CAPRIFOLIACEAE

Linnaea borealis L. var. *americana* (Forbes) Rehder.

Viburnum pauciflorum Raf.

CAMPANULACEAE

Campanula rotundifolia L.

LOBELIACEAE

Lobelia spicata Lam. var. *hirtella* Gray.

COMPOSITAE

Artemisia caudata Michx.

Bidens cernua L.

Erigeron philadelphicus L.

Petasites sagittatus (Pursh) Gray.

trigonophyllus Greene.

Solidago multiradiata Ait.

Taraxacum officinale Weber.

CANADIAN SPHAERIIDAE.

BY THE HON. MR. JUSTICE LATCHFORD.

(Continued from Vol. XXXIII, page 86)

2. SPHAERIUM CRASSUM Sterki. This species was described in 1901 from shells procured in Northern Michigan. In Ontario it has so far been found in but one locality—an artificial water-course, made about twenty-five years ago to intersect the flow of Cave creek across Holland Avenue, and divert it directly northward to a new outlet above the Little Chaudiere rapids. The members of the Club are now regrettably few who can recall the time when this stream disappeared into a rocky cave or fissure in Hintonburg, south of the Richmond road, and saw light again only when near the foot of Lazy Snye—*le Chenal Paresseux* of the rivermen—a locality prolific in molluscs in those remote days, though now foul and virtually barren.

A few immature shells, collected long ago in Cave creek, on the Stewart and Hinton farms, when it contained a large volume of water, which were thought to be *S. sulcatum*, were probably *S. crassum*. But the very metropolis of the species was not discovered until many years later. It was—not is, I regret to say—in the deepest part of the cutting through the Black river limestone, north of the Canadian Pacific Railway, in the line of Holland Avenue produced. There was at the time about a foot of clear water at the bottom of the trench, flowing freely over a few inches of small pieces of rock—in many cases fragments of cephalopods, corals and brachipods that had flourished and perished on the shores of a torrid sea in the inconceivably remote era when this limestone was in process of formation. Among these relics of primaeval faunas the new species was unexpectedly found in great numbers and beautiful form. Dr. Walker has courteously afforded me an opportunity of examining specimens of the type lot from Michigan. Our shells are larger and more robust, but appear to be identical in many of their aspects.

It is fortunate that an extensive series was secured during the season when *S. crassum* was first observed, as more recent visits to the locality proved absolutely fruitless. The new intercepting system of drainage along Wellington Street had cut off the flow of water from the south, and large blocks of stone fallen from the banks had clogged the cutting so that little water flowed through it. Of this rare and remarkable species not even a "bone"—as a mere value or empty shell is called—could be found, though many of *Lymnaea palustris* (a pond snail that ranges deeply over three continents) and of a large form of *Planorbis trivolvis* were noticed. However, on passing out of the cutting, and reaching a muddy pool in the stretch extending directly southward to the railway, a few good specimens of *S. crassum* were procured. This locality was still producing sparingly in August, 1919. For a few more years it will doubtless afford opportunities for collecting this fine shell, and then, like the ponds which once existed near Gladstone Avenue and St. Louis' Dam, be swallowed by the insatiable city.

S. crassum, when mature, is easily distinguished from *S. sulcatum*, especially when large number of the two species are placed side by side. To state the precise differences briefly and without the use of many technical words is difficult. Perhaps it will suffice to say that *crassum* as found near Ottawa, is less elongated than *sulcatum*, more inflated and heavier; the umbones are larger and rounder, and the beaks more closely approximate. The striae are deeper, and the rest bands are less distinct; the general colour, a deep ashy grey, is much more uniform.

This fine *Sphaerium* probably occurs in other places in Ontario. I have a few shells in poor condition from Masham which may be *crassum*. It is said by Dr. Sterki to have been found in Quebec, and New York, but the localities are not given.[6]

3. SPHAERIUM AUREUM Prime was described in 1851 from speciments probably found by Prof.

[6]Ann. Carng. Mus. Vol. X (1916) p. 432.

Agassiz on the expedition to Lake Superior. It is supposed to be identical with a *Sphaerium* now found in the Upper Mississippi Valley, in Illinois, Iowa, South Dakota, and as far east as North-western Ohio. Such shells are generally light to dark corneous or greyish. As it occurs near Ottawa it conforms more closely to Prime's description, and is "bright golden" or "greenish-yellow." Like *S. crassum* it has been found here in but one station—Moore's Creek in Hull. It is not a common shell, but is least rare in a pool about a hundred yards north of the Aylmer Road, near the abrupt turn of the stream southward, after a short westerly course. It is smaller than *S. sulcatum*, and larger than the recently described *S. torsum*, which are found associated with it in Moore's Creek.

A single representative of each of the three genera of *Unionidae* found in Canada occurs in the same stream—*Unio compressus* Lea, *Margaritana undulata* Say, and *Anodonta ferussaciana*, var. *subcylindracea* Lea—the latter being the only anodon occuring also in the creeks at Stittville and Britannia Highlands.

Mr. C. W. Johnson of the Boston Society of Natural History, has compared specimens of *S. aureum* from Hull with shells believed to be Prime's types, and is satisfied of the corectness of the identification, which Dr. Sterki confirms.

A single shell, shorter and much more inflated—almost sphaerical in fact—from Moore's creek, is doubtfully referable to this species. It might be regarded as merely abnormal if another shell, identical in size and shape, had not been found in the outlet of Meach Lake. If additional specimens should be found, the shell may be entitled to specific rank.

4. SPHAERIUM FLAVUM Prime is another of the shells described from specimens found on the Agassiz Expedition, and was described as from Sault Ste. Marie. Dr. Sterki states its habitat to be "the region of the Great Lakes." Whiteaves[7] records it as collected by Mr. McInnis in the Root and English rivers, near Lac Seul, in north-western Ontario.

My first specimens were imperfect separate valves obtained in the early eighties in the mill pond of Pattee & Perley, at the Chaudiere, which happened at the time to be empty. They were sent for indentification to Tryon of the Philadelphia Academy, who marked them "*S. striatinum*?" It was not until long afterward, one day in late summer, when the river was very low, that the shell was found living about a mile higher up the Ottawa. I was picking my steps along the remains of the dam that once led a portion of the waters of the Little Chaudiere to the pioneer mills of Nicholas Sparks.[8] As the crib work of the dam decayed the filling of stones and gravel was in places pressed outwards into the rapids. In the centre of a runnel in one of the breaches so formed I observed what seemed like a number of golden beads. Closer inspection proved the attractive little objects to be bright yellow sphaeriums unlike any form of *striatinum* known to me. Large numbers were collected in this and other similar places along the dam, and good sets distributed among my correspondents. The shell was so uniformly regarded as *S. flavum* of Prime that I have little doubt of the correctness of the identification.

Although the dam has since been swept completely away, the shell is, I am sure, still to be found in the depressions in the rapids where eddies form and fragments of rock accumulate. However the current is usually so strong that wading would be seldom unattended with danger. One locality for this species is accessible without risk when the river is low. It is in the old mill race itself. Along the shore line, and from fifty to a hundred feet above the dead water in the "Snye," lies a narrow talus, covered in late summer with not more than a few inches of water. On moving the larger stones and raking among the smaller ones, many specimens of this shell may be easily found.

S. flavum is smaller than any of the shells previously mentioned. At Ottawa it rarely exceeds 10 mm. in length. Its color is brighter than that of any of our sphaeriums except the much larger *S. aureum* and certain of the less inflated *S. occidentale*. As no other shell of the family has been observed in

[7]Report Bureau of Mines, 1912, p. 138.

[8]It may be of interest to note that Captain Le Breton's mills at Britannia were of a still earlier date. They were begun in 1818 to serve the military settlements established in that year at Richmond and March, and were the first built on the Upper Canada shore of the Grand river (as the old name of the Ottawa was then commonly abbreviated) above the Long Sault, where Hawkesbury now is. Robert Randall's ambitious projects to develop water power and establish mills and iron works to smelt the Hull ores on his four hundred acre property, purchased in 1809, and extending (in present-day nomenclature) from Bronson avenue to Booth avenue and from Carling avenue to the Ottawa (but not including the islands), were frustrated by the persecution to which he was subjected by members of the Family Compact, his seven years' imprisonment at Montreal, and the scheme devised and successfully carried out by Le Breton and Levius Peters Sherwood, assisted by Sherwood's brothers-in-law, John Stuart and Henry John Boulton, by which Stuart, as sheriff of Brockville, at the instance of Boulton, and without notice to Randall, for whom Boulton had acted as counsel, sold to Le Breton on December 11, 1820, all Randall's lands in what is now the heart of Ottawa. On the next day the captain, as no doubt in duty bound, conveyed an undivided half-interest in the property to Sherwood. The story of this nefarious transaction, which was held nevertheless by a judicial member of the Compact to be within the law, is told at length in Appendix (S.S.S.S.) to the Journals of the Legislative Assembly of Upper Canada for 1853.

The destruction of Sparks' mills is among the faintest of early memories. Of these mills—as of Troy—it may be truly said that even the ruins have perished.

the Little Chaudiere rapids, at least along the Ontario shore, any bright little bivalve found there may safely be designated *S. flavum.*

5. SPHAERIUM RHOMBOIDEUM Say is a shell of great beauty and very wide distribution, its range extending from the New England States to Alaska. The most northerly locality recorded for this province is Albany river, where it was collected by Mr. McInnes.

The specific name, like many of the names applied by the famous naturalist who described it, expresses the most striking characteristic of the species. Certain other sphaeria are rhomboidal in lateral outline; but none appears so obviously to have that form. Other features renders this species readily distinguishable. The epidermis is highly polished, usually dark olive in color, with lighter bands and an outer yellow zone. In a few localities, however, it is of a uniform deep brown. This is especially a marked feature of the shells from the pond on Duck Island, and, to a less extent, of those from the pond on the Metropolitan Electric Company's property at Britannia. Iron in the water may have brought about this effect. No other cause can in my opinion be suggested for the brown color—not only external but incorporated in the substance of the shell of the lymnaeidae which swarm in the bay, opposite the Rideau falls, into which Leamy lake discharges—"the Rafting Ground" of other times, where the huge sticks of white pine, made in the *chantiers* of the Wrights, McGoeys, and Hamiltons, were after their perilous drive down the chutes and cataracts of the Gatineau, formed into cribs and rafts in the spacious days of the square timber trade. Either from rusted chains, iron implements long lost in the bay, or from leachings from the mines and furnaces once operated a few miles to the north, every shell there acquires a coat of brown mail, and many become dwarfed in growth. *Planorbis antrorsus* has not a tenth of the volume of shells of the same species found among the nearby hills; and *Pl. campanulatus* is even smaller than the depauperate form from the marl beds at Hemlock Lake. *S. rhomboideum*, as it occurs not in the bay, but in the canal leading into it from Leamy lake, is not seriously affected, though browner than any found elsewhere except at Britannia and on Duck island.

This species was once very common in the ponds north of St. Louis' Dam, and is doubtless still to be found in Dow's lake, south of it. Farther to the south it ocurs in the outlet of Dow's swamp. To the east it is found in Hemlock lake, but not in large numbers. The most easily accessible and productive locality for it is the creek in Britannia Highlands, at the Bridge on Tavistook Road. It may, however, be met with in almost any stream or pond on the Ontario side of the Ottawa. In the clearer waters of the Laurentian hills it seems to occur but rarely. One specimen has been found in Meach lake, and none elsewhere on the Quebec side. An adult shell of average size measures 13x10x9 mm. Young shells are proportionably less inflated.

6. SPHAERIUM OCCIDENTALE Prime. This is one of our commonest species. It may be found in almost any marsh, or any depression in our deciduous woods where water lies at intervals. Many of the sphaeriidae are capable of enduring long periods of dessication—more apparent at times than real, as some moisture will on careful investigation be often seen to be present; but this species can seal up its activities and lie dormant for weeks or months in the driest situations. Of course all molluscs living in our marshes, and shallow creeks, and ponds, are frozen stiff as icicles every winter; but except in winter comparatively few can remain long alive without water or at least moisture. *S. occidentale* can better endure a long period of absolute drought, such as sometimes prevails in Ontario, especially in recent years, than any of the genus. None of our large bivalves seems capable of enduring dessication for more than a few days or at most a week; though certain Florida kinds have been found alive by Charles T. Simpson in stations which had long been as dry as dust.

In the woods in the Eastern part of the City, near Beechwood cemetery, every hollow contains this *Sphaerium* and no other. In midsummer it may be found in such places by raking the surface of the mould. It is usually bright yellow, oval in outline, but slightly inflated, and seldom exceeds 8 mm. in length. A much paler form ocurs on Lemieux island, south of the new pumping station. It is a clear Naples yellow in color, but does not vary from the normal in any other respect. At Britannia where *S. occidentale* exists in great numbers in the marsh in Loma Park, near the Magee farm, and, on that farm, north of the railway lines, in a hollow under large willows directly north of Britannia Highlands station—a locality singularly prolific in many desirable shells—it is smoky grey in color. West of the village it may be found inside the railway culvert. In these and other stations it is accompanied by several members of the family, and the beginner would do well to procure first the shells of McKay's bush or Lemieux island before resorting to places where several sphaeriums and musculiums are also found.

Under an inch objective this shell will be noticed to be covered with numerous small papillae. This feature has not been observed in any of our other species, and may serve as a means of identifying *occidentale.* Once however the characteristics of the species are carefully observed, confusion with any other known to occur near Ottawa is unlikely.

S. occidentale does not extend as far to the north as *S. rhomboideum*. It ranges however in a belt of irregular width from Quebec and the Eastern States to California and British Columbia.

7. SPHAERIUM TORSUM Sterki was described from shells collected in Moore's Creek in the same station that affords *S. aureum*. I have not found it elsewhere. Dr. Sterki may, however, have specimens among shells sent to him from the Rideau. If so the fact escaped my notice. By his permission—one of many sets of kindness—I append his description:—

Sphaerium torsum sp. nov.

Mussel inequipartite, oblique, well-inflated, posterior part higher, and much more voluminous than the anterior; dorso-ventral axis curved and oblique; beaks strongly inclined forward, large, prominent, rounded, not or slightly, mamillar, superior margin curved, not, or barely, bounded by angles; scutum and scutellum well marked; anterior and posterior ends rounded, inferior margin moderately curved; surface with fine, slight, irregular or subregular concentric striae and a few lines of growth, shining; yellow, straw colored in younger specimens; shell moderately strong, hinge long for the shape and size of the mussel, almost regularly curved, rather slight; cardinal teeth small, the left posterior tooth vestigial in some specimens; laminae rather slight, at almost right angles to each other; ligament covered, resilium moderately strong. Soft parts not examined. Long. 11 mm.; alt. 9 mm.; diam. 7 mm. (100: 83:64).

S. torsum appears to range near *emarginatum* of the same region, but is more oblique, of more rounded outlines, more evenly inflated. The beaks are less elevated, less mamillar, and more inclined forward, and the hinge is much slighter.

Habitat.—Quebec, Ontario, along the Ottawa River near Hull and Ottawa, collected by Justice Latchford. No. 6956 for full-grown, and 7286 for young and adolescent specimens. It occurs also in Wisconsin.

Fossil.—Goat Island, Niagara, collected by Miss J. E. Lotson, 1900, (No. 2224a).

8. SPHAERIUM EMARGINATUM Prime ranges from Maine to Lake Superior and Winnipeg, and northwest to the District of Patricia, where it was found by Mr. McInnes in the Attawapiscat river. Mr. James H. Ferris found it in great numbers in the Montreal river, north of Sault St. Marie, and has kindly sent me specimens from that locality.

In the vicinity of Ottawa this species has been found only in the canal, above Hartwell's locks, and in the outlet of Phillip's lake, in the County of Pontiac. Its resemblance to *torsum* is indicated in the description of that species. The Ottawa shells are slightly more inflated, the average size from the canal being 10.2 x 8 x 7 mm.

9. SPHAERIUM STAMINEUM Conrad does not seem to be a common shell in or near Ottawa, where I have not found it elsewhere than in the Rideau opposite Strathcona Park. In Toronto it abounds in the Don and Humber. The beautiful little Lynn between Simcoe and Port Ryerse, in the County of Norfolk, also affords it in great numbers.

A shell doubtfully considered *stamineum*, but which may be an undescribed species, occurs in the outlet of Swan lake in Pontiac. Unfortunately only a few could be procured.

S. stamineum is approximately triangular in outline and of a uniform yellow color. The name applied to it by Conrad (meaning *thready* or *fibrous*) does not refer to any of its characteristics. Probably *stramineum* (=*strawy*) was the term intended, as that is the prevailing color of the species; but as the specific name applied has some meaning it must stand for all time. Toronto shells average 13.5 x 10 x 9.7 m.m.

10. SPHAERIUM ACUMINATUM Prime. A mussel believed to be this species is very common in Lake Des Chenes, especially above the pier at Britannia and in Graham Bay. Prime at one time at least regarded *acuminatum* as a synonym of *striatinum;* but no form of the latter species that I have ever seen approaches in appearances the Des Chenês shell when mature, though young shells are not unlike young *striatinum*.

In midsummer dead shells may be occassionally noticed washed up along the railway embankment at the southerly end of the bay. Later, when the river is in its lowest state, thousands of this species rise from their drying beds all over the exposed flats, and plough along the surface their slow way—devious at times but in the main direct—towards the receding water. This manifestation of the instinct of self preservation is common to all mussels, large and small, in similar condition; but I know of no place in which it is more plainly exhibited than in Graham bay. The furrows end in a deeper depression when the animal is exhausted or has reached a location sufficiently moist. The number of specimens that one can collect is limited only by the time at one's disposal. Children learn quickly where the shells are to be found, and delight in picking them up and rendering aid to the naturalist who desires a large series of specimens. Identification is rendered easy owing to the fact that no other *Sphaerium* has been found in the bay. Many *pisidia* however ocur there—of which more hereafter; and south of the railway, in the marsh, connected at high water with the bay through a culvert, several species of our three genera of sphaeridae are to be found in early summer.

Eighty or ninety shells found on June 21, 1916, between little islets, near the shore, about five hun-

dred yards west of the pier at North Bay in Lake Nipissing, while similar to *acuminatum* not fully matured, appear to be a different species. If so, they have not been described. Additional material in quantity, collected later in the season, would probably remove all doubt; but an effort to obtain it on the occasion of a subsequent visit failed owing to the height of the water and the absence of proper facilities for dredging. The ten largest shells found average 8.78 x 7, 15 x 5.13 mm. or 100: 81.5: 58.5.

The average size of ten full grown shells found at Britannia is 12.1 x 10 x 7.5 mm. or 100:82.5: 61.5. Four miles up the lake, in Shirley's Bay, the shell is slightly smaller. The species occurs sparsely along New Orchard Beach.

11. SPHAERIUM STRIATINUM LAMARCK was described in 1818 from specimens believed to have been collected in Lake George, New York. The types are, I presume, preserved in the Jardin des Plantes. The type locality lies in a region where there are few collectors, even among those who, like the writer, occasionally visit its lovely shores. My few opportunities have been restricted to the south or upper end of the lake, and were absolutely fruitless. The shell doubtless occurs in one or more of the bays along the east shore, or at the outlet, near historic Ticonderoga.

The desirability of obtaining shells from the locality which furnished the type chiefly arises from the brevity of the original description and the difficulty of determining what shell it was applied to.

Lincoln had in his law office a drawer labelled "If you can't find it anywhere else, look here." Similarly *striatium* is a species to which any medium sized shell of the genus may be assigned. Dr. Sterki states (Am. Carng. Mus. Vol. X, p. 437) that almost every *Sphaerium* has been named "*striatinum.*"

Mussels believed to be of that species abound on the sandy shoals along the northerly shore of Duck Ilsand. They are so numerous that sometimes in August and September they form a distinct line where washed up by the waves from passing boats, and are preyed upon by plover and other wading birds. Ten adult shells average 11.2 x 8.3 x 5.6 mm., or 100: 74:50. No *Sphaerium* but this has been observed along the upper beaches of the island, unless a shorter and less inflated shell which is but occasionally met with shall prove distinct.

Striatinum has been found in the canal at Cornwall. Shells from that locality more nearly resemble specimens attributed to this species received from various points in the United States than do the Duck Island shells. It occurred among shells collected at Toronto, in the bay east of the mouth of the Humber, a locality now destroyed by harbor improvements, which afforded me the only specimens of the European *Valvata piscinalis L.* discovered on this continent. In passing it may be mentioned that another importation, *Bithynia tentaculata* L., abounds in Toronto Bay, and in the canal at Cornwall.

(To be continued.)

BELATED GUESTS.

BY FRANK MORRIS, PETERBOROUGH, ONT.

In the last week of December, while working on examination papers, I took an occasional tramp with a colleague through the countryside about the city of Peterborough, Ont. We were both armed with field-glasses and got more than the usual run of luck in observations.

On one occasion, west of the city, we sighted a flock of small birds at work among the coarse stalks of pigweed and other plants in a wayside field. The quickness of the birds' movements and the curious unanimity of the whole flock, as it forged hurriedly ahead to a fresh clump of seed spikes, or rose in swirling flight through the air, now warping half across the field, to settle suddenly down, as by a single impulse, at some unexpected point—all this made endless entertainment to watch, even though the bleak wind drew the rheum from one's eyes. On closer view the flock proved to be made up of goldfinches in their sober garb of winter with a sprinkling of snowbirds.

East of the city, again, on Dec. 28th, from the middle of a field beside us, there suddenly rose just such another flock of small birds, for all the world like a flutter of leaves caught up by a random gust and swept through the air; along they came, warping this way and that, now rising, now falling; and suddenly wheeling downwards in mid-air, dropped into a row of elm saplings right beside us. The numerous faint twitterings heard in flight were replaced by one or two, single, clear, deliciously sweet canary notes of *twee-ee, twee-ee,* from some leader of the band. "Goldfinches," I exclaimed; but my companion, more alert with his glasses, soon detected the rich brown-crimson cap of the Redpoll, and before I had time to confound my ears with the more telling evidence of the