to the posterior margin of the cephalon, so that it seems that in this specimen the impressions of the first two pairs of gnathobases under the thorax may not have been preserved. In that case, the six pairs of strong impressions may represent the last six pairs of thoracic segments, and the pygidium might begin with the first of the fainter ones.

Two specimens of *Isotelus*, somewhat similarly preserved, have been figured. One is Billings' specimen from the Trenton at Ottawa, and the other was described by Mickleborough and by Walcott from a specimen found near Cincinnati. Both of these specimens, however, show the trilobite itself, as well as the impression. Both show the long heavy gnathobases of the coxopodites, and it becomes evident that, as the coxopodites are attached directly under the dorsal furrows, the increase in the width of the thoracic lobe, which is so marked a feature in *Isotelus*, is due to the great development of these gnathobases. The writer believes that this impression on the ripple-marked sand of the Chazy gives a clue to the development of the gnathobases. Apparently *Isotelus* was a bottom crawler, and the gnathobases may have served as ambulatory appendages. In both the specimens of *Isotelus* mentioned above as retaining the appendages, the gnathobase of a thoracic appendage is nearly as long as the remainder of the appendage, and being a single rod, and not jointed, is much more useful as a lever. On all the specimens known, the gnathobases are strongly developed on the thorax, and only feebly so on the pygidium. Beecher found

that the appendages under the pygidium of *Triarthrus* were flattened and adapted for swimming, while those under the thorax could be used either in swimming or crawling. It would seem that this sort of specialization had gone still further in *Isotelus* than in *Triarthrus*. Here there is a large pygidium, probably provided with swimming organs (Walcott found traces of them under the pygidium of the specimen he described), and under the thorax the inner portions of the appendages were strengthened to function as ambulatory appendages. In *Triarthrus*, a form adapted primarily for swimming and secondarily for crawling, the appendages are very long, and extend far beyond the outer margins of the test, while in *Isotelus* the appendages are hardly long enough to reach the outer margins. The swimming power had to some extent been sacrificed in the adaptation to crawling. *Triarthrus* depended on its swiftness in swimming to escape from its enemies, and lacked the power of enrolment. *Isotelus*, a slower moving, but heavier-shelled animal, protected itself by complete enrolment.



Fig. 3. Diagram of the trails on a slab of sandstone found at Deschenes. 1 is the trail shown in the photograph on the plate, and 1 and 3 are supposed to have been made by an *Isotelus*.

Certain trails found by the writer on the surface of slabs of sandstone from the Chazy at Deschenes tend to confirm the suspicion that the gnathobases were used as ambulatory organs. A diagram and photograph of one of these trails is here reproduced, and it will be seen that it is exactly the sort of marking that would theoretically be produced by a trilobite which was crawling with the aid of the gnathobases only. The trail numbered 1 in the diagram can be traced for about 100 mm. on the slab, and consists of a series of pairs of approximately parallel ridges, arranged on opposite sides of a narrow furrow. The ridges are inclined at angles of from 30 to 60 degrees to the direction of the furrow. Each ridge is about 10 mm. long, and the furrow is from 3 to 5 mm. wide. The slab is a mould of the

impression made in the sand, and the ridges correspond to the depressions made by the gnathobases. The trail numbered 3 is similar to the one described, but the one numbered 2 is of a different sort.

The increase in width of the axial lobe, caused by the development of the gnathobases in the adaptation to the crawling mode of life, explains the parallelism which exists between certain genera of the *Asaphida*, and the parallelism between *Nileus* and some of the *Illaenida*. A number of forms, arising from different stocks, were becoming adapted to near-shore life, and all found that enlarged gnathobases assisted them in their new mode of life. Thus the narrow-axised *Asaphus* produced *Onchometopus*, *Isoteloides* produced *Isotelus*, and *Symphysurus* developed into *Nileus*, just as some as yet unknown form developed into the *Illaenurus* of the sands of the Potsdam.

LOCALITY.—This species is represented in the collections at the Museum of the Geological Survey by a thorax and pygidium from Deschenes, and a free cheek from Britannia, which are holotype and paratype respectively. There is also a partial thorax and pygidium collected by James Richardson in 1853 from the sandstone of the Chazy at West Hawkesbury. The pygidium of this specimen is 72 mm. long and about 110 mm. wide, and shows a single rib on each pleural lobe. The axial lobe of the thorax is very narrow, being only 33 mm. in width. The total width appears to have been somewhat over 100 mm. The fourth specimen was found loose at Point Claire, but was undoubtedly from the Chazy, which outcrops there. This specimen shows the posterior portion of the hypostoma and portions of six thoracic segments. The forks of the hypostoma are very short, and the body portion is convex. The axial lobe of the thorax is 53 mm. wide, and the total width of the thorax is 160 mm.

EXPLANATION OF PLATE II.

1. *Bathyurus superbus* Raymond. A small cranium. About natural size.
2. The same species. An imperfect thorax and pygidium. Slightly smaller than natural size.
3. The same species. A nearly complete specimen. About natural size.
4. Trail, supposed to be that of an *Isotelus*.
5. Impression of the ventral surface of a trilobite, presumably *Isotelus arenicola*. About one-fifth natural size.

NOTES ON THE WHITE-THROATED SPARROW.

BY L. MCL. TERRILL, WESTMOUNT, QUE.

Even after fifteen years' acquaintanceship, I still look forward to the arrival of the White-throated Sparrow as a chief event in the spring migration.

Birds confine themselves chiefly to the open country at this time; in fact few wood-dwellers have begun to arrive. Hardwood groves carpeted with *Hepaticas* and other blossoms hold some attraction for bird life, but in the gloom of the evergreen swamp few notes are heard. Here, the hardy Skunk-cabbage is alone strong enough to force its way through snow and ice-water; a Winter Wren occasionally bubbles forth its overflow of spirits, and possibly at twilight you may hear the Hermit Thrush, yet it requires the frequency of the White-throat's cheery whistle to make one feel entirely at home.

Immediately on their arrival (on the average about the 27th of April) one may find these sparrows paired and settled in their breeding haunts. After the first of May it is usual to hear individuals in city gardens (in one instance a lumber yard in the heart of the city was chosen by a bird which sang nearly every morning from the 14th to the 20th of May), but these birds are more likely northern than local residents. During the three or four weeks following their arrival the White-throats sing a great deal; even at night one will often hear a sudden burst of song. Usually the same number of notes are uttered, though the variation in pitch and inflection is considerable. Later, when the breeding season is far advanced, notes are frequently omitted; often the first two alone are uttered, the second being much shortened and abruptly terminated. One feels, on hearing this late summer song, that the bird has not finished what it started to say; as if the impulsive singer were denied the right to sing yet could hardly repress the song. The abrupt full-stop suggests sadness,—oblivious for the moment, the White-throat is suddenly reminded of the dying summer. Still later, in late August and September, though individuals will sometimes sing the spring song in its entirety, it is more usual to hear the first note only and that much shortened, an utterance that would readily escape detection.

Comparatively few birds commence nesting in May, though I have found several complete sets in that month. On May 15th, 1910, my earliest record, I located two partially completed nests; a week later found these nests abandoned, and two others with one and four eggs respectively. This habit of abandoning nests when disturbed, is common with such birds as the Ovenbird.

Chestnut-sided and Canadian Warblers, is almost universal with the White-throat in this district. Having examined a great many nests I can only record two or three instances in which the bird has returned to lay, after being flushed from an empty nest or from a nest containing one or two eggs.

On the other hand, if the bird has commenced incubating she will rarely desert. I have never identified an egg as having been removed from an abandoned nest to a new one, yet I am quite satisfied that this is a common occurrence; at least, any eggs in a nest at the time of abandonment will have disappeared on a return visit. More than this, the birds will often remove a quantity of lining, no doubt to serve in a new venture.

The nest is a substantial structure, usually built on the ground, and the bird is fastidious in regard to certain materials apparently necessary to give satisfaction. Various substances compose the body of the nest; generally plant stalks, withered grasses and bark shreds, on a foundation of skeleton leaves, with a lining similar to that employed by the Swamp Sparrow, usually of bleached grasses. The main distinction from other sparrows' nests lies in the outer rim of green mosses which is never, to my knowledge, absent; often suggesting in this respect nests of the Phoebe Flycatcher. Sometimes, in very wet woods, there will be an additional understructure of particles of decayed wood, raising the nest slightly and permitting of drainage. Moisture is apparently essential to the White-throat's welfare at this season; possibly they would have no objection to nesting in a dry bare place (the Ovenbird safely combats the disadvantages of ground nesting in the barest of woods) were it not that the swamps contain their chosen food. Occasionally, in the hilly country with a predominant growth of conifers, the White-throat will cohabit with Juncos on the dry slopes of hill pastures, when the nest is usually built in the thick of some shrubby evergreen bush. In the same locality, down in the tamarack-girt sphagnum bogs, it is also usual to find the nest above ground; the respective lack and density of undergrowth being chiefly responsible for this departure. Above all other spots, an opening, either path or glade, in damp evergreen woods is chosen, while adjoining Black Ash swamps usually accommodate a few pairs. The opening in thick woods is essential as little shade suffices; secondly, this opening should be carpeted with ferns and grasses, and especially with the running vines of Swamp Raspberry and Bedstraw. Occasionally the nest is built on top of a mossy mound or stump (especially in the wetter woods) hidden beneath a canopy of ferns; but more often it is hidden in a tangle of Bedstraw.

Descriptions of eggs are usually inadequate except by com-

parison; only thus can one appreciate the difference between eggs of Song, White-throated and Swamp Sparrows. All of these might be roughly described as spotted with brown on a light greenish ground; but on comparison, taking eggs of the Song Sparrow as a type of reddish brown, the others become respectively, distinctly brick-red and umber-brown. Of course, eggs of the White-throat are generally, though not invariably, larger than the other two species. Four eggs are usually deposited; less commonly three and five. The foregoing remarks apply for the most part to first layings, as the White-throat rears at least two broods in a season, usually the first in the early part of June and the second in mid-July, though some birds delay until August.

As the rank growth in the damp woods advances with the summer, the birds seek more open woods and second growths, where they nest in brush heaps and evergreen bushes as well as on the ground. In so doing they simply avoid the uncongenial depth and density of undergrowth similarly as in the sphagnum bogs earlier in the season. The White-throat gives little indication as to the location of its nest; likely you will hear the male sing, but not a note of alarm until you flush the female, when both birds immediately join in an angry outcry. If, however, the nest contains young and the parent is not on the nest, you will likely be notified when some distance away. As far as I know the female sparrow alone incubates her eggs; though once on a hot day at noon I flushed two birds from a rather exposed nest. This nest contained newly hatched young and no doubt the parents were endeavoring to protect them from the sun's rays. Leaving the locality and returning several minutes later, I had a good view of both birds covering the nest with outspread wings.

There is considerable individuality in the mode of leaving the nest; a bird building in bushes will usually slip quietly to the ground and steal away on the far side, eventually flying to a perch overhead, when the alarm note is sounded. In the case of ground-nesting, the bird usually flushes directly from the nest and immediately seeks a perch. Occasionally, however, she will slip away as quietly as a mouse and get some distance from the nest before taking flight. This method of evacuation is more common when the nest contains young, in which case you are fortunate in seeing the bird before hearing her. In whatever manner the bird may be flushed she will usually seek a perch above ground before giving vent to alarm, this alarm being expressed in a "chip" repeated at intervals, a note much more metallic than that of other resident sparrows.

In late July and early August, whilst many birds are still

with fledglings, one may hear the migratory "tsip" of earlier broods preparing to leave the woods. This is done gradually; by the middle of August small flocks are to be found in thickets and hedges of the more open country. From then on the deeper woods become very quiet, though there are always a few birds detained with late broods, even after the Wood Peewee's note is no longer heard. I have heard a White-throat in full song, in its breeding haunts, as late as September 27th (1908), but this is unusual. During September and October they are to be found chiefly flocking with other sparrows in the hedges of the open country, in the outskirts of woods, along river banks and in city gardens. In these situations they often utter their alarm notes, but I have yet to hear a White-throat singing in the open country.

By the middle of October the bulk have departed, and toward the end of the month practically all have gone; though I have one exceptional record, November 22nd, 1908, when I secured an immature bird and saw another.

My observations on the White-throated Sparrow were made in the counties of Laval, Jacques Cartier, Laprairie, Terrebonne and Compton, Province of Quebec.

FIELD NOTES OF CANADIAN BOTANY.—II.

BY EDWARD L. GREENE.

A year has passed, and somewhat more, since the first instalment of these notes was published. That paper, as may be seen by reference to it in the issue of THE NATURALIST for September of last year, consisted of notes on the vegetation of a tamarack marsh at Strathroy, western Ontario; and since I had not completed my account of the region as a whole, I may as well resume at the point where I left off.

I had descended to the marsh by a well-beaten path, evidently the trail of children and others of the Strathroy villagers who naturally resort to the place to gather its choice floral treasures in spring and summer. I left the spot from another side where there was no path; and on ascending to the slightly higher ground of the low hills that shut in the marsh on two sides, I encountered a low sumach thicket which, although it was the middle of June, was not yet in foliage. The sumachs are all late in coming into leaf, and this colony was at that stage when the new shoots are a few inches long, and the leaves barely beginning to unfold. There was that in the first near view of these shrubs, just emerging from their winter condition, their branches still

almost naked, which impelled me to halt and inspect them more closely. There were plenty of clusters of fruit remaining in fair condition from the autumn before. The drupelets were those of the group of *Rhus glabra*; and this was a surprise, because the first glance at the branches had convinced me beyond possibility of doubt that the colony was of the *R. typhina* group; not that they manifested that dense velvety, or rather plushy indument like that of the horns of stags when the horns are newly grown. There are *Rhus typhina* allies, unquestionably such to all who know them, that have no trace of the velvet or plush on their branches at any time. These are conditions of which the botanists who write the descriptive manuals know nothing. The book does not yet exist in which the most fundamental distinctions between these exceedingly common shrubs, those of the *glabra* type and those of the *typhina* type have been given. What the most essential characters of the two groups are, I proceed to state; and first, those marking the *typhina* group. The young branches are *cylindrical*, or *terete*, to use the good botanical term, which means that the cross section is in outline a circle; also the bark of such young branches is of a *deep or dark green*, without trace of bloom or pallor. In every form or phase or distinct species of the *glabra* alliance such young branches are not only *pale or whitish with bloom*, they are never cylindrical or terete, but always plainly *angled*, their cross sections never circular, always angular, more or less definitely and acutely so. By such clear and definite notes as these may the botanist out of doors distinguish between these two types of sumach even in mid-winter; and both types are common over an area that embraces almost all of North America east of the Rocky Mountains. And the points of difference here emphasized have not been known to the writers of our manuals sitting in the herbarium, although herbarium specimens exhibit them.

I shall have more to say concerning the sumachs of West-ern Ontario by and by.

This perhaps more distinctively southwestern part of the great province, as I traversed it from Sarnia near the southern point of Lake Huron to Hamilton on Lake Ontario, and as I have walked some scores of miles of it in pursuit of botanical knowledge, has to me the appearance of what may have been from the first a gently undulating prairie country broken into sections of small extent by many woodland-belted rivers and their numerous lesser tributaries.

Across the prairie looking eastward from Strathroy I noted as at the probable distance of a mile and more a stretch of timber, where I supposed I should find a water-course of some kind, and on the wooded hills above one special desideratum, *Thalictrum*

dioicum. On reaching the woods, I found there no river or stream or streamlet, nor any spot at all where one would expect that species of *Thalictrum*; but I was slow in reaching the woodland destination because of the interesting objects—botanical—which I met with along the railway. The botanist in a prairie country always makes the railroads his highway as a pedestrian, because along such line only can he hope to find strips of prairie land that were never overturned by the plow, and where remnants of the original native plants of the region have stood chances of survival.

The first half-mile or so eastward from Strathroy by the railway is low prairie land, at least now, though almost doubtless it may have been wet timber land originally, the Sydenham River near which Strathroy was built being well timbered, like other streams of the region, all along its course. To the plant associations of this half-mile of low moist prairie I shall return later; but the boundary of this low land, at the eastward, is a low but broad ridge of dry and light sandy soil, perhaps a glacial deposit, or else an ancient bank of the river now a half-mile distant. The railway has been cut through this sandy ridge, and the land on the sides of the track is prairie never yet broken by the plow. On the northwestward slope of this slight elevation, under that protection from cattle which the railway fences secure to many an easily extinguished native flower, I recognized, even before I had come very near the spot, a fine colony of an old favorite not seen by me before for many a year, *Erythrocoma triflora*, the Three-flowered Avens, or Three-flowered Geum. This is one of several beautiful early spring flowers which botanists and lovers of wild flowers in Wisconsin, and in Michigan a generation ago, knew as the earliest things of spring, and they sought it as they did the Pasque Flower, *Pulsatilla Nuttalliana* and *Ranunculus rhomboideus* on the bleakest and coldest exposures of the knolls of glacial drift, where alone either one of the three was ever to be seen. Of course in the middle of June in western Ontario the *Erythrocoma* was past its flowering, but the tufts of soft feathery coma, that as an appendage to the head of seeds is almost as red as the flower itself—these remain until the beginning of summer and render a colony of the plants a thing of beauty as long as they last.

On this same slope I observed a single plant of a violet that I had not met with before, nor have I seen it since in any later travels. As to foliage alone it might have been *V. fimbriatula*, but it had three good marks to preclude its being referred to that common and rather widely dispersed species. Its stout root-stock was widely and multifariously branched, so that the plant as a whole formed quite a broad tuft. Entirely past the period

of its showy flowering, the apetalous summer flowers were as far as possible from standing upright as they do in that species; they lay close along the ground and on slender peduncles clothed with long soft hairs. Here, then, were three abundantly sufficient characters by which to have distinguished this violet as new. At a later date, only a quarter-mile away, growing as its habit is on sandy but damp ground, I saw plenty of *V. fimbriatula*, and here as always with its simple short rootstock, upright apetalous flowers and pods borne among the leaves, and the peduncles stout without hairiness. I am careful to describe both the localities, and the peculiar marks of these plants, in the hope that botanists resident in western Ontario may have an eye to their further investigation, especially in perhaps early May, when they should be in petaliferous flower.

A little beyond this sandy ridge the railway embankment, only a little elevated above the level of the plain, was thickly beset with a dwarf wild rose, now in the middle of June, well in flower. I supposed it to be a colony of my *Rosa pratincola*, an almost herbaceous rose abundant all over the whole prairie region of the Upper Mississippi and its tributaries but this identification will perchance not hold good. It was too early for the fruits, and the plants after all seemed rather too compactly colonized for *R. pratincola*.

At this good point of my route to the woodland I took observation of a grain field as occupying acres on one side along the railway, and on the opposite an equal stretch of pasture land, the pasture being more or less elevated and sandy, this ridge of drift, if such it be, sloping away and becoming evanescent at a distance of not many rods from where I stood within the railway enclosure. In this elevated and sandy part of the pasture close at hand there were blackberry bushes and a scattered colony of sumach, the members of this low of stature, much smaller than those on the hills around the tamarack swamp, and they seemed laden with last year's panicles of different shape as well as heavier than those of the other. As seen from a short distance, I was hoping this might turn out to be a member of the *Rhus glabra* alliance; possibly my *R. arbuscula* of the glacial drift in northern Indiana not so very far away; but an inspection of the shrub, with its branches just budding out into leaf, resulted in the certainty that this also was of the *R. typhina* alliance, possibly the same, specifically, as the other; possibly distinct.

The nearer approach to the woods that I had set forth to reach disclosed evidence that on this side of the prairie also, as on the opposite side of the town, the original limits of it had been somewhat extended, and that of the woodland correspondingly restricted since the first settlement of the country; for now, what

any one not a botanist and close observer would not have doubted about as a part of the pristine prairie, began to show fine patches of *Smilacina racemosa*, at this time in fresh full bloom, while along the fences there was a continuous row of bloodroot, this of course long past flowering. These and a few other plants which by nature are strictly woodland plants, will maintain a foothold and even flourish in the open, long after their forest shelter has been removed, so long as neither the plow nor the ruminants disturb them.

The wooded belt when reached did not prove to be the wild woodland I had hoped to see; nor was there river or even any streamlet coursing through or near it. What I had come to was but a series of well kept groves of young trees, such as the farmers had with excellent economy not only permitted to remain, but had kept clear of woody undergrowths, permitting not much except the native herbaceous plants and a scattered growth of currant and gooseberry bushes, natives of the soil, to remain. The most common tree was beech, but also there was no dearth of red oak, some white oak and bur oak, an occasional ash, more than an occasional linden and black maple, besides such things of smaller stature as *Carpinus* and the hop hornbeam, besides a *Crataegus* species or two. In less elevated and rather damp places I noted the presence of *Dirca palustris* and *Enonymus obovatus*. Where the shade was deepest, chiefly under the beeches and maples, there was abundance of *Arisaema* and of bloodroot, besides yellow violets, and clustered between and upon the superficial root-arms of the beeches was a great abundance of *Unifolium canadense*. In places less shady, and where they were partly open to the sun, there were beautiful patches of *Geranium Robertianum* in full flower at the time; also here and there a tuft of scarlet columbine. I have observed scarlet columbines all the way across the United States from the Atlantic to the Pacific, and have long known them in the Rocky Mountains of Colorado, and in both the Coast Range and the Sierra Nevada. Botanists in Europe and in America have distinguished several species, and I doubt not most of them are valid. This one of western Ontario at once presented one mark that was new to me among this group. The basal leaves were more elegantly and narrowly cut than any I had observed either east or west, and also they were of an almost whitish glaucous hue, though all of a sudden the stem leaves all, even the lower, were of the usual green of the columbine leaves. And this plant is certainly not *Aquilegia canadensis*, for the sure mark of that is that its follicles when grown and mature spread away from one another at the top, and are even almost recurved. In the plant of western Ontario the follicles closely cohere to the very tips, and are even then con-

nivent rather than otherwise. The plant may not be new or undescribed; for careful people who have studied these plants in their native haunts in various places, and have cultivated them together have been obliged to distinguish several. Beyond doubt those listed and defined by Dr. Small in his excellent "Flora of the Southern States" are good. This plant of Ontario may perchance be one of those, but quite as probably it is neither; and assuredly it is not *A. canadensis* whatever it be.

Traversing this delightful succession of groves, I came at last to a dry open space, where the soil was sandy and the ground more elevated. By the presence of two or three other plants not seen before that day, I recognized the elevation as a continuation of the glacial drift I had passed an hour before. The best of these were *Ranunculus fascicularis* and *R. rhomboideus*. Both were past flowering and in good fruit; but they recalled again very vividly the gravelly knolls that in Wisconsin so long ago I used to visit early each spring to see and gather, among others before named, these two rare buttercups. I am informed by my friend Professor John Macoun that Goldie, who was the discoverer of *R. rhomboideus* and who published the species, almost a hundred years ago, was a settler in western Ontario, and botanized about Strathroy; so that here, without knowing it at the time, I was on classic ground for Canadian botany.

A COLONY OF CLIFF SWALLOWS AND OTHERS.

BY NORMAN CRIDDLE, TREESBANK, MAN.

While collecting along the banks of the Souris River near Treesbank on July 26th of this year, I came across several colonies of Cliff Swallows with nests built on the almost perpendicular banks of the stream. The first of these were well out of reach, but eventually I discovered two on quite a low cliff situated close to some convenient mud, which probably accounted for the unusually low site chosen. The two colonies contained about 130 nests, which were some 200 yards apart, the lowest being only five feet from the more even ground beneath and but a foot from the top. These were much bunched together and gave quite a strange effect to the cliff owing to their dark, pear-shaped forms and somewhat elongated necks against the lighter back-ground. Many of the young birds had already left their nests and could be seen flying with their parents, while others were only partly fledged, and several nests still contained eggs, though in an advanced stage of incubation.

As is well known, most swallows are attacked in their homes

by a very disagreeable parasite closely allied to the obnoxious bed bug, in fact many persons still believe that these insects are identical, and, as a result, condemn the swallows for spreading the true bed bug throughout the country. Needless to say, however, this is not the case, for though the unsavoury odour is identical a casual examination will convince any observant person of the difference between the two insects.

The colonies referred to above proved no exception to the general rule, in fact the nests inside and outside were simply swarming with this bug (*Aciacus hirundinis*), as were also the cliffs below the nests and for several feet on either side of them, while every crack and cranny was full of the disgusting insects in all stages of growth; many were so inflated with blood as to appear quite red. There was, also, an almost incessant shower of the bugs falling upon the earth beneath, and during the short time I spent in examining and collecting a few of the creatures, fully a dozen dropped upon my hat and clothes, so that I was glad to discard them and have a dip in the river. Afterwards I tried to entice a couple to bite me, but in vain, showing that they evidently preferred to confine themselves to the feathered tribe.

To me it seems remarkable that the young birds managed to survive at all. While the substance sucked from the parents during the brooding period must be very great, yet, with the exception of three partly fledged young found dead some twelve feet away, which may have been victims, no evil effects were observed.

The colonies were undoubtedly old ones, as was indicated by the broken nests partly built upon, and also by the great quantity of refuse beneath. This is doubtless why the bugs were present in such abundance.

It has not been my good fortune to run across more than about a dozen colonies of Cliff Swallows, but all these have invariably been situated on cliffs or barns either facing the north or east, so that they were sheltered from the sun during the hottest part of the day. My experience with Bank Swallows is that they always choose the north or eastern cliffs facing the sun. Perhaps this is merely a coincidence, but be that as it may, either the difference in habit or situation of nests seems to be responsible for a lack of bugs among the Bank Swallows, as I could not discover any in their vicinity, while the insects were quite active on and about the sheltered nests of the Cliff Swallows during a greater portion of the afternoon.

A species of *Aciacus*, probably identical with the Swallow Bug, is sometimes found in poultry houses, and I have also discovered them in a stump containing a pair of nesting Tree Swallows. Barn Swallows, as is well known, are also much

infested with them at times, especially when there are several together. The reason why swallows are so much attacked is probably due to their habit of returning to the same breeding place for several years in succession, and thereby making much more profitable hosts for the bugs than birds that change their nesting abode each season. It is also interesting to recollect that the nesting period of swallows only covers, at most, three months, so that the bugs are obliged to fast for nine months of the year. Most of this time, however, is spent in hibernation.

NESTING OF THE AMERICAN OSPREY.

BY W. J. BROWN, WESTMOUNT, QUE.

The heavy dense woods of tamarack, black spruce and balsam, with poplars and birches scattered here and there, which skirt the shores of the Gulf of St. Lawrence, are an excellent breeding ground for the American Osprey. From May 28th to June 15th of the present year twenty nests of this bird were located in an area of timber extending some twelve miles along the coast. The nearest nest from the shore was about one mile inland; then they appear to extend horizontally half a mile apart, placed on the very top of all sorts of trees, generally dead ones. In one instance two or three nests were but two hundred yards apart.

It is easy to find these huge nests of the Osprey, as they can be seen some eight hundred yards away with the sitting bird moving her head in all directions looking for possible enemies. As soon as you are detected—and you can count on the fish hawk seeing you half a mile away—the bird slowly rises off her nest and comes up to meet you, making all the time a whistling note and performing certain revolutions characteristic of the species. As you approach the nest it is more difficult for one to locate it, as these evergreen woods are very heavy and the underbrush equally so. However, the bird is overhead and practically leads one to the nest. Some of the nests are situated in small clearings and are, therefore, more easily found. As stated, it is easy to locate the nests, but it is quite another matter to procure the eggs. The largest nest examined was between five and six feet across and about two feet deep—built largely of sticks and lined with seaweed and grasses. The others were not quite so bulky, averaging about four to five feet. The only way to get into these nests is to hug the tree with one arm and work an avenue or lane over the side of the nest with the other hand. This is an extreme-

ly hard and hazardous undertaking and occupies a full half hour at least.

On May 28th five nests were examined containing three fresh eggs each. One was on top of a dead poplar 45 ft. up; two in live pine, about 60 ft. up, and one each in dead tamarack and balsam 50 ft. up. The following day two other nests were examined and they contained two fresh eggs each. On June 14th nine nests were located all containing three eggs each—which were on the point of hatching. A number of other trees were unclimbable. The birds apparently begin laying in this locality about May 24th. All of the sets taken were nicely marked as is usual with this species, the ground color being almost covered by the reddish coloration.

FALL EXCURSION.

An excursion of the Club was held to the Experimental Farm on Saturday afternoon, October 9th, when a fair number of members and others were present to inspect the fine grounds and Arboretum of this institution. Among the features especially attracting attention were the extensive hedges, demonstrating the value of various shrubs and trees for this purpose; the group of cedars or *Arbor Vitae* showing what a range of horticultural types may be obtained; the curious Maiden-hair tree *Ginkgo biloba*; some Japanese Anemones, which were still in the height of bloom, after most other flowers were out of season, etc.

An object lesson of considerable interest was the collection of wild, unimproved apples. The Old World *Pyrus baccata*, with its tiny fruits scarcely larger than peas, and the native American crab apple *Pyrus coronaria*, with somewhat larger, but extremely unpleasant fruits were strikingly in contrast with the large, fleshy, attractively colored and flavored apples which we know, fortunately, so much better.

Following the copious rains of a few days previous, mushrooms of several kinds were much in evidence. The characteristic circular colonies of the "Fairy ring" mushroom, *Marasmius oreades*, were especially noticeable in the thick sod of the Arboretum.

The majority of the trees had already lost the brilliance of their autumn foliage, but those which were still in this conspicuous garb, together with the scarlet fruits of the barberry, the burning bush, and others, were much appreciated. Remarks were made by the leaders on the cause of autumnal coloration, and on such other topics as were suggested by the observations of the afternoon.

H. G.

NOTES.

CLAY NODULES. In the account of the September excursion to Green's Creek, which appeared in the October issue, a mention was made of the interesting clay nodules, which occur there in such numbers. Since, the Editor has received from Dr. Percy E. Raymond, of the Geological Survey, some notes on these nodules, which will undoubtedly be of interest to our readers.

"Toward the end of the 'Great Ice Age' there was a lowering of the northeastern portion of the North American Continent with respect to the sea level, and, as a result, the great river valleys became, for a time, arms of the sea. One of these arms extended up the St. Lawrence as far as the upper end of Lake Ontario, with a side bay which occupied the Ottawa Valley for at least 200 miles west of Montreal. Another covered the region occupied by Lake Champlain, whence the name 'Champlain epoch,' often applied to this time. At that time, as now, the rivers, descending from the low highlands to the north and west, brought down sand and fine mud which was deposited over the sea bottom. With the mud came quantities of leaves from the northern forests, and occasionally, insects, feathers of birds, and bones or bodies of animals. In the sea itself lived such a fauna as is found off our northeastern coasts; whales, seals, various fish, barnacles and bivalves. As the animals died, their bodies or shells were buried in the constantly accumulating mud, and, being protected from rapid decay by the exclusion of the air, the harder portions have been preserved as fossils such as are found in the nodules at Green's Creek and Besserer's Grove.

"The exact method of formation of these nodules, or any nodules, is hardly known, but it seems probable that the acids which are the product of the decay of the organic matter had something to do with the formation of the cement which has hardened the clay for from one-half an inch to one inch in all directions from the fossil which forms the nucleus. It is, indeed, remarkable how closely the outline of one of the nodules follows the specimen within it.

"These nodules have furnished quite a fauna and flora, thanks to the persistent collecting of Dr. Ami and the members of the Field-Naturalists' Club. Nearly all the forms belong to species living at the present time, though a few, notably the insects, are now extinct. The fauna and flora are interesting as showing an instance in which organisms representing the life of both sea and land are preserved in the same bed, and as showing the great physical and climatic changes which may take place in a (geologically) short time. Sir William Dawson said of this flora that it 'represented the greatest refrigeration of

which we have any evidence,' and the fauna, with its seals and Saxicava, is certainly Arctic. The time which has elapsed since the retreat of the sea from this area probably is approximately the same as that required by Niagara for cutting its gorge, that is, as variously estimated, from 7,000 to 50,000 years."

A SIMPLE METHOD OF WATER PURIFICATION. By G. G. Nasmith, Esq., Ph.D., and R. R. Graham, Esq., M.B. A level teaspoonful of chloride of lime should be rubbed into a teacup of water. This solution should be diluted with three cupfuls of water, and a teaspoonful of the whole quantity should be added to each two gallon pail of drinking water. This will give .4 or .5 parts of free chlorine to a million parts of water and will in ten minutes destroy all typhoid and colon bacilli or other dysentery-producing organisms in the water. Moreover, all traces of the chlorine will rapidly disappear.

This method of purification has been tested with Toronto Bay water inoculated with millions of bacteria. Every germ has been destroyed and it has been unnecessary to boil the water.

This method should be very valuable for miners, prospectors, campers, and those living in summer resorts where the condition of the water might not be above suspicion.—Ontario Board of Health, Circular No. 35.

NEST OF WILSON'S SNIPE.—The following note appeared in *Forest and Stream*, of September 10th:—

"In Ashbridge Marsh, south of Gooderham's byres, in front of the Stanley Gun Club shooting house, a Wilson's snipe's nest was found by R. Buchanan, May 12th, 1910. When found, it contained the full clutch of four eggs. It was frequently visited by Mr. Alberts and others, and the eggs were hatched out between the 1st and 2nd of June. The nest and eggs were taken by Mr. Alberts and are now in the possession of James Munro. The male bird was frequently seen and sometimes on top of the trap house. The female was hard to flush, and lay close during all the shooting, if not approached from the path of the trap house."

A photograph is published in *Forest and Stream* which shows a gun wad lying beside the eggs in the nest; and a diagram of the position of the nest shows it to be nine feet from a much-used path and twelve yards from a shooting platform.

W. E. SAUNDERS.

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