

# SOME NEW DEVONIC FOSSILS

BY

JOHN M. CLARKE

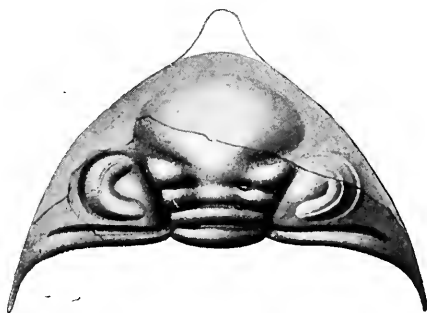
## Introductory note

It is not a customary procedure of the writer to issue preliminary reports on investigations in progress, but to insure some part of the results of labors extending over several years, it seems well to make exception in the present case by publishing the following notes on some of the Devonian fossils that have come under consideration during this time. Fuller accounts and more elaborate illustration of them will follow in proper time and without undue delay. These species are from the representatives of the New York early Devonian formations in Gaspé, Province of Quebec; Dalhousie, Province of New Brunswick; eastern and central Maine. It may be added that they are the incidents of a somewhat protracted study of features in the *Early Devonian Stratigraphy and Physiography of Eastern North America* and all are believed to be new to science.

## TRILOBITES

### *Dalmanites griffoni* nov.

In lobation of tail there is little to distinguish this species from *D. micrurus* Green, and the general outline of the head and of



*Dalmanites griffoni*

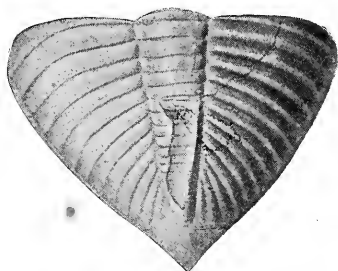
the glabellar lobes is similar, but in excavating these fossils from the compact residual clay into which the rock at the locality

indicated has altered I observed and made note of a cephalon on the anterior limb of which was a very pronounced elongate and spatulate extension, as is represented in outline in our figure. This was so fragile that I was unable to preserve it and no other specimen of the cephalon was complete in this frontal region. It is such a prolongation or snout as one sees in Salter's figure of *D. longicaudatus* [British Trilobites, 1864, pl. 3, fig. 19] from the Wenlock shale which one may regard as an incipient condition of the *Probolium* condition.

*Lower Devonian.* St Alban beds, Griffon Cove river, P. Q.

### ***Dalmanites coxius* nov.**

This species is represented by a pygidium subequally triangular and distinctly flat with relatively narrow axis and broad sides. The margins have a slight outward curve and meet behind in a short broad caudal spine. The pleural ribs extend very nearly to



*Dalmanites coxius*

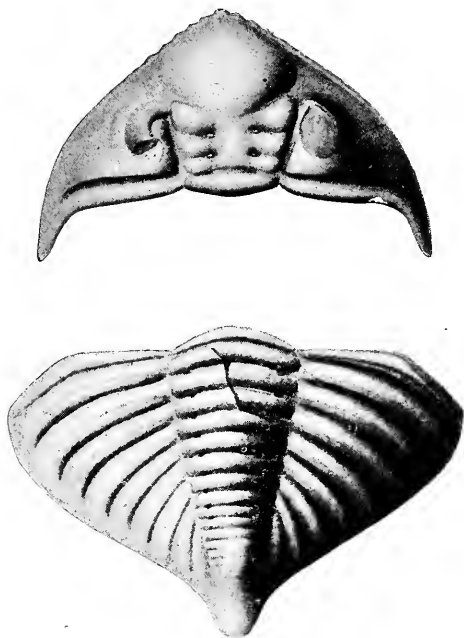
the margin and on the cast they appear to be elevated abruptly on the posterior edge and slope gradually from this edge upward. The same character is noticeable on the segments of the axis. The intervening grooves are thus not sharply defined except at their upper margins. There are 12 of these flattened shelving ribs on the pleura and 12 to 15 on the axis. Each of the pleural ribs shows trace of a fine surface groove. The test is very thin and its surface so far as known very finely granulated. The specimen has a length of 35 mm and a width of 44 mm. I should be at a loss for a known species with which to compare this tail. In respect to the character of its segments and its thin test it is like *D.*

*limulurus*, the well known Upper Siluric species of New York, but therein the resemblance ceases.

*Lower Devonian.* Probably from Cape Rosier, P. Q.

***Dalmanites dolbeli* nov.**

Certain cephalons and pygidia which there are good reasons for assigning to each other present many points of resemblance to several well known species of the same subgeneric type. The lat-



*Dalmanites dolbeli*

ter are *D. pleuroptyx* of the New Scotland beds (Helderbergian), *D. stemmatus* of the Oriskany and *D. anchiops* of the Schoharie grit. Generally speaking these four species are alike in the following respects: They are all forms which attain a large size, have notably short and broad cephalons, with the first and second glabella lobes fused distally and elevated to the eye lobe, frontal border with a row of crenulations at the edge, the more conspicuous being terminal, grooved eye base, faint if any groove along the lateral facial suture, and inosculating surface markings on the cheeks. The tails are broadly triangular and sparse ribbed ending in caudal spines not greatly extended.

By tabulating the differentials of these four species we shall indicate the features in which *D. dolbeli* is unlike the rest.

|                              | pleuroptyx                     | stemmatus                           | anchiops                                          | dolbeli                                                             |
|------------------------------|--------------------------------|-------------------------------------|---------------------------------------------------|---------------------------------------------------------------------|
| Cephalon                     | Short                          | Longer                              | Short                                             | Short                                                               |
| Occipital ring               | No spine                       | No spine                            | Spine                                             | No spine                                                            |
| Confluent papillae on cheeks | Conspicuous                    | Inconspicuous                       | Inconspicuous                                     | Inconspicuous                                                       |
| Suture line on cheek         | Flush                          | Flush                               | Depressed                                         | Flush                                                               |
| Pygidium                     |                                |                                     |                                                   |                                                                     |
| Lateral ribs                 | 11-13                          | 9-10                                | 8-9                                               | 8-9                                                                 |
| Axial ribs                   | 13-(15)                        | 9-(11)                              | 9-(14)                                            | 10-(13)                                                             |
| Ribs                         | Deeply grooved, rounded        | Not grooved, rounded                | Not grooved, rounded                              | Faintly grooved, rounded                                            |
| Caudal spine                 | Short, acute, elevated axially | Broad, obtuse, not elevated axially | Slender, extended, upturned, not elevated axially | Broad, somewhat extended, upturned, blunt, and not elevated axially |

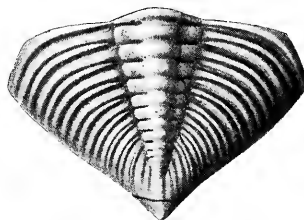
Sharing its principal structures with the other three and separated from them by differentials which are of the same quality as those distinguishing other members of the series, *D. dolbeli* represents a notably early Devonian type of structure.

*Dimensions.* Cephalon: large examples attain an axial length of 40 mm and a width of 75 mm. Pygidium: an average example has a length of 40 mm and a width of 60 mm.

*Lower Devonian.* Grande Grève and Shiphead, P. Q.

### *Dalmanites lowi* nov.

A very distinct type of structure is presented by a few pygidia which are of considerable size, relatively quite short, broad at the



*Dalmanites lowi*

top, with pleural ribs 10 or 11 in number, the last three of which are simple and faint but all the rest very strongly duplicate throughout their entire extent becoming obsolete at or just within the margin. The axis is broad and the dorsal furrows rapidly approx-

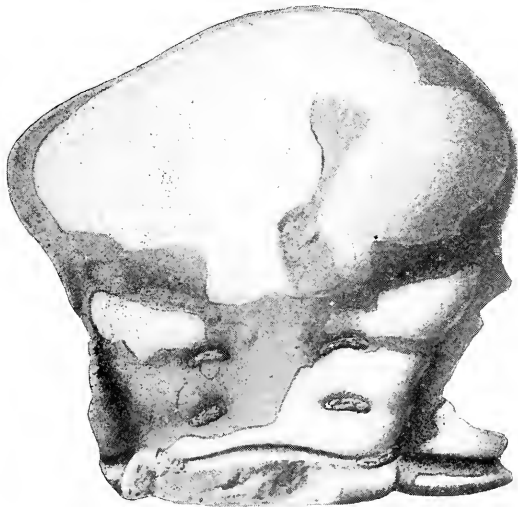
imate; it bears 11 or 12 segments and its apex is not abrupt but merges into a low median ridge continued to the end of the tail. The terminal spine is little more than a broad and short rather obtuse expansion. The surface of the test is finely granulate except for a few scattered coarser pustules on the axis. The specimens average 26 mm in length and 29 mm in width.

This style of pygidial structure with strongly bifurcate pleural ribs is represented in the faunas of the early Devonian elsewhere by such species as *D. bisignatus* Clarke (Oriskany) and *D. dentatus* Barrett (Oriskany). It is probable that the cephalons of all have a crenulated or dentate border as *D. dentatus* and its associate *D. dolphi* Clarke are known to have.

*Lower Devonian.* Grande Grève and Indian Cove, P. Q.

***Dalmanites perceensis* nov.**

The parts found of this species are separated pygidia and cranidia. In the latter the frontal lobe is gently rounded and depressed; the first and second lateral lobes well fused at their extremities; the surface of the frontal lobe coarsely papillose. The

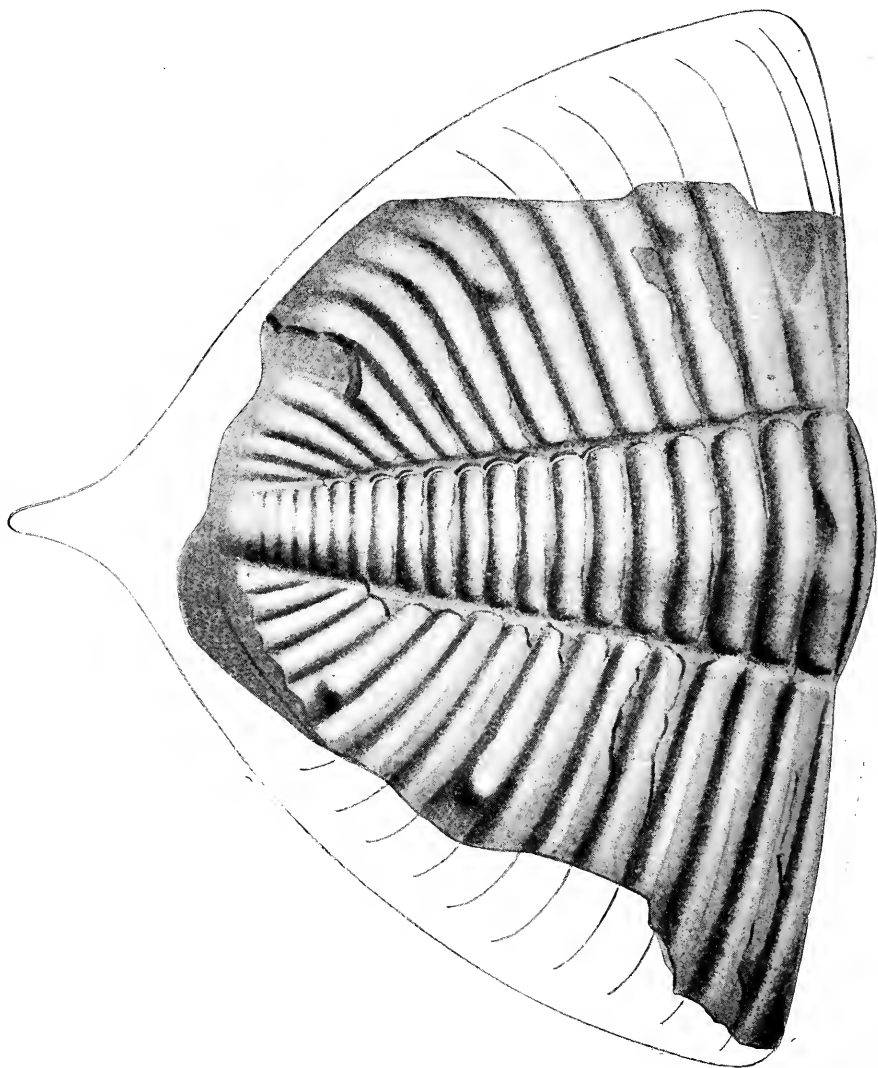


*Dalmanites perceensis*

pygidium is broadly triangular, but little arched at the sides; the lateral margins rounding in full curves and the tail spine short, acute and upturned; the axis has straight regularly converging dorsal furrows and its width is less than two thirds the width of each pleura. It bears 18-20 broad flat directly transverse annula-

tions with very narrow furrows. The fourth and eighth annulations bear two strong nodes on the axis and the 9th, 12th and 13th show fainter traces of them. The broad and flat pleurae bear 15-17 flat ribs grooved by narrow and sharply incised

*Dalmanites perceensis*

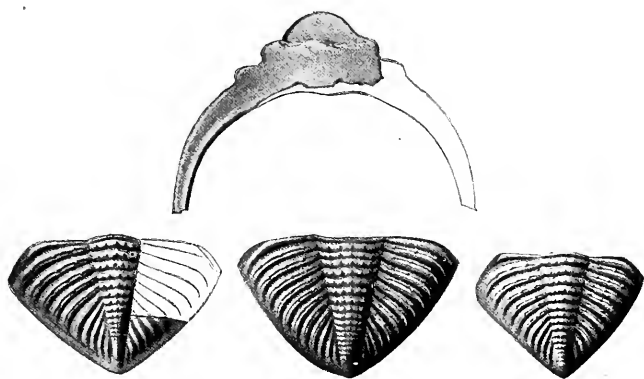


oblique furrows; the ribs bend abruptly backward near the margin and are discernible almost to the edge of the shield. They are also sparsely but very irregularly nodose, the nodes being large and coarse. The whole surface is finely granular.

*Lower Devonian.* Percé rock, P. Q.

*Dalmanites veiti* nov.

Associated with specimens of *D. phacoptyx* from the limestone hills behind Peninsula, Gaspé Bay, are abundant pygidia and cephalae of uniform size, unlike the species with which they are associated as well as with any others of our acquaintance. These pygidia are relatively small, subequally triangular, flattened above and rather abruptly sloping at the margins; apparently without tail spine. There are 11–12 lateral ribs, 6 or 7 of which are grooved medially. The axis bears 13–14 segments. The upper limb of each of the divided lateral ribs carries 2, 3 or 4 pustules so devel-



*Dalmanites veiti*. The underside of the cephalic doublure x2 and three pygidia natural size

oped as to overhang the sulcus, while each segment of the axis bears a single row of 5, 6 or 7 pustules. The length of these shields will average 23 mm with an anterior width of 29 mm.

The cephalae belonging to these pygidia are not completely preserved but indicate a type of simple glabellar lobation as in *D. micrurus*, with closely pustulose surface. The border is smooth laterally but in front is extended into a short crenulated snout or shelf as in *D. pleuroptyx* and *D. dolbeli* though less expanded at the sides than in either of these.

There is undeniable similarity between this fossil and the *D. bisignatus* described by me from the Oriskany of Becraft mountain.<sup>1</sup> The latter, known only from the pygidium, has the part narrower and more elongate and its axial pustules are so arranged as to make a longitudinal median double row. That species we have noted (*op. cit.*) is allied to *D. dentatus* Barrett from the same horizon in Orange county, N. Y. but in ignorance of the cephalon of the

<sup>1</sup> N. Y. St. Mus. Mem., 3. p. 19, pl. 2, fig. 6–8.

former, comparison can go no farther. *Dalmanites veiti* has a type of cephalon quite unlike that of *D. dentatus* which is dentate on the entire periphery.

*Locality.* This species has been found only in a loose block from the limestone ridge behind Peninsula, Gaspé Basin, in association with *D. phacoptyx*, *Phacops logani gaspensis*, *Platyceras conulus*, *Anoplia nucleata* and other species of the Grande Grève fauna.

*Lower Devonian.* Grande Grève, P. Q.

### ***Dalmanites whiteavesi* nov.**

This species is represented by a series of small pygidia somewhat of the type of that part in *D. anchiops* Green but more particularly like that of *D. meeki*, figures of which may be found in Walcott's *Palaeontology of the Eureka District*, 1884, pl. 17, fig. 5, and *Palaeontology of New York*, 1888, v. 7, pl. 11A, fig. 29, 30;



*Dalmanites whiteavesi*

that is, rather short and subtriangular but with rounded margins and an extended, slender caudal spine. The axis is moderately broad and convex bearing seven or eight segments which are well rounded and the pleural ribs are of the same number, flat on top with narrow intervals and each is grooved by a fine line.

The margins of the shield curve slightly outward uniting behind to form a spine which has about one fourth the length of the shield. It is narrow, ends acutely and is slightly upturned. As a whole the shield is shorter, relatively broader and has more segments than does *D. meeki*. The latter is from the lower part of the Devonian series in Nevada.

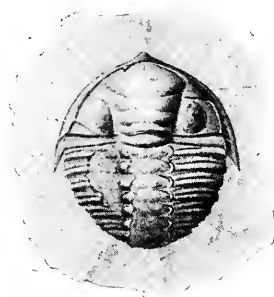
*Lower Devonian.* Grande Grève, P. Q.

### ***Dalmanites gaveyi* nov.**

We are here presented with a species in which the frontal margin of the head bears a slight, simple, lobed and blunt extension without accessory processes or crenulations similar in effect to that of *D. griffoni*. This is a structure after the type of *D. vigilans*

Hall and *D. limulurus* Conrad of the Niagaran, of which a simple, well lobed structure of the glabella is an accompaniment.

This species has been observed in several examples, has a rather short cephalon in which the glabella is subpentagonal, the dorsal furrows not deep and rather obscure at the outer ends, the frontal lobe highly transverse, right short, and merging directly into the frontal extension. The glabellar furrows are very obscure, the first and second lobes but ill defined, slightly swollen and club-shaped but the third lobes are linear and are better defined. Eyes



*Dalmanites gaveyi*

comparatively small and not sulcate at the base, cheek spines very narrow and produced. The cheeks slope somewhat abruptly to a thickened and rounded edge without border. The surface is marked by no noticeable pustules but by a fine granular ornament. This is a very distinctive and rather rare type of structure expressed not so much in the frontal projection as in the somewhat swollen aspect of the glabellar lobes and the obsolescence of the furrows, as well as the smoothness of the surface.

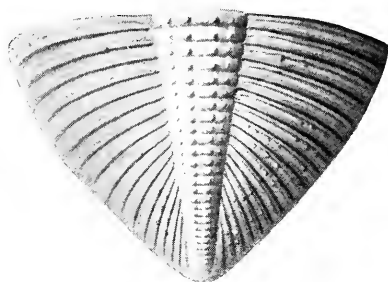
*Dimensions.* Length 12 mm, width 23 mm. One of the specimens carries a considerable part of the thorax but the pygidium of this species is not yet identified.

*Lower Devonian.* Grande Grève, P. Q.

### *Dalmanites ploratus* nov.

There is a group of tuberculated dalmanites in the early Devonian rocks, embracing *D. dentatus* Barrett (which the ornament of the cephalon shows to be a *Corycephalus*), from the Port Jervis Oriskany, the allied *D. bisignatus* Clarke and *D. phacoptyx* H. and C. from the Becraft mountain Oriskany. Of the last two the pygidium of the former is a shield of slender propor-

tions with regularly widened tubercles on the axis, in the other it is large and has coarse irregularly scattered tubercles. The pygidium before us is of the general type of *D. bisignatus* but is larger and considerably more segmented. Thus *D. bisignatus* has 7-8 pleural ribs while *D. ploratus* has 15-16, the former 10-12 axial rings, the latter 20-22. Notwithstanding this difference there is a similarity in the size and arrangement of the tubercles or



*Dalmanites ploratus*

granules; on the annulations there is a single row of four of which the middle ones are largest. Passing to the apex of the spindle this middle pair becomes more conspicuous by the disappearance of the others and thus there appears to be a double axial row of these pustules. On the pleurae they are scattered irregularly and faintly over the sulcate ribs. Our specimens do not show whether or not the caudal extremity ends in a spine.

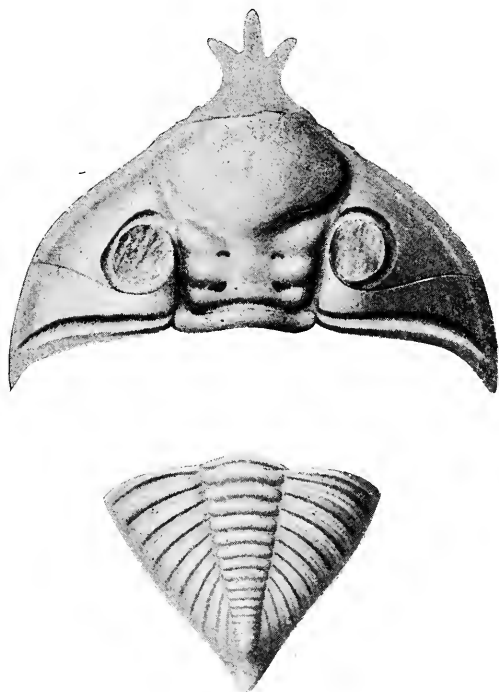
*Lower Devonian.* Loose at Cunningham's camp, 4 miles below Matagamon lake, Me.

### *Dalmanites* (*Probolium*) *biardi* nov.

*Phacops weaveri*? Salter. Silurian Trilobites. 1864. p. 57, fig. 15

*Cephalon* broadly subelliptical in outline, short axially, like the prevailing type in contemporaneous faunas (*D. anchiops*, *pleuroptyx*, *stemmaus*, *nasutus*, *tridens*). Glabellar division normal but the usual fusion of lobes 1 and 2 at their distal extremities which affects so many of the early Devonian species of *Dalmanites*, is not strongly expressed and herein again there is agreement with *D. (Probolium) nasutus* and *tridens*. Margin entire except near the anterior extremity where there is a series of broad low scallops or crenulations, three or four in number on each side of the snout. These are so obscure

that they are seldom seen except on casts of the ventral surface of the border and in such cases the outermost sometimes assume the aspect of a pair of subsidiary spines. The snout is axial, has a broad base, is contracted in diameter medially and at the distal extremity carries a trident the central process being axial, the other two diverging palmately and all considerably extended. There seems to be some variation in the length of this process but apparently it was from one third to one half as long as the cephalon itself. The entire process is flat. In the trilobed species of the



*Dalmanites (Probolium) biardi*

New Scotland beds, *D. tridens*, there is likewise noticeable variation in respect to the development of these processes as shown by the figures given in *Palaeontology of New York*, v. 3, 1859, pl. 75, fig. 3-6; it sometimes has them so much reduced that the extremity takes on a spatulate outline. The genal spines are relatively broad and short. The surface of the cheek below the visual area is deeply grooved, the facial suture on the cheeks does not lie in a furrow and the surface below the eyes shows only rather obscure traces of confluent papillae. The general surface

is rather finely pustulose especially on the cheek spines. The thoracic segments show no features that can be regarded as distinctive.

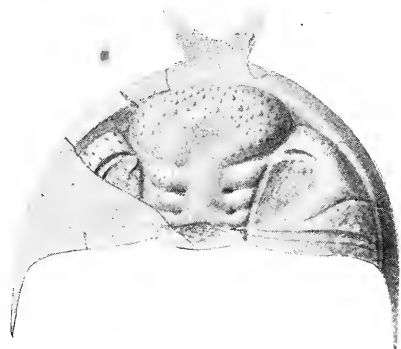
*Pygidium.* Elongate, subequally triangular, subacuminate, of the general type of *D. micrurus* and less like the nodose surface with long tail spine characterizing *D. (Probolium) nasutus*. Axis relatively narrow, segments 10 to 12. Pleural ribs 9 to 10, flat above, grooved by a fine line and separated from each other by rather narrow furrows. Caudal termination a broad and short, acute and slightly upturned spine. Surface finely granulose on the ribs and along the margins with obscure evidence of low faint nodes.

*Dimensions.* The average of our specimens indicates a length of cephalon not including the snout, of 30 mm, a width of 63 mm. In such a specimen the snout would have a length of 16 mm with a spread from tip to tip of the lateral spines of 12 mm. An average pygidium measures 36 mm in length and 42 mm in width.

*Lower Devonian.* Percé rock and Blowhole cliffs, P. Q

#### **Dalmanites (Probolium) esnoufi nov.**

A quite imperfect cephalon in general features has the aspect of the shields referred to *D. micrurus* Green, the border being broad, flat and smooth at the edge, the frontal lobe of the glabella transverse and rather narrow, the other lobes quite small but the



*Dalmanites (Probolium) esnoufi*

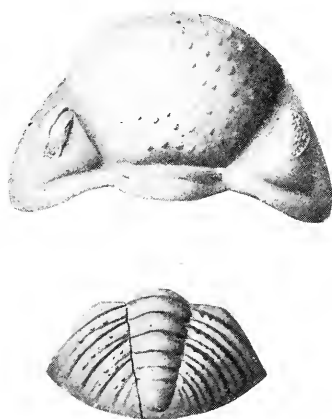
first two lobes are fused at the outer edges. The genal spines are produced, the eyes furrowed at their base and the groove within the border is conspicuous. The border in front is produced into a bifurcate process, the branches of which are flat, very divergent and rise from a broad base.

The aspect of the cephalon before us is very unlike that of *D. (P.) biardi* in the various details referred to. *Dalmanites (P.) nasutus* Conrad<sup>1</sup> is a bifurcate species in the Helderbergian (New Scotland beds) of New York, which has more in common with *P. esnoufi*, specially in its smooth border, but the base of its snout is very much more elongated and its branches slender and cylindrical. The specimen measures in length, from tip of snout 32 mm, from front of glabella 23 mm and in width 50 mm.

*Lower Devonian.* Grande Grève, P. Q.

*Phacops logani* Hall var. *gaspensis* nov.

The species of *Phacops* very common in the Grande Grève limestones presents itself in all variations of size. The larger forms are coarsely tubercled on the glabella and in these there is a well defined row of knobs on the thoracic axis along the dorsal furrows, shown always to best advantage on the internal cast. The pygidium



*Phacops logani* var. *gaspensis*

has four to five duplicate lateral ribs. Added to these critical features is the absence of genal spinules. The larger of these forms have a close and distinct resemblance to the species described by Hall as *P. bombifrons*<sup>2</sup> from "the limestone of the Helderberg mountains," by which was intended that now known as the Onondaga limestone, a resemblance expressed in all the characters of the cephalon which carries a full bombate glabella. We have

<sup>1</sup>Palaeontology of New York, 3: 362, pl. 76, fig. 1-8.

<sup>2</sup>Descriptions of New Species of Fossils. 1861. p. 67; N. Y. State Cab. Nat. Hist. 15th An. Rep't. 1862. p. 95; Illustrations of Devonian Fossils. 1876. pl. 6, fig. 22-24, 29.

no means of knowing the other parts of the animals thus designated by Hall. In the Grande Grève rocks these large, coarsely tubercled cephalons have the thoracic segments knotted at the dorsal furrows as in large specimens of *Ph. logani*. In smaller specimens these thoracic characters are obscured except in the cast, but the cephalic shields of the latter do not show the spinules of the Percé species and of typical *P. logani*.

The variations of expression in the representatives of the genus *Phacops* in the New York Devonian are slender and identifications are always obscure. Fixing upon the following characters as critical, viz, the cristation of the genal angles, the knotting of the thoracic segments and the grooving of the pleural ribs on the pygidium, we may tabulate the species thus:

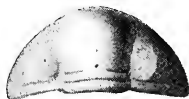
|                                                | <i>Cheeks</i>   | <i>Thorax</i> | <i>Pygidial ribs</i> |
|------------------------------------------------|-----------------|---------------|----------------------|
| <i>P. logani</i> (Helderbergian)               | faintly spined  | knotted       | duplicate            |
| <i>P. cristatus</i> (Schoharie grit)           | strongly spined | smooth        | duplicate            |
| <i>P. cristata</i> var. <i>pipa</i> (Onondaga) | faintly spined  | smooth        | duplicate            |
| <i>P. bombifrons</i> (Onondaga)                | smooth          | smooth        | duplicate            |
| <i>P. rana</i> (Hamilton-Ithaca)               | smooth          | smooth        | simple               |

In this schedule the Grande Grève species takes a place close to *P. logani*; the Percé form, which is always small, is a near approach to the typical expression of the species.

*Lower Devonian.* Everywhere along the Florillon from Shiphead to Little Gaspé, and in the blocks of limestone from the second range found in the stream bed at Peninsula. Also at the Ruisseau du Grande Cavée associated with *Dalmanites griffoni*, and in Percé rock, *P. Q.*

### *Phacops (Phacopidella) nylanderi* nov.

This is an addition to the peculiar group of early Devonian species of which we recognize the following other members: *P. brasiliensis* (Maecurú), *P. anceps* (Decewville), *P. correlator*,



*Phacops (Phacopidella) nylanderi*

New York Oriskany and Gaspé sandstone. We have noted in what respects this group departs from the structure presented by *P. downingiae*, the exemplar of the generic group *Acaste*=*Pha-*

copidella Reed. The material from this locality has afforded but a single cephalon of small size with semicircular outline, rotund but not protuberant glabella, in which all glabellar lobes are extinct save that at the base which takes the form of a narrow and obscure ring. The preservation here is without compression which in some of the other species of the series serves to indicate the glabellar furrows. The nuchal ring is elevated, the eyes relatively large, and the small cheeks are apparently produced into short genal spines. The length of this specimen is 4 mm and its full width 8 mm.

No indications of other parts that can be referred to this species are present.

*Lower Devonian.* Edmunds Hill, Chapman Plantation, Me.

**Bronteus barrandii Hall var. majus nov.**

A pygidium with the structural details of *B. barrandii*, but having many times the size distinctive of that species in New York and Gaspé. It has the short axis, broad median rib and



*Bronteus barrandii Hall var. majus*

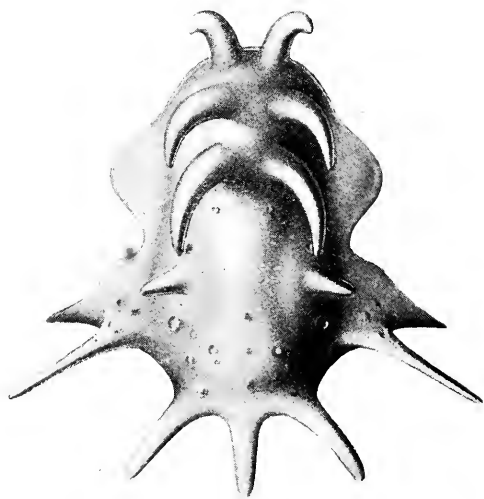
seven lateral ribs on each side, all becoming obsolete on the smooth border. There is here no variation from the specific type but a noteworthy distinction in expression.

*Lower Devonian.* Stewart's cove, Dalhousie, N. B.

**Lichas (Gaspelichas) forillonina nov.**

The several parts of this species found are, on account of the great spines, intricately complicated with the matrix and it has been possible to extricate them only at the cost of infinite labor and

patience. The species is not common and our specimens represent three cranidia with separated cheeks. The general type of cephalic structure irrespective of the spines is practically that normal to such typical expressions of *Lichas* as seen in *Arges*, *Ceratolichas*,



*Lichas (Gaspelichas) forilloniana*

*Hoplolichas* and *Conolichas*, the frontal lobe being large, ovoid and prominent, not set off by deep lateral grooves as in *Terataspis* but most prominently elevated posteriorly. The lateral lobes are long and narrow, subcrescentic in form and but very slightly elevated so that the surface between the dorsal furrows is low, gently

convex and very long, terminating posteriorly in a more elevated triangular area. The prevailing aspect of the cranidium and glabellar lobes is that of narrowness and length, particularly in the distance between the nuchal furrow and the frontal lobe. The nuchal furrow is broad and low and the occipital ring broad, flat and arched.

*Spines.* While the general surface is tubercled and some of the tubercles become developed into short spines the major spines are as follows: three pairs, one in front of another on the crest of the glabella; these are of great size and strength and deeply curved backward. They seem to be all of about the same length. In some of our specimens the posterior pair curves backward in a long arch to and beyond the posterior margin of the head, but in a younger specimen they are shorter. The middle and anterior pairs are quite as long. In section these great frontal spines or hooks are not circular but somewhat flattened on the opposing faces though rounder on the outer surface and narrow fore and aft.

On each lateral lobe where widest, and just above the dorsal furrows, is a spine of less height than the foregoing and apparently erect and these are flanked in front by a much shorter pair. These five pairs seem to be all there are on the glabella except for the spinous tubercles in the occipital area.

The occipital ring bears at its edge on the axis a series of long curved flat or vertically compressed spines, one at the middle and one diverging from the axial spine, at each side. These are neither as long nor as large as those of the frontal lobe but they must have reached back over several of the thoracic segments. The occipital ring is deeply contracted at the dorsal furrows and where it expands again beneath the cheeks it extends out on each side, into a flat but straight and slender spine larger than the others. This makes five spines on the neck ring, 15 in all on the cranidium, seven pairs and one axial. It would be natural to expect others on the palpebral lobe but these seem to be wanting.

The other parts of the species are represented by portions of free cheeks which indicate that these ran out into short, thick and narrow genal extensions with a row of rather small spines along the occipital margin, while just outside of the eye near the margin there was a very large, long and recurved hook like those of the frontal lobe. There is still some uncertainty as to the exact details

of these parts, due in large measure to the difficulty of extracting them from the rock.

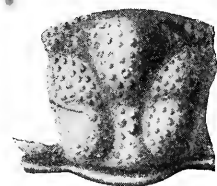
*Dimensions.* The largest of the specimens affords the following measurements: Probable entire length to top of axial spine, 90 mm; length of posterior glabellar spine (not restored) 41 mm; on the curve, 55 mm; greatest vertical height of anterior spines (not restored) 30 mm; length of lateral occipital spines, 27 mm; vertical height of spine on cheek, 30 mm. These figures indicate that the species is one of the largest as well as the most extravagantly ornamented of all forms of *Lichas*. It is surpassed in dimensions only by *Terataspis grandis* and *Uralichas ribeiroi*, the lords of this tribe. Equipped with cerements of mortality, successors of this genus *Gaspelichas* are not to be expected.

*Lower Devonian.* Grande Grève, P. Q.

#### *Lichas bellamicus* nov.

This is a species of medium dimensions having the lobation of cephalon and the outline of the pygidium very similar to the corresponding parts in the prevalent forms of *Lichas* from the Helderbergian.

The frontal lobe is pyriform, not elevated or bombate but uniformly convex, without abrupt posterior slope; the lateral furrows



*Lichas bellamicus*

are deep and the converging lateral lobes elongate, of about equal width throughout and divided only by an extremely faint cross furrow. The grooves dividing these outer glabellar lobes forming the fixed cheeks are very shallow, and these cheeks are convex and elongated about the eye lobes. The cephalon appears to be bounded by a smooth margin which is flat in front. The entire surface except the furrows is coarsely tubercled and it would

appear that some of the tubercles at the crest of the frontal lobe are extended into thick spinules. Parts of a pygidium indicate that this organ was flat and extended and the margin carried long flat spines.

*Lower Devonic.* Grande Grève, P. Q.

### *Ceratocephala robinia* nov.

This form is known from various parts and one nearly entire specimen, which attains much larger proportions than *C. tuberculata*.



*Ceratocephala robinia*

*culata* (Helderbergian) and yet is allied to both that species and the *C. callicephala* from the Onondaga limestone. Placing these species in comparison we may find the distinctive characters expressed as follows:

|                   | <i>C. tuberculata</i>                        | <i>C. callicephala</i>                      | <i>C. robinia</i>                                                |
|-------------------|----------------------------------------------|---------------------------------------------|------------------------------------------------------------------|
| Size              | Small                                        | Medium                                      | Large                                                            |
| Neck ring         | With short stout spine                       | With small spine                            | With longer, stout and somewhat curved spine                     |
| Thoracic segments | Finely tubercled                             | Regularly and coarsely tubercled            | Coarsely tubercled                                               |
| Pygidium          |                                              |                                             |                                                                  |
| 1st spines        | Moderately long                              | Slender and longer than 2d pair             | Very short                                                       |
| 2d spines         | Much longer                                  | Shorter than 1st pair                       | Longer than 1st pair                                             |
| 3d spines         | Large, stout and twice the length of 2d pair | Not conspicuously the largest of the series | Sharp and slender, longest                                       |
| 4th spines        | Very short                                   | Relatively long and slender                 | Sharp and slender, more than $\frac{1}{2}$ the length of 3d pair |
| Surface           | Strongly tubercled                           | Tubercled                                   | No tubercles                                                     |

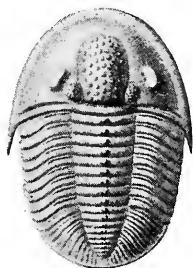
These differences will be found to pertain chiefly to minor features but we conclude that there is in the Gaspé specimens a distinction from these allies in time and structure which is clearly defined and significant in the interpretation of these faunas. It is not at present possible to say whether the New York Oriskany species is of the same type.

*Dimensions.* The only specimen which we have observed having the parts together is in the Redpath Museum of McGill University. We owe to Prof. F. D. Adams the opportunity of studying this example. It is from Grande Grève and has a length of 20 mm. Cranidia of other specimens are of about the same size.

*Lower Devonian.* Grande Grève and Percé rock, P. Q.

### *Cordania gasepiou* nov.

Body small, oval, cephalon with ovoid coarsely tubercled glabella and small basal lobes, small and highly elevated eyes beneath which the cheeks are excavated and concave and the anterior limb also concave and broad, bordered by an upturned thickened rim; genal



*Cordania gasepiou*

angles extended into slender spines reaching more than two thirds the length of the thorax. There may be a spinate tubercle on the neck ring but this has not been fully determined. The thorax has segments which are crested in the axial line by a row of spinules apparently increasing somewhat in length posteriorly and the lateral moieties of the segments are finely pustulose. The pygidium has

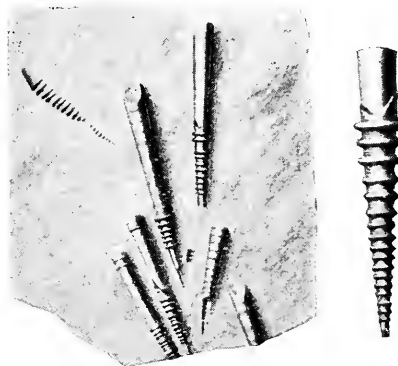
a strongly elevated axis and the median spines are higher and more recurved than those of the thorax. The pleurae are depressed convex and about the margin concave without a marginal rim. The pleural ribs are distinctly duplicate and equally so near the margin. All the pygidial ribs carry fine tubercles. The length of an entire specimen is 11 mm, width 9 mm.

*Lower Devonic.* Lehuquet's Cove, The Forillon, P. Q.

## ANNELIDS

### *Tentaculites leclercqia* nov.

Shells having very much the configuration of *T. gyracanthus* Eaton,<sup>1</sup> occurring, like that, in aggregations in the limestone, but uniformly of very much greater size. The slender cones, attaining a length of 10-15 mm, are strongly annulated but the



*Tentaculites leclercqia.*  
The slab x2: the individual x5

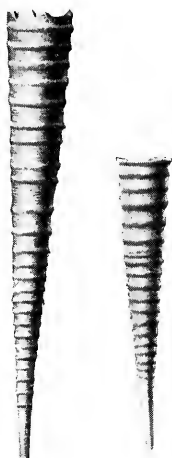
annuli are often highly irregular in size and have an abrupt or concave slope on the lower side and a convex slope above. They are themselves covered with fine concentric elevated lines. The annuli appear to extend to the tip of the shell.

*Lower Devonic.* Percé rock, P. Q.

<sup>1</sup>See Hall, Pal. of N. Y. 1859. 3:137, pl. 6, fig. 22, 23 (*T. irregularis*); and *idem.* 1888. v. 7, suppl. pl. 104, fig. 7-13.

**Tentaculites cartieri nov.**

This is a large species with regularly annulated growth in early stages only but with increase in size the annulations become variable and of obscure outline, all the surface annulations and furrows alike being crossed by very fine regular and equal concentric lines, so that in respect to compression it is not remote from the Oriskany



*Tentaculites cartieri*  
The larger x2; the smaller, x3

species *T. elongatus*. The internal cast bears the usual conformation, suggesting a series of inverted and insheathed cones.

These shells attain a length of 35-40 mm with an apertural width of 4 mm.

*Middle Devonic.* Gaspé Basin, P. Q.

**Tentaculites scalaris Schlotheim**

*Tentaculites scalaris* Schlotheim. Petrefaktenkunde, p. 377, pl. 20, fig. 8, 9; *et auctorum*

There are no evidences of distinction between specimens of *Tentaculites* found in the Chapman Plantation and this well known Coblentzian species. Our specimens bear the strong rounded

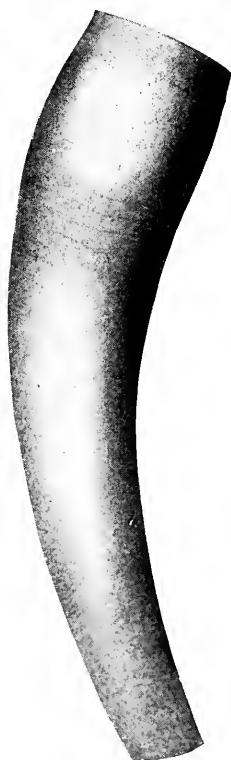
annulations, subject to very slight variation with some irregularity in the intervals and these annulations are covered with fine concentric lines.

*Lower Devonian.* Edmunds Hill, Chapman Plantation, Me.

### CEPHALOPODS

#### *Cyrtoceras albani* nov.

This quite common shell has a long slender and gently curved cone, broadly swollen on the body chamber and constricted behind



*Cyrtoceras albani*

the aperture. The greatest curvature is in the later parts of the shell, the earlier portion being quite straight for a short distance.

The septa are regularly concave and close together, the surface ornamented by very fine elevated threadlike eccentric lines. The species is not unlike the *C. subrectum* Hall of the Helderbergian, whatever generic form that may prove to be when better known.

*Lower Devonian.* St Alban beds, Cape Rosier Cove, P. Q.

***Kionoceras rhysum* nov.**

Straight longicones with regular narrow, erect annulations which may be slightly oblique and are separated by broad, smooth, con-



*Kionoceras rhysum*

cave or flat interspaces. On the best preserved external casts there is no trace of either longitudinal or concentric lines but the summits of the annuli are dotted or punctured.

This form is represented by specimens for the most part small, in which there are on the average six annuli in a length of 20 mm

but other examples indicate that the species attained large proportions.

*Lower Devonian.* Grande Grève, P. Q.

**Kionoceras champlaini** nov.

This species is represented by large cones having a series of low and broad undulations of the surface continuing quite to the aperture and these are crossed longitudinally by elevated, distant, simple



*Kionoceras champlaini*

lines with broad flat interspaces, each about 25 in number, the former becoming obsolete at the aperture.

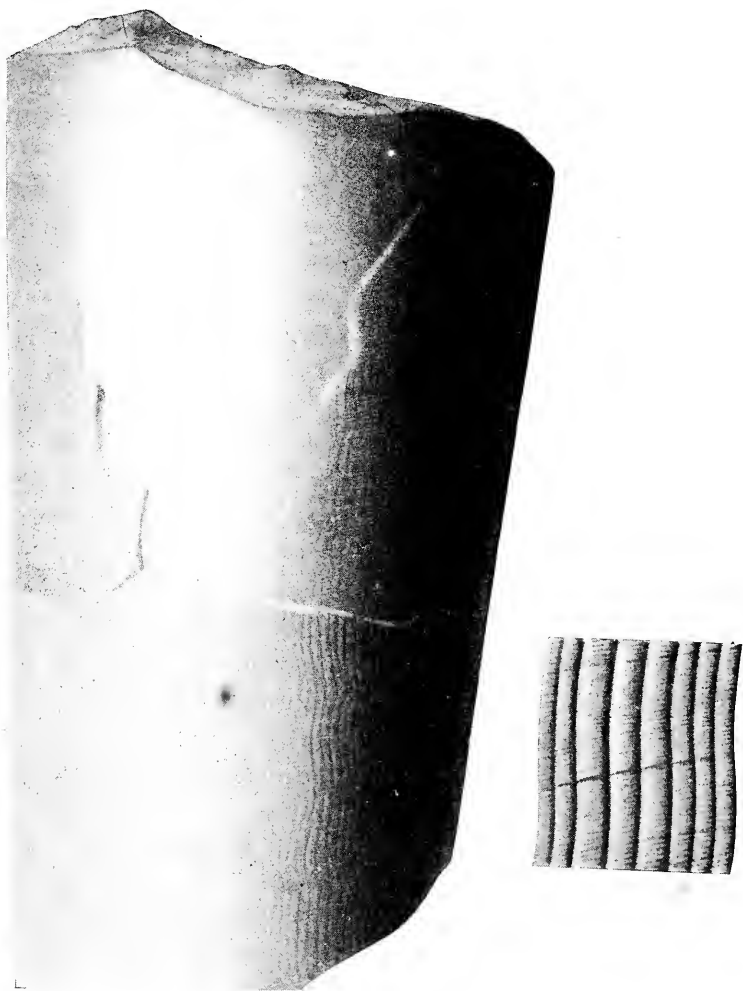
This species is of rare occurrence and its characters distinctive. The best preserved specimen has a width of 22 mm at the aperture and a length (incomplete) of 50 mm.

*Lower Devonian.* Grande Grève, P. Q.

**Orthoceras norumbegae** nov.

A robust shell of which we have about six inches of the final part, retaining the surface sculpture. The shell seems to have tapered gradually and to possess a circular section. The fragment at hand has a length of 165 mm, a width at the top of 75 mm, at the bottom of 60 mm. The sculpture

consists of incised vertical lines at irregular intervals, making very flat and low elevated striae, some broad, some very narrow and threadlike, all rather wavy and irregular in their course, large and



*Orthoceras norumbegae*

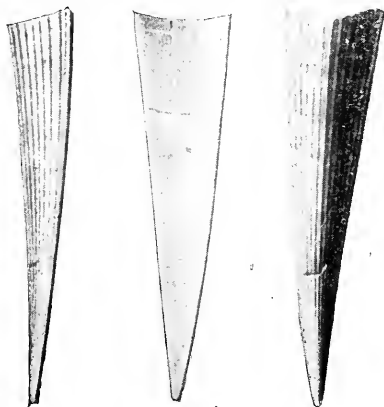
small interspaced without order. At wider intervals are deeper longitudinal sulci. All are crossed by faint and irregularly distributed concentric lines. This style of exterior is highly unusual and quite peculiar.

*Lower Devonian.* Edmunds Hill, Chapman Plantation, Me.

## PTEROPODS

*Hyolithus richardi* nov.

Shell large, tapering gradually; ventral face flat or slightly concave; dorsal face highly arched, subcarinate axially; apertural margin not produced on either face. Semioval in transverse section, apertural diameter to length as 1 to 3.5. The shell is slightly arched axially, the margins and the dorsal face being correspondingly incurved. The ventral surface is marked by very fine lines

*Hyolithus richardi*

concentric to the slightly reentrant curvature of the margin; these are not crossed by vertical lines except those of structure, but the axial area may be flat and its boundaries present the aspect of vertical lines or depressions.

The opposite or arched surface bears a series of rather coarse subequal vertical ridges separated by flat and broader intervals. Near each margin is a deeper groove; obscure concentric striae are also preserved on this surface. The apertural margin of this face is slightly inflected.

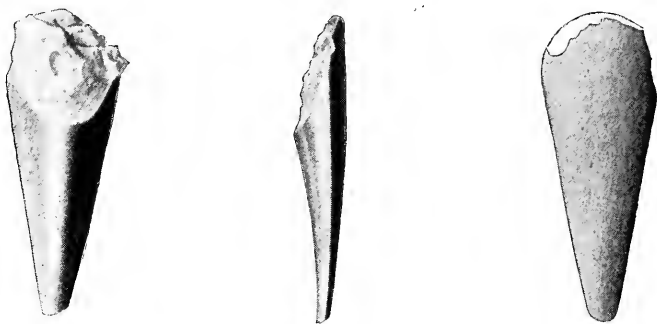
Length of average specimen 35 mm; apertural diameter 8 mm.

*Lower Devonian.* Grande Grève, P. Q.

*Hyolithus oxyis* nov.

Shell usually larger than the foregoing and relatively much broader, margins tapering more rapidly, surface slightly arched axially. Ventral face gently convex throughout and produced at the margin beyond the opposite face into a semielliptical extension; dorsal face convex but much less so than in *H. richardi*, the

median portion the most elevated and bounded by two longitudinal grooves. Apertural diameter to length of ventral face as 1 to 2.5; of dorsal face as 1 to 2. The surface is marked only by concentric



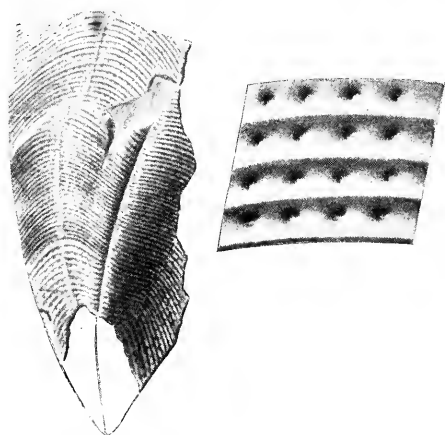
*Hyolithus oxys*

tric striae, arched upward on the dorsal face to correspond with the curvature of the margin; transverse on the ventral face. Average specimens measure 40 mm in length and 14 mm in apertural diameter.

*Lower Devonian.* Grande Grève, P. Q.

***Conularia penouili* nov.**

A large species distinctly grooved at the angles and ridged at the middle of each face. The concentric markings are elevated



*Conularia penouili*

lines close together and curving broadly upward. These are smooth on the edge, without ornament, but the interspaces have

sculpturing consisting of a series of low subcircular depressions in transverse rows separated by elevated surfaces which may take on the form of short convex pillars. This ornament is only about the middle of each face; toward the edges it fades away or is replaced by fine longitudinal puckers starting with the upper slope of a transverse ridge and passing down the slope and part way across the interspace.

*Lower Devonian.* Loose at Peninsula, P. Q.

***Conularia desiderata* Hall var. *tuzoi* nov.**

This is a large shell having the surface characters similar to those of *C. desiderata*, that is, consisting of fine transverse



*Conularia desiderata* var. *tuzoi*

lines bending backward at the center and bearing extremely obscure tubercles visible only when the preservation is exceptional. Unlike *C. desiderata* the shells bear evidence of a faint median vertical but not interrupting line on each face.

*Lower Devonian.* Percé rock, P. Q.

**GASTROPODS**

***Platyceras leboutillieri* nov.**

Shell small, erect, apex minute not exsert; minutely coiled for one and one third volution, then abruptly expanded with a spiral twist, the body whorl being erect and subcylindrical and the total

volutions less than two. There is no evidence of spirality in the body whorl beyond the first third of the shell. Section of body whorl



*Platyceras leboutillieri*

circular. Shell growth somewhat irregular in late stages but apparently without nodes.

Aperture but slightly undulated.

Hight from apex to stoma 18 mm, diameter of body whorl near aperture 14 mm.

*Lower Devonian.* Grande Grève and Percé rock, P. Q.

### *Platyceras gaspense* nov.

A rather small species with small spiral of one and one half whorls very rapidly expanding so that at the end of the one and one half volutions the shell is of notable width; thence the whorl becoming free



*Platyceras gaspense*

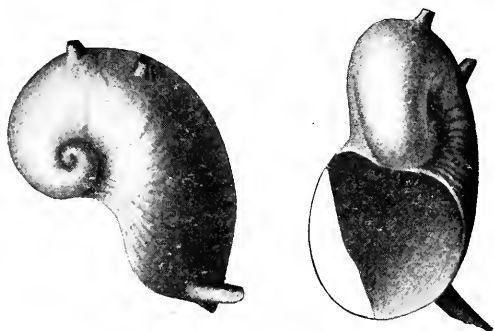
and suberect, suggesting the outline of *P. thetisi* Hall of the Hamilton shales but with shorter body whorl and larger spire. The final whorl is compressed but appears to have been subelliptical in cross-section. Surface smooth with one or more longitudinal furrows.

*Middle Devonian.* Gaspé Basin, P. Q.

### *Platyceras paxillifer* nov.

A small shell closely coiled for two and one half volutions or throughout its length, rapidly expanding and having the general aspect of a shallow *Diaphorostoma* or *Strophostylus*; the surface roughly corrugated concentrically, the upper shoulder of the shell bearing a single row of slender spines, beginning, in the best preserved specimens, at the end of the second whorl or the commencement of rapid expansion, and three in number at unequal intervals. This species represents one of the large group of spined *Platycerata* so frequent at this period in the development of the genus;

though none of this type has been described from the Helderbergian fauna yet representatives are known to occur therein, and in the Oriskany of Glenierie we have the multispinous shell *P.*



*Platyceras paxillifer*

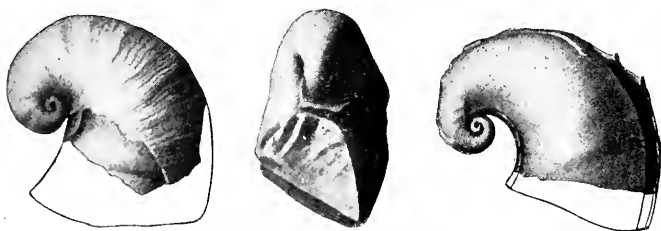
*nodosum* Conrad and *P. subnodosum* Hall, which usually appear in the form of nodate casts.

In the Onondaga limestone fauna are *P. dumosum*, *echinatum*, *multispinosum*, *fornicatum* but among them all is none of the type expressed in *P. paxillifer*.

*Lower Devonic.* Grande Grève, P. Q.

***Platyceras guesnini* nov.**

Shell of medium size, suberect, subsymmetrically coiled; apex deeply coiled in horizontal plane, rapid expansion beginning at one and one half volutions, body whorl irregularly expanded, sub-circular in cross-section, direct and unattached for one half its



*Platyceras guesnini*

length. Surface without revolving furrows and ridges, and marked with subequidistant concentric undulating fringes gradually becoming obsolete near the aperture; also traversed longitudinally by very fine revolving lines.

*Lower Devonic.* Percé rock, P. Q.

**Platyceras lejeunii** nov.

Shell of medium size with relatively small coil and rapidly expanding suberect body whorl. Surface with subspiral or somewhat twisted longitudinal ridges crossing and festooning irregular



*Platyceras lejeunii*

concentric growth lines. The surface is covered with very long and slender spines which are curved or arched backward. The shell is more slender than other echinate species and the spines relatively longer and more arched.

*Lower Devonian.* Grande Grève, P. Q.

**Platyceras (Orthonychia) belli** nov.

Shell erect, minutely arched and incurved at the apex, expanding very gradually but equally for nearly one half its length and thence more abruptly, the cross-section of the whorls being es-



*Platyceras (Orthonychia) belli*

entially circular and the stomal margin undulated. Surface crossed transversely by rugose concentric growth lines, their undulations corresponding to low grooves and folds of the shell. Length of a full-sized specimen 50 mm; stomal width 33 mm.

*Lower Devonian.* Grande Grève, P. Q.

**Platyceras hebes** nov.

Shell conical, slightly oblique, apex blunt or minute, surface expanding rapidly with a vertical slope on the posterior and a more broadly curved slope on the anterior side; lower part of the cone obscurely plicated, aperture nearly round.

This singular expression of *Platyceras*, noteworthy for its broad blunt apex, is quite unusual if not altogether new to American



*Platyceras hebes*

faunas, but such a shell has been noticed by Oehlert in the Lower Devonian of Augen and figured in the *Bulletin de la Société Gèologique de France*, 1890, volume 17, plate 19, figure 4.

*Lower Devonian.* Edmunds Hill, Chapman Plantation, Me.

**Platyceras kahlebergensis** Beushausen

*Capulus kahlebergensis* Beushausen. Abhandl. zur geolog. Specialk. Preussen, 1884. pl. 1, fig. 14

There seems no doubt of identity in this case. The species is a *Platyceras* with a *Diaphorostoma*-like spire from which the body



*Platyceras kahlebergensis*

whorl expands rapidly and carries a deep revolving sulcus on the lower side.

*Lower Devonian.* Edmunds Hill, Chapman Plantation, Me., and in the *Spiriferensandstein* of the Hartz mountains at the Kahleberg.

*Loxonema* sp. cf. *funatum* A. Roemer

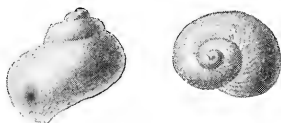
A shell of relatively rare occurrence with very faint sinuous ridges on the internal cast. It suggests the species referred

*Loxonema* cf. *funatum*

to from the Spiriferensandstein of the Hartz mountains.  
*Lower Devonian.* Edmunds Hill, Chapman Plantation, Me.

*Holopea gaspesia* nov.

Shell rather small. Spire short, whorls three to four, somewhat flattened beneath. Expansion rapid, sutures sharp but not deep though the sutural region may be flattened; nonumbilicate. Stoma subcircular. Surface with fine and close concentric lines which about the sutures are gathered into coarse raised radii which are lost before traversing one half the whorl. Some specimens

*Holopea gaspesia*

show a series of two or more revolving raised lines on the body at and below the periphery and two of these may be the boundaries of a slit band, though this feature can not be determined from the sandstone casts. This, however, does not appear to be a prevalent character of the species.

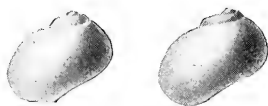
*Dimensions.* An average specimen has a height of 10 mm and a basal diameter of 9 mm.

*Middle Devonian.* Gaspé Basin, P. Q.

*Holopea wakehami* nov.

Shell small, compact, with depressed spire, full ventricose body whorl and small obscure earlier whorls, suture impressed, height

to width as four to three. Aperture broadly oval, entire; inner lip thickened and slightly excavated. Whorls four. Surface smooth or covered with very fine concentric lines. Average dimensions, height 7 mm, width 5 mm. Distinguished from *H. gaspesia*



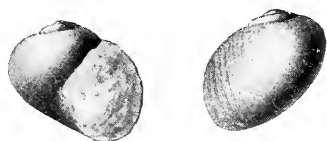
*Holopea wakehami*

by its rounder, more compact form, fuller whorls and more depressed spire. This species is in some of its expressions almost a miniature of the common *Macrochilus hamiltoniae* Hall of the Hamilton shales of New York.

*Middle Devonian.* Gaspé Basin, P. Q.

***Holopea enjalrani* nov.**

Small, rotund, Diaphorostoma-shaped shells with greatly expanded body whorl and low reduced spire. Whorls two and one half to three, greatly overlapping, sutures not impressed; aper-



*Holopea enjalrani*

ture entire, oval; base perforate. Surface of final whorl regularly convex and covered with fine regular concentric growth lines. Height of typical example 10 mm, height of body whorl 8 mm, width across base 12 mm.

*Lower Devonian.* Dalhousie, N. B.

***Holopea enjalrani* var. *corrugata* nov.**

A shell of the same proportions as *H. enjalrani* carries a series of rather strong oblique corrugations on the body whorl parallel to the growth lines and somewhat swollen at the top near

the suture. It is an expression unusual at this early age though well known in Carbonic shells of similar type and as the de-



*Holopea enjalrani* var. *corrugata*

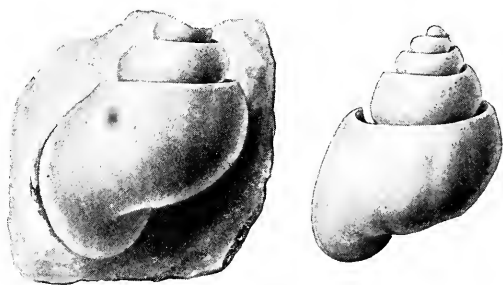
parture from *H. enjalrani* is alone in the clustering of the concentric growth striae into pilae, I should regard the shell a varietal expression of that species.

*Lower Devonic.* Dalhousie, N. B.

### *Holopea beushauseni* nov.

*Macrocheilus*? sp. Beushausen. Abhandl. z. geol. Specialk. v. Preussen etc 1884. pl. 1, fig. 7

Shell of considerable size, stoutly subconical with sutures slightly impressed; whorls four to five, depressed convex, overlapped for one fourth to one third of their width; surface smooth or with fine concentric lines; angle of spire 40 degrees; final whorl at its commencement having a diameter equal to the height of the spire



*Holopea beushauseni*

above; at the aperture much elongated, explanate or reflected in the lower part. The whorls sometimes show a slightly shouldered appearance and the final whorl may be subangular about its base. This shell occurs in great abundance in the form of distorted casts of the interior and is of the type of structure exhibited by such shells as *Conchula steiningeri* Koken [Neues Jahrb. für Mineral. Beilageband 6. 1889, pl. 13, fig. 2] and *Bucinum arcuatum* (Schlotheim) MVK [Fossils Older Dep. Rhen. Prov. 1842. pl. 32, fig. 1]. With the former it may be directly

compared. Both of these shells are from the Middle Devonian. Beushausen figures as *Macrocheilus* ? sp. an internal cast of like aspect and proportions from the *Spiriferensandstein* of the Oberharz (Bocksberg), identical indeed so far as identity can be indicated by internal casts. Specially noteworthy is the agreement in relative size of the final whorl and the explanate form of the apertural margin.

*Lower Devonian.* Presque Isle stream. A shell of somewhat similar character but apparently stouter with more convex whorls occurs at Edmunds Hill, Chapman Plantation, Me.

### *Coelidium streblocceras* nov.

An extremely elongate and terete shell with not less than 20 volutions at full growth. The best preserved specimen has a length of 70 mm, and a width at the base of 11 mm. The later whorls display a sharp median angulation with a moderately broad and



*Coelidium streblocceras*

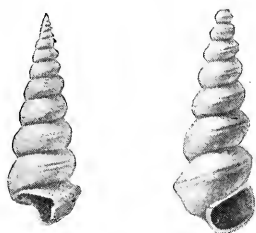
distinct slit band from which the slope to the suture is abrupt, more distinct and flattened above, more convex below.

This singularly delicate "*Murchisonia*" carries to an extreme the expression presented by some of the species described by Hall from the Guelph and by Lindstroem from the Gothlandian.

*Lower Devonian.* Dalhousie, N. B.

*Coelidium tenue* nov.

This is an elongate, turriculate and slender shell with sharply keeled whorls margined by a simple slit band to which the surface slopes in an almost direct plane without either convex or concave curvature, the surface of the whorls bearing reflected concentric lines. The species comes very close to Kayser's *Murchisonia losseni* [Fauna des Hauptquartzites, p. 15, pl. 8, fig. 9] from the Spiriferensandstein of the Hartz and the Coblentzian of the Rhine. While approaching this form most closely it is also allied to the *M. angulata* Phillips var. a. MVK [Fossils Older Deposits Rhenish Provinces, pl. 32, fig. 7] from the Stringocephalus

*Coelidium tenue*

limestone of the Rhine. Attention may also be directed to the shell identified by Verneuil from the Lower Devonian of Nishnij-Tagilsk in the Urals [Geol. de la Russie, 1845. v. 2, p. 339, pl. 22, fig. 7] under the name *M. cingulata* Hisinger. Kayser remarks that this is not Hisinger's species, which is confined to the Swedish Upper Silurian. The forms described by Billings from the Gaspé limestone as *M. hebe* and *M. egregia* are of the same type but are stouter shells with more convex volutions. The *Holopella obsoleta* of Sowerby figured by Murchison among the fossils of the Tilestones may be of similar type but it is known in literature only from internal casts which serve but a faulty purpose in the determination of such shells.

*Lower Devonian.* Presque Isle stream, Chapman Plantation, Me. Abundant also at Dalhousie, N. B.

*Eotomaria hitchcocki* nov.

Shell with rather low, somewhat concave spiral of four to five whorls, the spire usually much depressed when in the shales. The surface of the whorls is regularly sloping, very slightly concave, giving an almost uninterrupted slope to the spire. Periphery

of body whorl sharply carinate or even extended into a keel or flange which seems to carry a slit band. Aperture sharply angulated exteriorly, subcircular in outline, thickened and slightly excavate on the inner lip. Base of shell broad and nearly flat for its full width. Fine concentric growth lines are the only sculpture. It is possible that this shell may be of similar character to the *Trochus* ? *helicites* Sowerby from the Tilestones of Horeb Chapel [see *Siluria*, pl. 34, fig. 12] but comparison can be



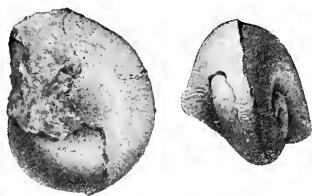
*Eotomaria hitchcocki*

based only on the resemblance of the internal casts of the two shells for of the exterior of the latter we have as yet no definite knowledge. It is instructive to observe that the *Spiriferensandstein* of the Oberharz (Bocksberg) carries an *Eotomaria* of similar style with extended peripheral flange [*Pleurotomaria kleini* Beushausen, *Beitr. zur Kenntn. d. Oberharz. Spiriferensandst.* 1884. pl. 1, fig. 10], though a shell of much larger type than that here described.

*Lower Devonian.* Presque Isle stream and in the burnt lands 2 miles west, Chapman Plantation, Me.

*Eotomaria* ? *rotula* nov.

Shell small, spire greatly depressed below the level of the final whorl, so that the coiling has proceeded almost in a horizontal plane.



*Eotomaria* ? *rotula*

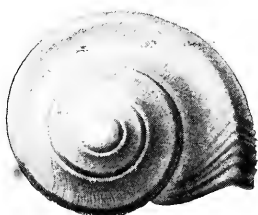
Whorls about two, gradually expanding and all in contact. Outline of body whorl bilaterally subsymmetrical, expanding on the

lower side to the stoma. It bears a peripheral elevated or convex band which is bounded above by a sulcus, though not so well defined below. The upper shoulder of the whorl is subcarinate while the lower surface is broadly rounded and bears an oblique sulcus on the final third of the volution. Aperture sinuous, projecting above and reentrant in a broad curve below the position of the peripheral band. Surface crossed by fine concentric lines which curve forward on the upper surface of the whorl and make a retral turn on the periphery whence they again curve forward in a broad sweep, on the lower surface being interrupted by the interior sulcus.

*Lower Devonian.* Grande Grève, P. Q.

***Trochonema lescarboti* nov.**

Shell moderately large, trochiform. Whorls broadly sulcate above, gently convex peripherally and regularly convex below; three to four in number. Sutures impressed and bounded by an elevated ridge or carina within which the surface is depressed in a broad and shallow sulcus bounded outwardly by a sharp keel



*Trochonema lescarboti*

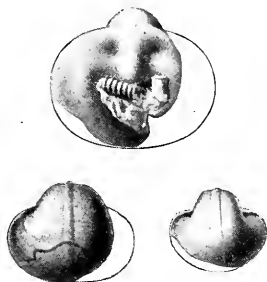
which lies at the shoulder of the whorl and from which the whorl surface is abruptly depressed. No peripheral band is known though the internal cast bears a peripheral depression. Lower surface not known except from the cast, apparently regularly convex. Surface marked by regular concentric lines without revolving striae.

*Lower Devonian.* Percé rock, P. Q.

***Phragmostoma diopetes* nov.**

A small bellerophonitid with well developed slit band and apparently smooth surface save for regular concentric growth lines. The shell expands rapidly to an explanate mouth which involves

the spire and forms a broad flat plate on the posterior region with the callus about the spire extending into the aperture, making a



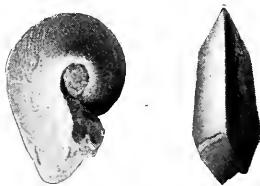
*Phragmostoma diopetes*

structure altogether similar to that of *P. natator* (Portage group), the type of the genus.

*Lower Devonic.* Matagamon lake, Me.

#### ***Tropidodiscus obex* nov.**

This is a species of unusual interest in that it represents the only member of the genus known, save the type *T. curvilineatus* (Conrad) from the Onondaga limestone of New York. The Maine shell is smaller than that, very sharply keeled, narrowly umbilicated,



*Tropidodiscus obex*

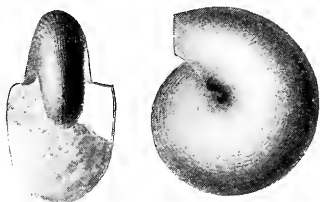
with the outward slope of the whorls direct and without evidence of revolving sulci, the inner slope being vertical. The surface is crossed by fine concentric growth lines bending sharply back to the keel.

*Lower Devonic.* Edmunds Hill, Chapman Plantation, Me.

#### ***Euphemus ? quebecensis* nov.**

To this well known Carbonic genus I refer with doubt flat or discoid, involute, horizontally coiled shells having a goniatitic aspect, the final whorl deeply overlapping the preceding and closing

the umbilicus. The whorls are narrow but deep, abruptly curved on the periphery; the stoma expanded but not explanate. The surface is marked by regular simple and continuous elevated revol-



*Euphemus ? quebecensis*

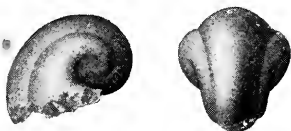
ing lines which become crowded toward the aperture. There is no evidence of a slit band. The shell has a diameter of 10 mm.

This species represents a very unusual type of structure for a Devonian bellerophonitid but is provisionally placed in this association.

*Middle Devonian.* Gaspé Basin, Gaspé.

#### **Bellerophon (Plectonotus?) gaspensis nov.**

Shell rotuloid, rapidly expanding; expanded but not explanate at the aperture. Outer surface trilobed by two revolving lateral furrows which start early and become wider and deeper with age. These do not divide the surface equally but the lateral divisions



*Bellerophon (Plectonotus) gaspensis*

are considerably narrower than the median division which is broad, prominent and elevated but flattened on top and may have had a peripheral seam. The specimen measures 12 mm in diameter and has about the same apertural width.

*Lower Devonian.* Grande Grève, P. Q.

#### **Probolaeum ? canadense nov.**

We are disposed to regard as a representative of the Polyplacophora or chitons an elongated semicone-shaped plate sinuate on its front margin, with a posterior terminal beak and broadly infolded posterior margin. The characters of this plate are shown in the

figure drawn from a sculpture cast, displaying the sharp concentric growth lines which are crowded together on the infolded part of the test. The length is 28 mm and the anterior width 19 mm.

In the Devonian of the Appalachian gulf no chitons have been



*Probolaeum ? canadense*

found, though these bodies are known from several horizons in the transatlantic Devonian. There is noteworthy similarity in the form and aspect of *P. canadense* to *Chiton sagittalis* Sandberger (*Stringocephalus limestone*).<sup>1</sup>

*Lower Devonian.* St. Alban beds, Cape Rosier Cove, P. Q.

#### PELECYPODS

##### *Aviculopecten alcis* nov.

Shell slightly oblique with anterior beak and short anterior wing. Hinge and posterior wing not extending as far back as the shell



*Aviculopecten alcis*

outline. Curvature of the margin gently convex in front and anterolaterally, narrowed and slightly produced behind. Body of the shell gently convex: length and height equal. Surface covered by fine radial riblets of unequal size, close together, generally with some tendency to fasciculation behind, fine and fainter and closely crowded in front. These are all crossed by very fine concentric

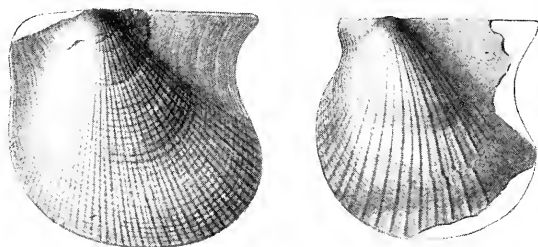
<sup>1</sup> Verstein. rhein. Schichtensys. p. 239, pl. 26, fig. 23.

lines and coarse concentric wrinkles which are quite irregularly spaced. This description is based wholly on a left valve to which it has seemed unsafe to refer any associated right valves. Though there are ribbed *Aviculopectens* in all the formations here brought under consideration I know none which agrees with or approaches this.

*Lower Devonian.* Moosehead lake, 7 miles north of Kineo, Me.

### ***Aviculopecten flammiger* nov.**

This is a shell of somewhat variable exterior which approaches in outline the *Pterinopecten proteus* Clarke of the Becraft Mountain Oriskany [see N. Y. State Mus. Mem. 3, p. 32, pl. 4, fig. 7], but it is unlike that in exterior. The round sub-circular shell is strongly radiated, the primary radii being sometimes coarse with broad fascicles of intermediate striae, sometimes



*Aviculopecten flammiger*

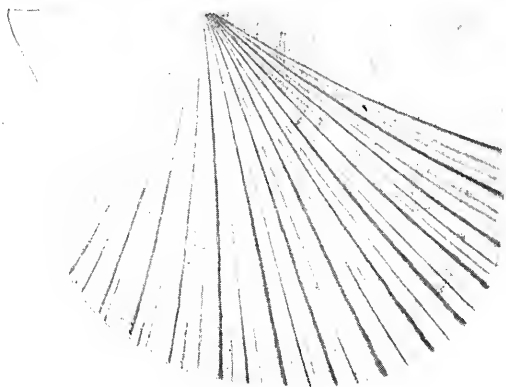
finer and less distinctly fasciculate. In the number of these primary ribs there is the greatest variation. All are crossed by sharply elevated concentric striae. The anterior wing is deeply sulcate and sinuous, the posterior relatively large and with concentric striae only. Only left valves of this species have been observed and they are readily recognized in spite of their variable ornament.

*Lower Devonian.* Askwith siding, Misery stream and Moose river, Me.

### ***Aviculopecten jumeau* nov.**

Shell of considerable size, suberect, explanate below, with sub-orbicular outline tending to obliquity posteriorly. Beak anterior, anterior wing short, posterior broad flat or subconcave, the point not extending beyond the posterior curve of the shell; sharply incurved on the lateral margin. Surface with fasciculate bands somewhat after the type of ornament in *Actinopteria textilis*; coarse distant ribs with intermediate smooth spaces divided

by a simple low rib, these interspaces being subdivided near the margin. Concentric sublamellose lines at distant intervals. On



*Aviculopecten jumeaui*

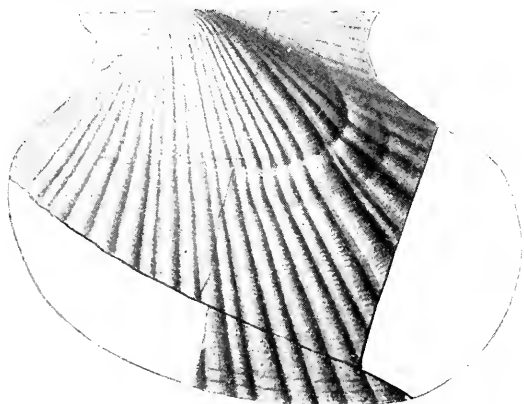
the wing radial lines are obscure but concentric lines sharp and crowded.

*Dimensions.* The typical specimen has a length of 47 mm; height of 42 mm.

*Lower Devonian.* Percé rock, P. Q.

***Aviculopecten ? incrassatus* nov.**

Shell large, outline obliquely subelliptical. Posterior wing short. Surface with coarse and heavy radial ribs of unequal size separated by relatively narrow rounded grooves. Inequality in the size of the ribs is noticeable in the umbonal region and new ribs are



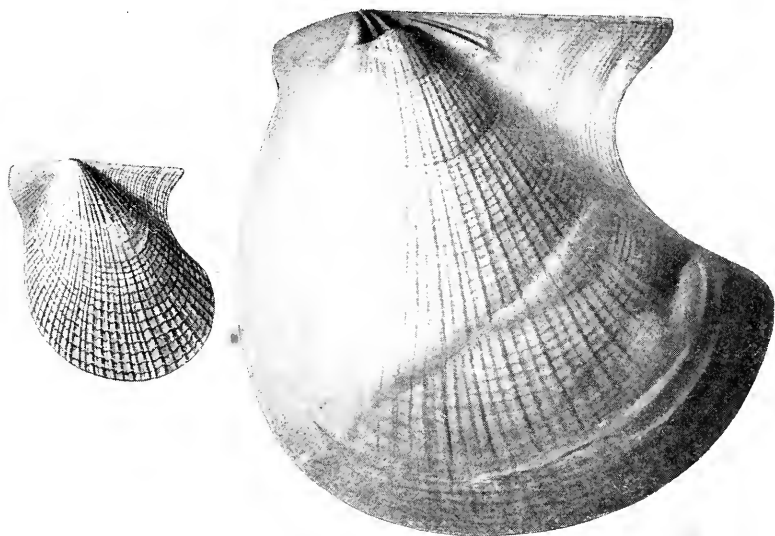
*Aviculopecten ? incrassatus*

added by division of the large ones. All are crossed by a concentric ornament of fine compressed lines with occasional deep concentric growth furrows. This type of ornamentation is an extreme condition of that sometimes expressed by *Pterinopecten proteus*. The original specimen has a height of 50 mm and a probable length of 70 mm.

*Lower Devonian.* Grande Grève, P. Q.

***Actinopteria (Pterinea) fronsacia nov.***

This is a species having somewhat the aspect of the common and well known *A. boydi* of the Hamilton fauna of New York, but more erect and with a larger auricle. Its surface is marked by quite regularly alternating radii and these are crossed by imbricating concentric lines which are closely crowded together



*Actinopteria (Pterinea) fronsacia*

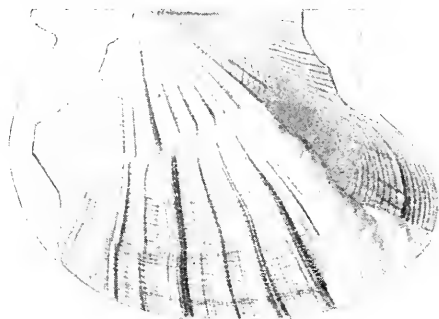
and crenulated fore and aft. In *A. boydi* the radial riblets are of more uniform size and as usually preserved in the shales show only inconspicuous evidence of the lamellose concentric lines here present. More closely allied in ornament and in form is the *A. eschwegii* Clarke<sup>1</sup>, from the Lower Devonic Maccurú sandstone of the Amazonas.

*Middle Devonian.* Gaspé Basin, P. Q.

<sup>1</sup>Archivos do Mus. Nac. Rio de Janeiro. 1899. 10:45, pl. 5, fig. 9.

**Pterinopecten denysi** nov.

Shell moderately large, subcircular, known only from its left valve which in the single specimen before us is somewhat incomplete about the hinge but has a very characteristic sculpture. This consists primarily of a few strong radial ribs of unequal size, which rapidly spread apart leaving broad interspaces which do not, in any noticeable degree on the body of the shell, become occupied by other ribs, except small and simple ones of a secondary series.



*Pterinopecten denysi*

The primary ribs themselves widen, become broad and flat and split up into lesser ones, though all derived from the division of any rib may remain together in a fascicle. On the anterior part of the shell the diffusion of the riblets is less defined and regular. All these are crossed by very fine reticulating concentric striae. This is a style of irregular sculpture which with more specimens would probably prove to be quite inconstant and is in a measure reproduced in the very variable species from the Oriskany of New York, which we have designated as *P. proteus*. A similar aspect is presented by the *P. wulfi* Frech from the lower Coblentian of the Eifel.<sup>1</sup>

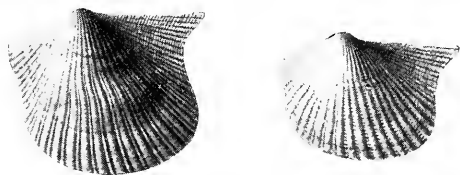
*Lower Devonian.* Dalhousie, N. B.

**Pterinopecten aroostooki** nov.

Shells subcircular or somewhat transverse with outline slightly extended posteriorly; beak at the anterior third of the hinge, posterior hinge straight, reaching to the extreme limit of the outline, posterior wing very slightly extended; anterior hinge straight, anterior wing moderately large but undulated, an oblique ridge traversing it from the beak just beneath the hinge leaving the portion behind it depressed and flat. Below this ridge the ear is de-

<sup>1</sup>Devon. Aviculiden Deutschlands, p. 25, pl. 2, fig. 7.

pressed or broadly sulcate. Umbo convex, narrow; pallial region sloping evenly downward and depressed. The surface sculpture consists of well defined ribs, which are broad and sparse over the median region where they usually carry one very small rib between each two of the large ones. On the anterior slope and wing these



*Pterinopecten aroostooki*

ribs are smaller and also on the posterior slope and wing. Canceling lamellae cross the posterior wing and are visible in the sulci of all the posterior surface of the valve. The left valves only are known.

*Lower Devonic.* Edmunds Hill, Chapman Plantation, Me.

***Limoptera rosieri* nov.**

This large and rather fine species has a flabellate outline with umbones almost at the anterior end of the hinge. The hinge line



*Limoptera rosieri*

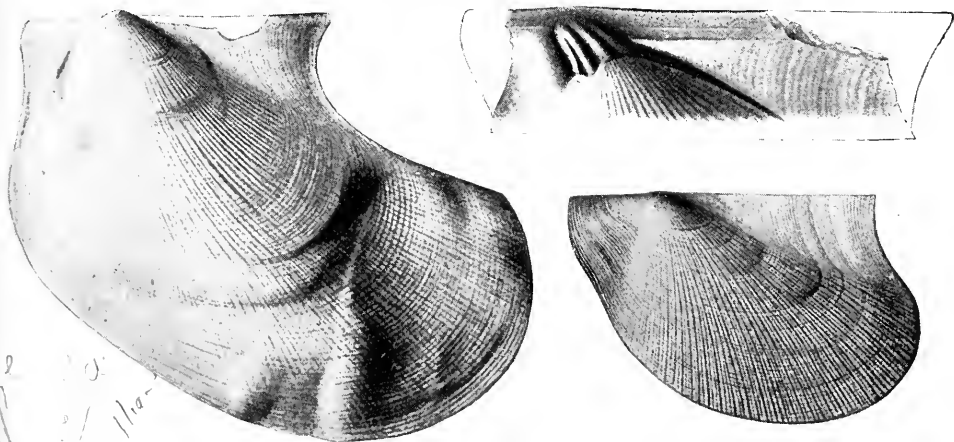
is very long and straight terminating posteriorly on the extreme point of a very broad wing. The incurvature from this wing

toward the body of the shell is but slight, but the area is set off by a low, broad depression on the surface and a distinct change of curvature in the surface lines. The body of this shell is broad and transverse, the curvature being regularly suboval, while the anterior course of the margin is much more direct, curving outwardly below and slightly incurved above. The anterior wing is very small, separated from the umbones by a deep sulcus. The ligament area is very broad and is longitudinally lined. The ornament lines of the surface consist of distinct concentric lamellae, becoming more closely arranged near the margins. Their interspaces are crossed and the lamellae themselves notched or crenulated by subequally distant elevated radial lines. The reticulated and fimbriated effect is specially shown on the posterior wing. Our specimens show the following dimensions: Length on hinge, 100 mm, height and length of body, 90 mm.

*Lower Devonian.* St. Alban beds, Cape Rosier Cove, P. Q.

***Pterinea mainensis* nov.**

Shell often of large size, oblique, hinge considerably shorter than the full length of the valve. Anterior wing well developed, but slightly sloping at the hinge and set off from the shell body



*Pterinea mainensis*

by a low broad sulcus. Posterior wing relatively short not reaching the posterolateral limit of the valve and sometimes not more than one half or two thirds this distance. Body of the valves depressed not sharply set off from the wings; anterior outline at first direct, then inclining more or less rapidly backward and often

sp. 4p. 2  
Fol. 100 mm  
W. 110 mm

extended at the posterolateral margin from which the retreat toward the posterior wing is abruptly oblique. The surface of the left valve is covered by fine radii, equal on the anterior slope but unequal on the posterior and showing a tendency to fasciculation. These are minutely cancellated by concentric lines which on the anterior slope and wing and on the posterior slope become prominent to the exclusion of the radii. The right valve is shallow, evenly depressed, with the radii along the crescence line stronger and more distant and the cancellating lines subdued.

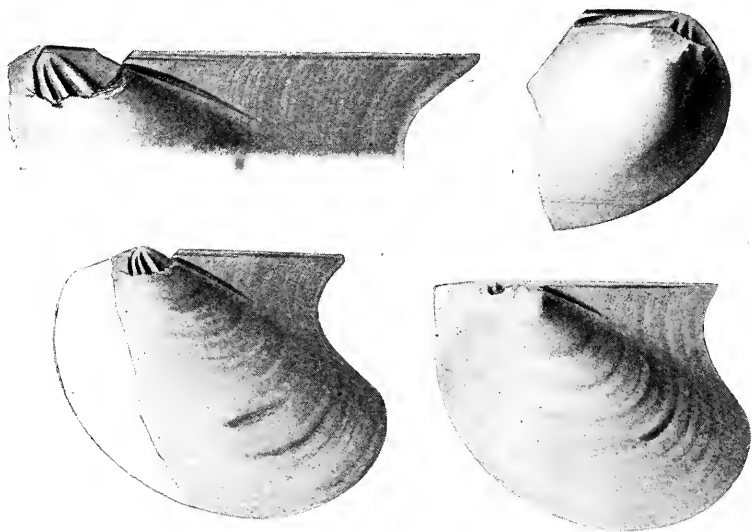
The hinge is distinctly pterineoid, showing a doubly divided umbonal tooth, strong oblique posterior ridge and broad, striated ligament surface.

This shell, extraordinarily abundant at some localities, is readily recognized by its extremely fine radial surface markings accompanying unusual size.

*Lower Devonian.* Telos lake dam and Moosehead lake, 7 miles north of Kineo, Me.

#### ***Pterinea moneris* nov.**

Somewhat oblique valves with hinge line less than the greatest length, anterior beaks, and moderately developed posterior wing.



*Pterinea moneris*

The surface is depressed and entirely devoid of radial markings on either body or wing, thus only concentric lines or rough wrinkles are present.

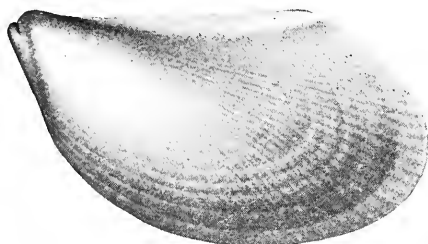
The umbonal teeth are strongly developed in the left valve as a set of three oblique ridges, behind them being a strong oblique ridge. What may prove to be the right valve of the species has a more convex surface, strong anterior muscle scar and teeth to correspond with the sockets of the other valve.

This species is like but much more oblique than the *P. folimanni* Frech and *P. laevis* Goldfuss of the Coblentzian.

*Lower Devonian.* Webster lake, north side,  $\frac{1}{4}$  mile east of Telos canal and Matagamon lake, on east side 1 mile above dam, Me.

#### *Pterinea chapmani* nov.

A large left valve has the beak almost terminal, a long straight hinge, lateral teeth not visible but umbonal teeth sharply defined; posterior wing narrow and not extended, anterior wing very small; anterior slope abrupt, almost vertical; umbo narrow elevated, the



*Pterinea chapmani*

general surface of the valve broadly convex; outline oblique. The surface carries faint radial riblets, which are obsolete on the anterior slope.

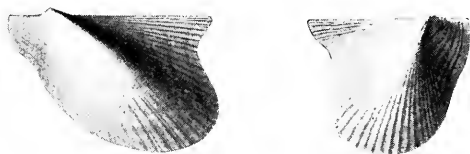
The species differs from any of its associates in its obliquity, abrupt anterior slope, abbreviated anterior wing and short posterior extension.

*Lower Devonian.* Edmunds Hill, Chapman Plantation, Me.

#### *Pterinea edmundi* nov.

The distinguishing marks of this species are found in its ornament and variable outline. In aspect it approaches very closely the *P. radialis* from Presque Isle stream but its left valve is sometimes more oblique, sometimes more erect, its umbonal convexity less marked. Its sculpture consists of coarse flattened ribs which are more or less irregularly interspersed with ribs of smaller size; on the anterior slope these gradually disappear leaving the

anterior ear smooth, but on the posterior slope they are continued to the hinge. The posterior wing is cancellated and the cardinal line more strongly striate. The left valve which is less convex than the other has the radial riblets developed only on the median area, both anterior and posterior wings being smooth save on the



*Pterinea edmundi*

posterior hinge where is a cancellated group of three or four strong radii. The variations in the outline of this species reach an extreme in the variety *subrecta*, which retains the same style of ornament as the foregoing and relative proportions and development of the parts, but is quite erect. This appears to be a persistent feature which we find exemplified in several examples.

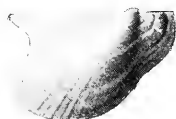
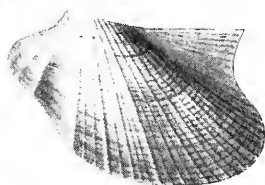
*Lower Devonian.* Edmunds Hill, Chapman Plantation, Me.

#### *Pterinea* cf. *fasciculata* Goldfuss

*Pterinea fasciculata* Goldfuss. *Petrefacta Germaniae*, 2:137, pl. 129, fig. 5

*Pterinea fasciculata* Frech. *Devon. Aviculiden Deutschlands* 1891. p. 84, pl. 8, fig. 1; pl. 9, fig. 1-3

This species is radially and coarsely ribbed, quite convex and oblique along the crescence line, the anterior wing strongly



*Pterinea* cf. *fasciculata* Goldfuss

developed on the abrupt anterior slope and the hinge teeth both beneath the beak and behind it very pronounced. It is very

like the species cited in all respects so far as the former is known. It is, however, possible that some of the coarsely ribbed internal casts may belong to the more finely marked form to which we refer in the following.

*Lower Devonian.* Presque Isle stream, Chapman Plantation, Me.

***Pterinea fasciculata* Goldfuss**

var. ***occidentalis* nov.**

See *Pterinea fasciculata* Goldfuss. *Petrefacta Germaniae*, 2: 137, pl. 129, fig. 5, and Frech. *Devon. Aviculiden Deutschlands*. 1891. p. 84, pl. 8, fig. 1; pl. 9, fig. 1-3.

This extremely common shell is essentially a miniature of *P. fasciculata* Goldfuss. Though reduced in all its proportions and in the strength of its ornament yet it expresses excellently the characters of the German species. The valves are both convex, the left notably and the right but slightly. The left valve has the body well elevated above the posterior wing. This wing is sometimes more incurved at the margin and more extended at the point than in the figured German specimens but these features are variable in the Dallhousie shells. The body of the shell or direction of the crescence line is commonly more oblique than in European specimens but this is an expression due in some measure to mode of preservation, for examples occur here quite as erect as those referred to. The breadth of the byssal groove and emargination on the valve are also notable; together with the relative development of the anterior ear they are in full agreement with *P. fasciculata*. The surface of this valve is marked by coarsely fasciculated radial striae. The major ribs do not exceed five or six but these are widely separated on the body of the shell, the interspaces occupied by radii of lower order.

On the posterior slope the striae are of uniform size and are visible on the wing. On the anterior wing there are two or three coarse riblets but the byssal sinus is deep and without radii. Crossing these elevated radial lines are fine crowded and elevated concentric lines giving all the surface except the byssal sinus a reticulate ornament.

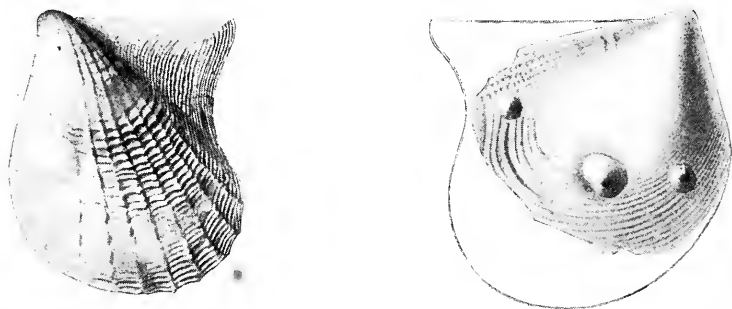
The right valve is much less convex than the left, the anterior wing relatively large, the byssal sinus deep, the body of the shell

depressed. The surface bears a few simple filiform radial lines along the body of the shell and others are visible on the posterior wing at the hinge. No concentric lines are evident.

*Lower Devonian.* Dalhousie, N. B.

***Pterinea intercostata* nov.**

Shell suberect or oblique with small auricle and well defined, broad but not extended posterior ear. Hinge straight, about two thirds the greatest diameter of the shell. Beaks anterior, subterminal. Left valve with coarse and strong radial ribs separated by broad flat interspaces. Of these one can count about 12 on the body of the shell. The primary interspaces are usually divided by a much finer median riblet but further subdivision is very unusual. On the broad posterior wing radial ribs are sparse and indistinct though usually traces of them may be seen. Here the fine concen-



*Pterinea intercostata*

tric lines predominate, giving the surface a smoothness in contrast to the rest of the valve. The concentric lines are also visible on the rest of the surface. As usually preserved they make faint interruptions of the radial ribs but when normal are lamellose and strongly defined. The right valve is practically devoid of radial sculpture, the surface being crossed by sharply defined concentric lines, only the posterior wing showing a few riblets on the cast. The contrast in the markings of the two valves is extreme but is conclusively demonstrated by several specimens with both valves retained.

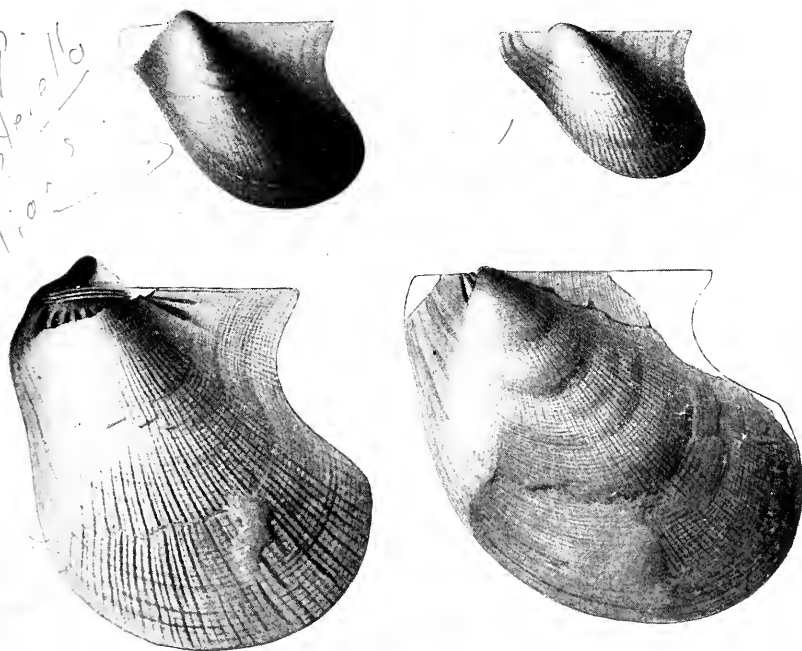
This species may be compared in respect to ornament with several coarsely ribbed shells, e.g. *P. costata* Goldfs., *Avicula*

*rigomagensis* Frech, from the Coblentian, *A. reticulata* Sowerby, from the Aymestry limestone, but such comparisons are resemblances only in one or another feature. No closely allied form is now recognized.

*Lower Devonian.* Dalhousie, N. B.

### *Pterinea radialis* nov.

This is one of a group with an Actinopterialike exterior, but it has the highly developed anterior muscle scar, the umbonal and the lateral teeth of *Pterinea*. No attempts therefore at correlation with species which have been determined as Actinopteria and *Avicula* are here called for. The shells have the size and propor-



*Pterinea radialis*

Upper figures the usual form at Chapman Plantation; lower figures exemplify the larger size attained at Matagamon lake.

tions of the foregoing (*P. cf. fasciculata*) and the following species. The hinge line is but slightly extended posteriorly, the anterior wing well marked, convex and sulcated; the crescence line oblique and the valve highly convex in the umbonal region, with abrupt anterior and more gradual posterior slope. The sur-

face sculpture consists of closely crowded subequal rounded riblets, alternation of size being noticeable near the margins.

*Lower Devonian.* Presque Isle stream, Chapman Plantation, Matagamon lake and elsewhere, Me.

### ***Pterinea ? mytiloides* nov.**

A Leptodesmalike shell, extremely oblique and elongate with a subacute anterior extremity, anterior beak, short hinge, oblique broadly rounded umbonal ridge terminating in a broad blunt posterior extremity. The lower margin of the valve makes at the



*Pterinea ? mytiloides*

anterior extremity an angle of about 40 degrees with the hinge, is slightly incurved by the broad and obscure cincture in front of the umbonal ridge.

*Dimensions.* The best preserved example has a length from anterior end to postlateral curve of 25 mm; height from the beak 7 mm; greatest height 12 mm.

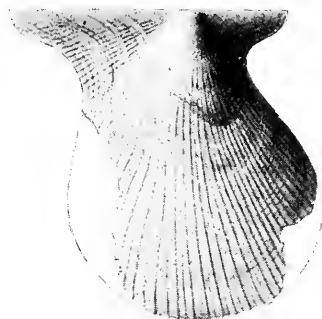
This species is provisionally referred to *Pterinea* and it is more than doubtful if it has any immediate relations with *Leptodesma* Hall in the sense in which that name was employed by its author. Its age and surroundings indicate that it has direct pterineoid affinities. The shell is rare but its form leads to its ready recognition.

*Lower Devonian.* Dalhousie, N. B.

### ***Pterinea brisa* nov.**

An elongate shell, quite erect, the axis of growth being essentially at right angles to the hinge. The body is produced and moderately expanded; the wings distinctly developed but not large, the posterior being narrow, the anterior short and the byssal sinus well defined. The length of the hinge in the specimen before us is 32 mm, the vertical height 40 mm. The beak is at the anterior third of the hinge. The surface is marked by radial elevated lines with broad, flat interspaces, broken by intercalated lines of minor series. In the

umbonal region the lines are close together but they spread outward and the primary interspaces become broad. The body of the



*Pterinea brisa*

valve shows few concentric lines but these are strong on the wings and those on the posterior wing are cancellated by the radii near the hinge.

*Lower Devonian.* Edmunds Hill, Chapman Plantation, Me.

***Pterinea brisa* var. *vexillum* nov.**

A right valve is suberect with a semicircular lower margin, deep byssal sinus, short but well defined anterior wing and broad posterior wing extended to an acute posterior angle. Its surface is flat or slightly concave in the pallial region. The sculpture con-



*Pterinea brisa* var. *vexillum*

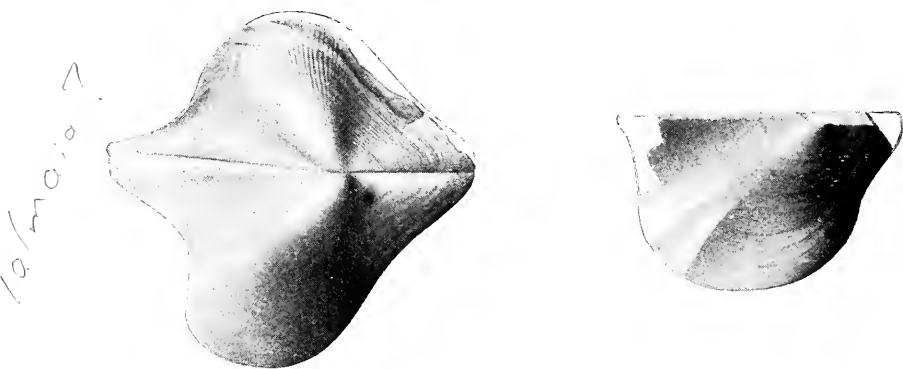
sists of fine radial riblets of subequal size moderately distant and numerous over the body of the valve, very obscure on the posterior wing, which is entirely covered by concentric crowded lamellose lines; the latter are extremely faint over the rest of the shell. A less complete specimen in which the left valve is impressed upon the right shows that the surface of the latter was crossed by very strong radial and very distant ribs, the broad flat interspaces some-

times carrying intercalating ribs of lower order. These were crossed by concentric lines, presumably lamellae. The aspect of the surface is thus not unlike that of *P. intercostata* but the outline is very different and the right valve is distinctly ribbed. The species *P. brisa* from Chapman Plantation, the description of which is based on a right valve, is a very close approach to this in respect to outline and surface characters, though a more elongate, erect shell. To express this intimate relation the present form is regarded as a variety of the latter.

*Lower Devonian.* Dalhousie, N. B.

***Pterinea (Pteronitella?) incurvata* nov.**

Valves elongate on the hinge, the greatest length of the hinge being almost twice the height of the shell. Anterior wing well defined on both valves, byssal sinus not deep but broad and not marked by a notch on the right valve. Beaks one third the length of the hinge from the anterior extremity. General outline very oblique. Left valve highly convex and incurved over the body, sloping abruptly to the posterior wing, more gradually to the



*Pterinea (Pteronitella?) incurvata*

broad byssal sinus in front. From the prominent umbo the crescence line swings in a curve backward and forms a strong projection on the lower margin. The posterior wing is extended well beyond the posterior margin of the body and bounded by a concave curve which terminates in an acute point. Its surface is depressed in a direction conforming with the curve of the body. The surface of this valve is covered with regular concentric growth lines which are essentially unmodified on the anterior and posterior wings but the body of the valve bears radial striae which have

somewhat the aspect of unequal and flat riblets produced by series of incised lines. These multiply and broaden unequally presenting much the same aspect as those in *P. edmundi* of the Chapman Plantation.

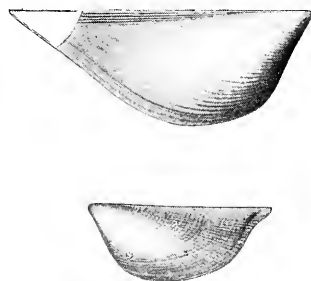
The right valve is depressed; on the posterior wing deeply concave, convex but not elevated along the crescence line, thence sloping to the lower margin with an incurved surface, the postlateral edge of the valve being upturned. The byssal notch and sinus are indicated by a marginal incurvature and depression. One specimen shows the striated ligament area, a small anterior adductor and slender anterior tooth. Surface of this valve entirely smooth or with concentric lines only.

This shell is characterized by its extreme convexity and incurvature.

*Lower Devonic.* Dalhousie, N. B.

### *Pteronitella hirundo* nov.

Shell much elongate on the hinge, terminating posteriorly in a slender, acute point, anteriorly blunt, the auricle atrophied and the anterior slope of the valves abrupt. Beak subterminal, elevated, umbonal ridge subparallel with the anterior margin. From this ridge the surface of the left valve slopes very gradually



*Pteronitella hirundo*

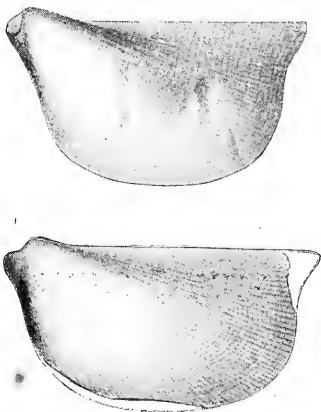
downward and back; right valve flat except at the beak. Surface of left valve bearing sharp and numerous radial lines, crowded and with a tendency to fasciculation over the anterior and lower parts but equidistant posteriorly. The hinge and ligament areas are bounded and crossed by a few very strong striae, the cardinal edge of the valve being thickened. All these lines are crossed by concentric striae, short and elevated everywhere except on the posterior cardinal surface. On the right valve the radial lines are obsolete

except on the posterior wing near the hinge, only the concentric lines standing out sharply and equidistant. The inner surface of both valves is quite smooth. This is a striking species well defined by its outline and surface characters. Its thin shell has left insufficient evidence of its dentition but I have referred it to *Pteronitella* largely because of its general aspect.

*Lower Devonian.* Dalhousie, N. B.

***Pteronitella passer* nov.**

This differs from the preceding in presenting a less extended and rather blunt posterior extremity, a more conspicuous anterior ear and a relatively greater breadth. The outline is still elongate with a gentle surface slope on all sides except the front where it



*Pteronitella passer*

is quite abrupt. The surface is fully reticulated by radial and concentric lines, the former being as before stronger along the posterior wing.

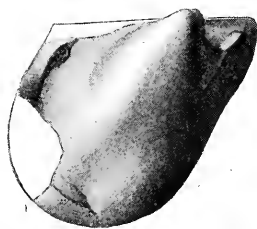
In my judgment this will be readily distinguished by its outline as exhibited in two left valves here figured, though it is undeniably similar to *P. hirundo* in many of its characters.

*Lower Devonian.* Dalhousie, N. B.

***Pteronitella peninsulae* nov.**

Very sharp internal casts of right valves show the characteristic structure of this genus as defined by Billings, clearly demonstrating the departure from the type of *Pteronites* in the presence of a series of *Cyrtodontalike* teeth beneath the beak together with the

long posterior ridgelike tooth. These valves are very oblique, the straight hinge making the greatest diameter of the shell; the anterior wing is insignificant and the posterior not extended. From



*Pteronitella peninsulae*

anterior and posterior cardinal angles the lateral margins depart at almost 90 degrees. The beak is very near the anterior extremity and the shell is quite convex along the oblique and somewhat curved crescence line, from which the anterior slope is abrupt and the posterior abrupt and slightly concave at first becoming flat at the hinge. The anterior scar is small and deep, the posterior large and faint. Beneath the beak are three or four teeth diverging from the edge of the ligament area.

*Lower Devonian.* Presque Isle stream, Chapman Plantation, Me.

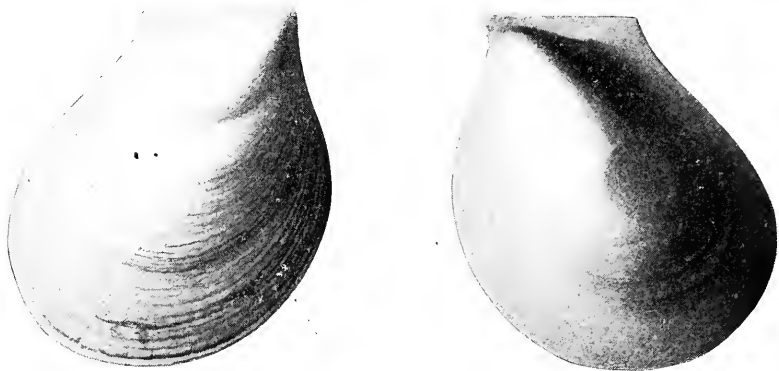
### ***Myalina pterinaeoides* nov.**

One of the commoner species at Presque Isle stream is a *Myalina* with a striking resemblance throughout, save in the character of the hinge, to certain *Pterineas* with curtailed posterior wing, and specially similar to *Pt. follmanni* Frech.<sup>1</sup>

The frequent internal casts show the species to be devoid of the hinge teeth of *Pterinea* and present only the moderately broad ligamental striations of *Myalina* and the abbreviated earless and abrupt front margin. This latter feature is rather feebly developed but when the shell is retained the anterior incurvature

<sup>1</sup>Frech. *op. cit.* pl. 10, fig. 5: Drevermann. Fauna d. Untercohlensch, p. 82, pl. 10, fig. 1, 2.

with margins truncated and meeting at right angles is evident. In other respects we may note the following characters: The shell is relatively suberect without posterior hinge, obliquely elongate, suboval with greatest width across the pallial region, the hinge line being short, not more than one half as long as the length



*Myalina pterinaeoides*

of the shell. The valves are shallow and thick; posterior muscle scar well defined, situated at one half the length of the shell; pallial line short, barely reaching beyond the middle; anterior scar absent.

The surface of the shell is coarsely rugose in concentric growth lines and is without other ornament. Of such a species as this we know nothing among the faunas of the Appalachian early Devonian.

*Lower Devonian.* Presque Isle stream, Chapman Plantation, Me.

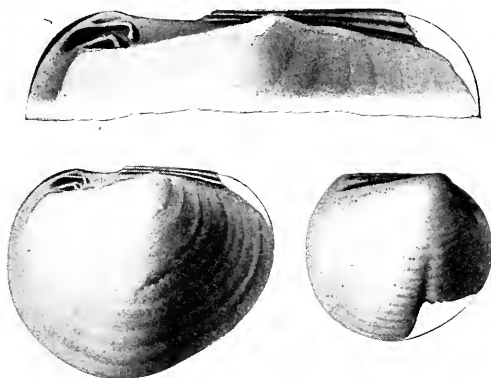
### *Cyrtodonta beyrichi* Beushausen

*Cyrtodonta beyrichi* Beushausen. Beitr. zur. Kenntn. d. Oberrheinischen Spiriferensandsteins. 1884. p. 67, pl. 3, fig. 2, 3.

I am disposed to refer to this species without much reservation certain subcircular shells of Paracyclaslike outline with quite convex surface, slightly depressed behind and faintly sinuous in front. In these the hinge has the structure of *Cyrtodonta* strongly developed—the curved double anterior teeth and the long lateral or posterior grooves and ridges. Beushausen's figures were made from internal casts but they display the general outline and size of those before us.

The genus *Cyrtodonta* has not been observed in the Devonian rocks of the Appalachian province and its occurrence in the eastern

region is of decided interest. While these Devonian species seem to agree in hinge structure with those which have been referred to the genus from the Lower Silurian yet it is possible that differences may be found and Beushausen's recognition of the



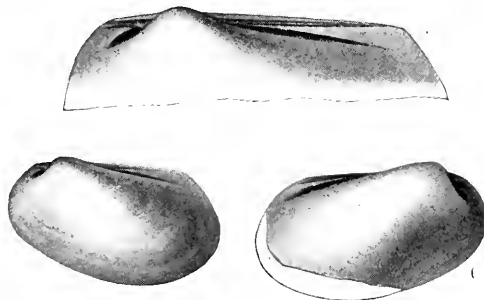
*Cyrtodonta beyrichi*

validity of *Cyrtodonta* which has commonly been regarded a synonym of Conrad's term *Cypricardites*, has been indorsed by Ulrich [Paleontology of Minnesota, 1897. v. 3, p. 534] who has elaborately illustrated the Silurian species. *Cyrtodonta beyrichi* in Germany occurs in the Spiriferensandstein of the Hartz mountains at the Kahleberg.

*Lower Devonian.* Moosehead lake, 7 miles north of Kineo, Me.

***Cyrtodonta muscula* nov.**

Much more elongate than the preceding, retaining the pterineoid



*Cyrtodonta muscula*

form, narrow in front, widening backward and with a broad anterior sinus. Hinge as in the other species.

*Lower Devonian.* Moosehead lake, 7 miles north of Kineo, Me.

**Megambonia denysia** nov.

Shell very small, suborbicular in outline and rotund in contour. Auricle not prominent, byssal groove broad shallow and indistinct, but visible nearly to the beak. Surface very finely radiate on the body of the shell but with fewer radii on the auricle. The

*Megambonia denysia*

orbicular outline, regular convexity and feeble byssal groove seem to indicate this as distinct from *M. crenistriata* Clarke, though not varying materially in surface characters. Further knowledge of the shell may determine a closer relationship in the two.

*Lower Devonian.* Percé rock, P. Q.

**Mytilarca dalhousie** nov.

Ct. *M. ovata* Hall. *Palaeontology of New York*, 3: 279, pl. 50, fig. 7.  
*M. solida* Maurer. *Fauna d. rechtsrhein. Unterdevon.* 1886.  
 p. 13; Frech. *Devon. Aviculiden Deutschlands*, p. 143, fig. 15.

*Mytilarca* is not common in early Devonian faunas. The specimens of the genus from the Dalhousie fauna are well developed in respect to generic characters and of moderately large size approaching in dimensions the Helderbergian species *Megambonia ovata* Hall which has never been well described or figured though its relation to *Mytilarca* has long been recognized<sup>1</sup>; and in outline and contour *Myalina solida* Maurer of the Lower Coblenzian where such species are rare. *Mytilarca dalhousie* is elongate subovate in outline, with short straight posterior hinge and long abruptly deflected anterior margin extending to the basal curvature of the valves with a slightly sinuous curve. The surface is regularly but slightly convex with the

<sup>1</sup>N. Y. State Mus. Mem. 3, p. 89.

greatest elevation along the anterior crescence line and the slope thence gradual in all directions except anteriorly, where it is curved down and inward. The general expression of the shell will be better appreciated from the figures than by description. There are large and small shells present with these characters all representing the same specific form.

The hinge characters are excellently shown in one specimen of the left valve. The beak is terminal; beneath it is the apex of the broad ligament area which is strongly striated transversely.



*Mytilarca dalhousie*

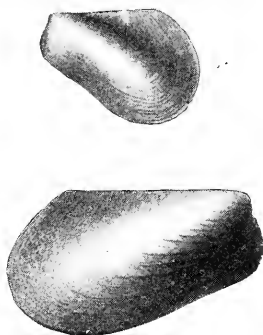
The anterior edge of this area slopes obliquely back to the inner apex of the valve and at this point is a single oblique elongated tooth, doubly crenulated on the crest leaving between it and the edge of the ligament area a pit or socket for the reception of the tooth of the other valve. This socket is bounded below by a continuation of the tooth. Toward the posterior end of the hinge is an oblique but obscure ridge below the ligament area. This hinge structure is in agreement with Hall's delineation of it for the genus *Mytilarca*. The umbonal region of the shell is thick and the posterior margin shows successive thickened layers of shell growth.

*Lower Devonian.* Dalhousie, N. B.

### ***Modiomorpha impar* nov.**

Shell of small or medium size with straight hinge line not extending for the full length of the valves. Beaks anterior but not terminal, depressed, the umbonal region rising gradually and soon broadening out over the low posterior slope. In front of this ridge

the surface is gently depressed making a distinct sinus in the lower margins specially on the left valve. Anterior margins



*Modiomorpha impar*

relatively narrow and blunt, posterior extremity broadly rounded. Postumbonal slope gently concave. Surface covered with regular concentric lines.

*Lower Devonian.* Dalhousie, N. B.

***Modiomorpha odiata* nov.**

Shells elongate, depressed convex and of considerable size; beak at the anterior third, hinge short, anterior curvature relatively nar-



*Modiomorpha odiata*

row, the valves widening backward in a low very broad curve, umbonal ridge low but clearly defined making a flat or depressed

posterior slope and rather straight posterior margin. Length about twice-the height; actual length of a full sized example 60 mm, height 35 mm. Surface with concentric lines only.

*Lower Devonian.* Moosehead lake, Baker Brook point and Matagamon lake, Me.

***Modimorpha vulcanalis* nov.**

Shell robust, with very thick valves; outline short, obliquely cordate, hinge line oblique, beak in front of the middle, not elevated; umbonal ridge low but distinct from which the slope anteriorly is broad and very gently convex while posteriorly it is at first gently concave, then depressed and almost flat near the hinge line. The marginal outline is narrow in front at the ex-



*Modiomorpha vulcanalis*

tremity of the oblique hinge, widens in a low curve backward, turns almost at right angles at the end of the crescence line, curving thence broadly upward and forward, joining the obliquely elevated hinge in a broad curve. The length and width of the shell are nearly the same.

The resemblance of this species to Drevermann's *Goniophora cognata*<sup>1</sup> is very close in all visible features save that the crescence ridge in the latter is somewhat sharper. It may also be compared to *M. elevata* Krantz of the lower Coblentzian.<sup>2</sup> Professor Kayser suggests a similarity with *M. siegenensis*

<sup>1</sup>Fauna d. Untercoblentzsch. 1922. p. 88, pl. 10, fig. 15, 16.

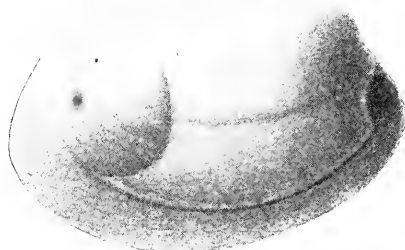
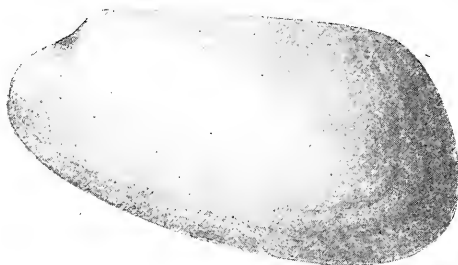
<sup>2</sup>Beushausen. Lamell. d. rhein. Devons. p. 23, pl. 2, fig. 9-11.

Beushausen.<sup>1</sup> At all events the short obliquely cordate shell is not familiar in Appalachian fauna of this age.

*Lower Devonian.* Edmunds Hill, Chapman Plantation, Me.

**Modiomorpha protea** nov.

Shell elongate, subrhomboidal, beaks anterior, posterior hinge not elevated, crescence line high, relatively approximate to hinge. Length and hight as four to three. Anterior margin broadly rounded, not narrow, basal margin sloping gently downward to near the umbonal ridge, thence bending up and back in a broad



*Modiomorpha protea*

angle; posterior hinge angle rounded. Umbonal ridge subangular, sharply defined by the rapid slope of the surface toward the hinge, but not elevated above the general convexity of the sides of the valves.

Anterior adductor scar with the little foot muscle scar well defined.

This species is somewhat variable in outline, some of the specimens assigned thereto being considerably larger than others. This

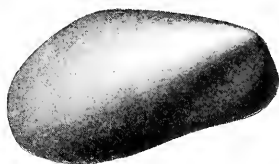
<sup>1</sup>*op. cit.* p. 24, pl. 2, fig. 8.

variation, however, is not expressed in the typical specimens at Edmunds Hill as well as in the examples referred to the same species occurring at Presque Isle stream.

*Lower Devonian.* Edmunds Hill and Presque Isle stream, Chapman Plantation, Me.

**Modiella modiola nov.**

This is a more elongate, more slender and generally larger shell than *M. pygmaea* Hall, the posteriorly expanded and convex body of the shell being narrower, the byssal sulcus less deep and



*Modiella modiola*

the anterior fold very much reduced in diameter. The shells are thus subacuminate or modioloid and very obliquely arcuate. Average examples have a length of 18 to 24 mm.

*Middle Devonian.* Gaspé Basin, Gaspé.

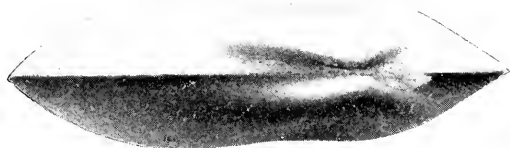
**Grammysia modiomorphae nov.**

Shell large, elongate, generally with strong oblique medial depression dividing the valves into two lobes, sometimes a low ridge lying in the bottom of this depression; beaks at the anterior one third of the hinge, slightly elevated, appressed and incurved; hinge line direct, not elevated; marginal outline incurved in front of the beaks, rather narrow at the anterior extremity, broadly incurving on the basal margin at the median sulcus, recurving in a broad angle at the postlateral extremity. The median sulcus varies in width and strength in different examples, at times being highly and somewhat unequally developed on both valves, rather more on the right and again being only a low, broad depression.

Muscle scars obscure, only the anterior adductor being occasionally shown on our specimens. Surface markings concentric striae strongly marked at the anterior margin.

The elongate form of this shell and its subequal extremities give it the appearance of a Modiomorpha. The evidence seems to indicate however that it is a Grammysia of unusual expression,

with which it is not easy to find comparison among other shells. Drs Kayser and Drevermann who have kindly examined specimens



*Grammysia modiomorphae*

of the shell agree that it is very similar to Beushausen's *G. prümienensis*<sup>1</sup> from the upper Coblentian of the Eifel.

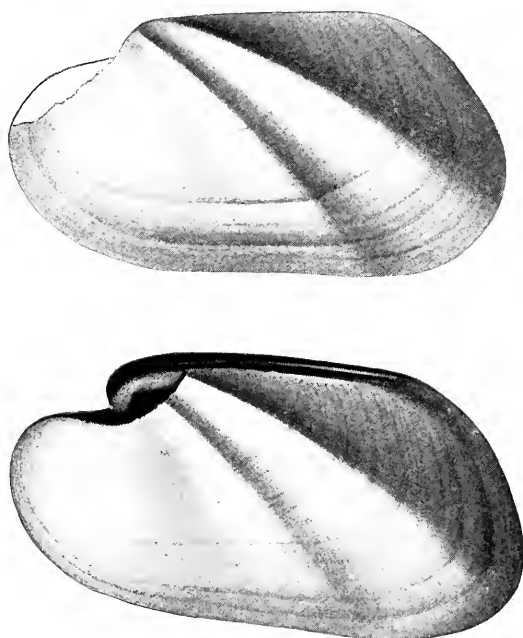
*Lower Devonian.* This species is the most abundant of the lamellibranchs at Edmunds Hill, Chapman Plantation, Me.

---

<sup>1</sup>*op. cit.* p. 243, pl. 24, fig. 2-1.

*Prosocoelus pes-anseris* Zeiler & Wirtgen var. *occidentalis* nov.

The genus *Prosocoelus* was established by Keferstein in 1857 and was first applied to the species *Grammysia pes-anseris* Zeiler & Wirtgen<sup>1</sup> by Beushausen<sup>2</sup> and the latter author subsequently described several species from Coblentian horizons. The hinge in the genus is characterized by its strong and large, curved umbonal teeth, two in number, with the uppermost the larger, and in the left valve a small triangular anterior tooth; a



*Prosocoelus pes-anseris* var. *occidentalis*

broad ligament area with longitudinal groove. The exterior bears two or three strong divergent ridges. In *P. pes-anseris* these surface ridges have an extreme of development.

It is of extraordinary interest to find this genus, not before known outside the typical regions of the Coblentian, present in the fauna of central Maine and by a species which bears so strong a resemblance to *P. pes-anseris* as to make comparison therewith more reasonable than with any other of the known forms.

The shells from this fauna are usually elongate, broader behind than in front, nearly twice as long as high, with two strongly

<sup>1</sup>Singhofen. Jahrb. des Vereins für Naturkunde im Herzogthum Nassau. 1851. p. 290.

<sup>2</sup>Beitr. zur. Kenntn. d. Oberharzer Spiriferensandsteins. 1884. p. 109.

defined radial ridges; the umbonal ridge, separated from the median ridge by a moderately deep broadening groove and in front of this a depression bounded by a still lower sometimes quite vague elevation. Some of Beushausen's species of *Prosocoelus*, especially *P. ellipticus* (Schalke, Hartz) have much the outline and expression of this shell. There are specimens in our collections that indicate a more orbicular outline quite similar to that of *P. orbicularis* Beushausen.<sup>1</sup> I am not altogether certain whether these represent the latter species or may be compressed specimens of the former. The evidence seems to favor the former view.

*Lower Devonian.* Tomhegan point, Moosehead lake, Me.

### ***Leptodomus communis* nov.**

Shell elongate with a Cimitarialike curve to the hinge, beak anterior, hinge not equaling the length of the shell; lower margin sinuate, curving upward posteriorly to a narrowed, subacute ex-



*Leptodomus communis*

trinity whence the posterior edge retreats to the hinge. Surface deeply sulcate from umbo to basal margin. Umbonal ridge conspicuous, blunt and broadly curved, exterior with low irregular concentric folds.

*Lower Devonian.* Presque Isle stream, Chapman Plantation, Me.

### ***Leptodomus corrugatus* nov.**

Shell small, beak at the anterior third of the hinge, outline sub-elliptical, posterior slope gently sulcate, smooth, anterior surface



*Leptodomus corrugatus*

coarsely corrugated and over the median area these anterior ridges duplicate, there being on the whole on the lateral slope two

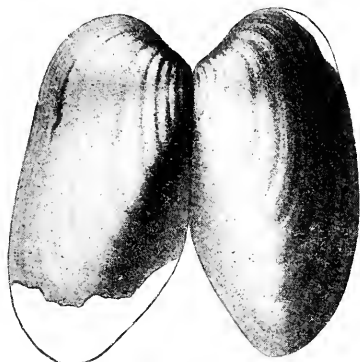
<sup>1</sup>*ibid.* p. 110, pl. 5, fig. 8.

ridges for every one on the anterior surface. Median surface slightly depressed.

*Lower Devonic.* Presque Isle stream, Chapman Plantation, Me.

***Leptodomus prunus* nov.**

Elongate shells with anterior umbones and low cincture most distinct at the beaks. Surface quite evenly convex though the beaks are depressed. Umbonal ridge broad and ill defined. Ornament consisting of concentric ridges, sharp in the umbonal region



*Leptodomus prunus*

and with closely crowded concentric lines between all, becoming obscure toward the margins. Length of each valve about twice the height.

This species is distinguished from *L. canadensis* Billings of the Grande Grève limestone by its shallower cincture but further knowledge of the species may show its very close relationship to *L. striatulus* F. Roemer of the upper Coblenzian. [For figures of the latter see Beushausen. *op. cit.* p. 265, pl. 24, fig. 12-14]

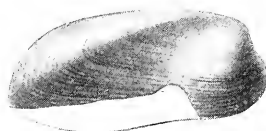
*Lower Devonic.* Telos lake, Blind Cove Point, Me.

***Goniophora curvata* nov.**

Shell of medium size, elongate, hinge line usually concealed, but apparently short, not extending posteriorly to within one third of the shell's length of the end. Beaks anterior, subterminal, valve slightly excavated in front beneath them, making the anterior extremity relatively narrow. The umbonal ridge is obliquely curved and lies high on the valves making the postumbonal slope narrow.

The specimens of this shell are not common and it would seem the width of the postumbonal slope and the position of the ridge

are subject to variation by compression. In forms where this post-umbonal slope is broader the shell approaches the *Orthonota solenoides* Sow.,<sup>1</sup> of which specimens are before us from the



*Goniophora curvata*

Upper Ludlow of Bradnor lane, Kingston. The latter shell, however, is broader and more produced behind and has a shorter and more oblique hinge line.

*Lower Devonian.* Dalhousie, N. B.

### *Sphenotus ellsi* nov.

Shell elongate, subrectangular, hinge line and lower margin parallel. Beak at the anterior fourth of the hinge, anterior slope



*Sphenotus ellsi*

uncurved, anterior margin broadly rounded. Umbones not elevated, flattened and divided by a sinus or cincture which traverses

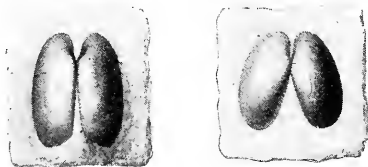
<sup>1</sup>Murchison. *Siluria*. Ed. 3. pl. 23, fig. 9.

the valves obliquely backward though without greatly affecting the regularity of the basal margin. Umbonal ridge sharply developed, not crested; extending to the postlateral angle. Postumbonal slope broad and concave, its outer edge constituting the entire posterior margin of the valve which slopes forward to the hinge. This concave area is traversed by an obscure radial ridge. Surface of the valves covered with fine concentric striae in low and irregular undulations over the shell body; these however are absent on the posterior slopes where sharp concentric lines alone are visible. Length about one third the height.

*Lower Devonian.* Dalhousie, N. B.

### **Carydium elongatum nov.**

This is distinguished from its associate *C. gregarium* Beushausen by its longer and narrow valves which are quite regularly convex from a transverse median line, the surface sloping thence uniformly above and below, leaving the umbones depressed. The



*Carydium elongatum*

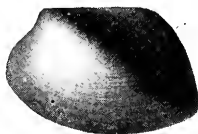
anterior end is visibly narrower than the posterior though the latter is not greatly expanded. The beaks are situated about one third the hinge length from the anterior end and the region in front of the beaks is somewhat excavated. The height of the shell is about one third of the length. The surface is covered by concentric lines only.

*Lower Devonian.* Dalhousie, N. B.

### **Cypriocardella norumbegae nov.**

Shell short, subrectangular, broader behind than in front, beaks well forward, umbones prominent, umbonal ridge well developed and dividing the valves so as to leave a broad postumbonal slope which is slightly depressed or concave. Hinge line short, not extended in front. Shell margin curving from a broad anterior extremity with an outward bend into the basal margin which becomes direct near the umbonal ridge where it turns sharply

almost at right angles, curving outward, upward and forward and joining the hinge in an obtuse angle. Hinge with the characteristic



*Cypricardella norumbegae*

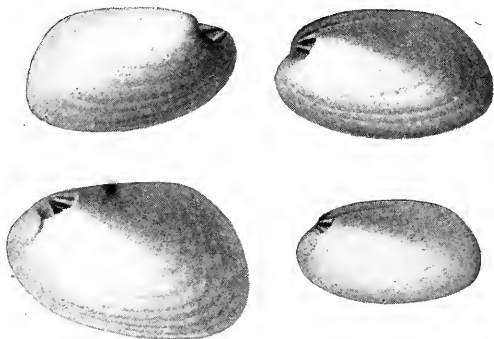
median tooth just beneath and in front of the beak on the left valve.

Shell substance thick, surface with regular concentric growth lines and sometimes a vague radial fold in the postumbonal slope.

*Lower Devonian.* Dalhousie, N. B.

*Cypricardella parvula* nov.

These are small shells of oval outline with an almost uniform convexity, beaks well toward the front and very low umbonal ridge. They are about one third longer than high and are especially noteworthy for the strong development of the umbonal teeth,



*Cypricardella parvula*

which are slightly curved ridges, the median one much the strongest, bounded by deep sockets and a more subdued tooth above and below.

There are no *Cypricardella*s of this type in the New York faunas where they are chiefly characterized by sharp concentric lines and strong umbonal ridge. Such shells as these are however very closely similar to *C. bicostata* Krantz and *C. elongata* Beushausen,<sup>1</sup> especially to the former.

*Lower Devonian.* Moosehead lake, a little north of Saccatean point, Me.

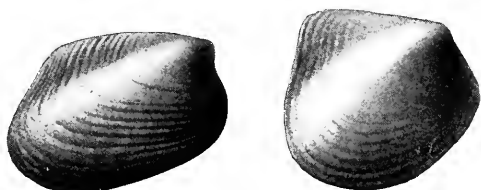
<sup>1</sup> See Beushausen's figures, *op. cit.* pl. 11, fig. 5-14.

*Cypriocardinia magna* nov.  
or cf. *crenistriata* Sandberger

See Sandberger. Verstein. d. rhein. Schichtensystems. 1850-56. p. 263, pl. 28, fig. 5

Beushausen. Lamellibr. d. rhein. Devon. 1895. p. 178, pl. 16, fig. 9-13

Shell large for this genus, somewhat variable in outline but usually obliquely rhomboidal with very strong umbonal ridge, anterior beaks, very decided postumbonal slope which is deeply incurved, narrow anterior extremity widening backward. Hinge somewhat curved, shell extended behind, lower margin slightly incurved and sinuate. Length and greatest height as six to five, actual length 30 mm, high 25 mm. Some specimens are quite



*Cypriocardinia magna* or cf. *crenistriata*

erect with the height and length equal. Surface bearing strong concentric lamellose and quite regular sculpture, on which the finer ornamental lines occurring in many other species have not been retained.

This shell in its size and proportions is very closely like *C. crenistriata* as figured by Beushausen from the lower and upper Coblenzian of the Rhine. Species in the Grande Grève limestone (*C. distincta* Billings) attain its size and *C. planulata* Hall (Schoharie grit) has a similar contour but no other form than that above cited is known to us which approaches it both in size and contour.

*Lower Devonian.* Moosehead lake, Baker Brook point, Me.

*Cardiomorpha (Goniophora ?) simplex* nov.

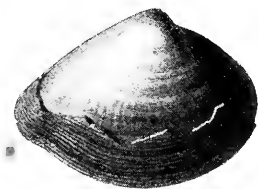
Shells elongate with anterior beaks; narrow in front, widening behind and with a very high and bluntly angular umbonal ridge behind which is an abrupt posterior slope and in front a well marked sinuosity or radial depression. The posterior extremity of the shell is quite narrow and subacute.

The hinge is well displayed in some specimens and is peculiar for its simplicity; there is a moderately broad striated ligament area which widens slightly beneath the beaks but there is, under the most favorable preservation, no evidence whatever of the umbonal teeth which exist in the typical forms of *Goniophora*. Therefore the suggestion of relationship to that genus is wholly based on the general aspect of the exterior. The shell is generally about twice as long as high and many attain a length of 50 mm. Surface sculpture simple concentric lines. Beushausen referred to *Cardiomorpha* such toothless shells, including within his diagnosis a large variety of external expressions, among others forms having this *Goniophoralike* exterior [*see* especially *C. alata* Sandb. in *op. cit.* p. 223, pl. 25, fig. 15-17].

*Lower Devonian.* Moosehead lake, north of Soccatean point, Me.

***Palaeoneilo mainensis* nov.**

Shell attaining large dimensions for a species of the genus, subtriangular, depressed convex, with beak but little in front of middle of the hinge. Height three fifths of the length. Posterior surface gently sinuate and the postlateral shell margins corres-



*Palaeoneilo mainensis*

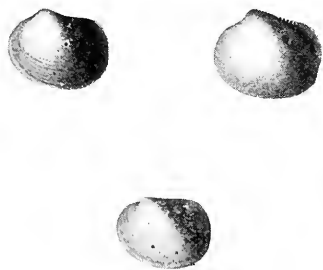
pondingly emarginate, extremities narrow. Surface covered with fine concentric growth lines. On the interior the muscle scars are deeply impressed, there being on the umbonal side of each a ridge but both anterior scar and ridge are very much the more strongly marked and almost attain the strength of the ridge in *Nuculites*.

The hinge has the following structure: The posterior arm carries a row of 16-18 ligament pits ending at the anterior edge of the posterior adductor. Those directly under the beak are very slender and transverse, outward they become stronger and more and more chevron-shaped; the anterior arm is not separated by an oblique line from the posterior and carries seven or eight pits, increasing outward rapidly in size and becoming strong and oblique at the terminus near the inner edge of the adductor. In respect to hinge structure, the species is readily distinguishable from *P. orbigny*, which it sometimes resembles in form. It is not easy to find European or Mississippian species which this shell resembles in form and hinge structure. Comparisons of similarity are readily made with species of the Devonian on both sides of the Atlantic but these are not helpful in the absence of agreement in critical details. We may however observe that the shell occasionally puts on a concentrically wrinkled surface which we find together with agreements in outline, convexity and, so far as can be ascertained, in hinge structure, expressed in *P. maureri* Beushausen and some of its variants in the Coblenzian fauna. [Beush. *op. cit.* p. 85, pl. 7, fig. 11-28]

*Lower Devonian.* Abundant at Presque Isle stream and 2 miles westward in the burnt district, Chapman Plantation, Me.

### *Palaeoneilo circulus* nov.

Shell small, almost circular in outline, slightly oblique, depressed and evenly convex, with beak somewhat anterior, surface marked



*Palaeoneilo circulus*

by the fine elevated concentric lines characterizing so many species of this genus and with a very low posterior sulcus. Muscle scars slightly buttressed by shelly ridges.

*Lower Devonian.* Presque Isle stream, Chapman Plantation, Me.

*Nucula* cf. *krachtae* A. Roemer

*Nucula krachtae* A. Roemer. Verstein. des Harzgebirges, 1843.  
p. 23, pl. 6, fig. 10

*Nucula krachtae* Beushausen. Lamell. des rhein. Devon. 1895.  
p. 47, pl. 4, fig. 20

I am disposed to identify with this well known Coblentzian species a small trihedral *Nucula* of great obliquity and prominent overarching beaks.

*Lower Devonian.* Presque Isle stream, Chapman Plantation, Me.

*Palaeoneilo* (*Nuculites*) *folles* nov.

This is a species of the type of *Nuculites branneri* Clarke from the Maecurú river<sup>1</sup> and *Cucullella ovata* Sow. from the Tilestones of Horeb Chapel<sup>2</sup> but while it approaches both of these very closely there is only the barest indication in the specimens before us of the anterior clavicle shown by a slender depression in the sculpture casts while the other characters of the



*Palaeoneilo* (*Nuculites*) *folles*

shell are those of *Palaeoneilo*, even to the presence of a slight posterior sinuosity or oblique depression which brings it into comparison with *P. orbigny* Clarke from Maecurú<sup>3</sup> in which the surface is covered with very fine concentric lines, and with a number of more coarsely marked sinuous species from the Coblentzian.

*Lower Devonian.* Dalhousie, N. B.

<sup>1</sup>Archivos do Mus. Nacional Rio de Janeiro. 10: 73, pl. 8, fig. 6-8.

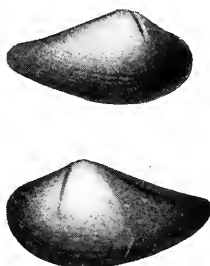
<sup>2</sup>Murchison, Siluria. Ed. 3. pl. 34, fig. 17.

<sup>3</sup>Op. cit. p. 74, pl. 8, fig. 14-17.

*Nuculana (Ditichia) securis* nov.

Cf. *Nuculana securiformis* Goldfuss (sp.) *Petrefacta Germaniae*. 2: 151, pl. 124, fig. 8 and Beushausen, *Devon. Aviculiden Deutschlands*, p. 59, pl. 4, fig. 26-28

Shell small, transversely elongated and snouted, beak approximately median, hinge line sloping slightly in front, deeply incurved behind. Posterior extensions narrow, curved gently upward at the extremity, anterior extremity broad and blunt; umbones not prominent, umbonal ridge obscure; greatest convexity of the valve anterior near the hinge; surface generally convex over the body of the shell, depressed toward the posterior extremity; hinge toothed almost to the extremity of the posterior extension, while the marginal surface along the extension is excavated and slightly ridged. Just within the position of the muscle scars which are usually faint are two faint shell ridges or clavicles preserved as grooves on the sculpture



*Nuculana (Ditichia) securis*

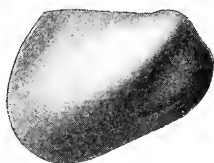
casts. Of these the anterior is the larger, both are broad and low, but the structure is altogether unusual though not unexpected in this genus. This structure is expressed in Nuculites by the strong development of an anterior ridge and in such forms occasionally the two ridges appear as in the species *N. (Cucullella) elliptica* Maurer of the Coblenzian for which Sandberger proposed the generic term *Ditichia* because of this structure. Beushausen however considers this development of a second ridge of only specific value and embraces such species within *Cucullella*. For the same reason we may hold the present species within the genus *Nuculana* though shells of this lediform type have not before shown such structures. The presence of these muscular clavicles is the only apparent difference between this shell and the *Nuculana securiformis* Goldfuss of the Coblenzian.

The surface of the valves is covered with very fine concentric striae.

*Lower Devonian.* Dalhousie, N. B.

**Macroodus matthewi** nov.

Shell quite small, obliquely ovate, much broader behind with obliquely curving lower margin and broadly rounded posterior extremity. The hinge is not long and slopes at its posterior end to the posterior curve. The beak is well forward, nearly terminal,



Macroodus matthewi

umbones prominent, umbonal ridge arched, oblique, high, fading out posteriorly. A broad sinus lies medially in front of the umbonal ridge and produces an inward curve on the lower shell margin. Length and posterior height of the shell nearly the same.

*Lower Devonian.* Dalhousie, N. B.

**Macroodus ? baileyi** nov.

Shell small, elongate, gradually expanding backward. Beaks at about one third the length of the hinge from the anterior extremity. Hinge line rounding broadly backward. Umbonal ridge or crescence line high, posterior, well defined in early growth



Macroodus ? baileyi

but becoming obscure in later stages. Anterior extremity well rounded, the lower margin of the valves incurving medially and rounding again to the broader and rather blunt posterior extremity. The surface of the valves is rendered concave medially by a broad not sharply defined sinus passing from the umbones to the lower margins. Contour quite regularly convex on each side of the sinus.

The length of the shell is somewhat less than thrice the height. Surface smooth. The hinge structure of this shell has not been definitely determined but the species is provisionally referred to *Macrodon*.

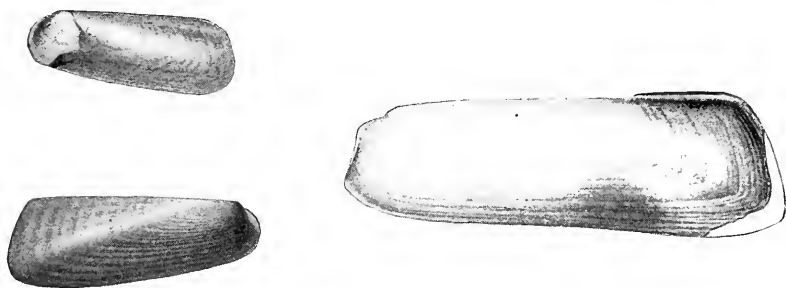
*Lower Devonian.* Dalhousie, N. B.

### ***Palaeosolen simplex* Maurer**

*Solen simplex* Maurer. Fauna d. rechtsrhein. Unterdevon. 1886. p. 18

*Palaeosolen simplex* Beushausen. Lamellibr. d. rhein. Devon. 1895. p. 224, pl. 18, fig. 9, 10

The specimens before us though not abundant in our collections seem to present no distinction from the lower Coblentian shell



*Palaeosolen simplex*

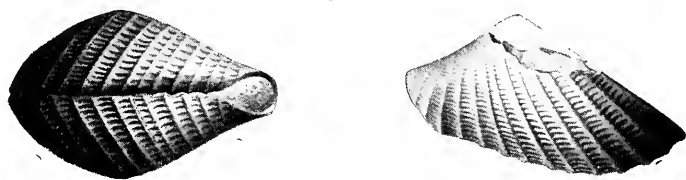
referred to, and we are disposed to assign them to that species without further question.

*Lower Devonian.* Moosehead lake, a little north of Soccatean point; also on Presque Isle stream, Chapman Plantation, Me.

### ***Conocardium incarcerationum* nov.**

This species will be found a close ally of *C. inceptum* Hall, whose form and surface characters as occurring in the Oriskany of Becraft mountain I have already delineated in New York State Museum Memoir 3. The shell sometimes attains a larger size than the New York species; its form is the same but its exterior differs in the following particulars. The ornament is not so fine, the radial lines less numerous and the deep concentric lamellae can be traced continuously across the shell while in *C. inceptum* they are so interrupted by the radial ribs on the body of

the shell as to form radial rows of deep meshes which often alternate in their position in adjoining rows. The meshes in *C. incarceratum* are much the larger transversely. The anterior ridge is sharply elevated and crested, the anterior slope very abrupt, excavated and striated by the elevated concentric lamellae which here take on a radial attitude. The posterior termination is extended and acute and the valves gape at this end. These specimens show very clearly the structure of the sculpture or prismatic layer of the shell in these species, which is rendered distinctly



*Conocardium incarceratum* x3

cavernous by the projection of the concentric growth in the form of pronounced lamellae rising from the deep intervals between the ribs and dividing these areas into series of elongate pit-shaped meshes.

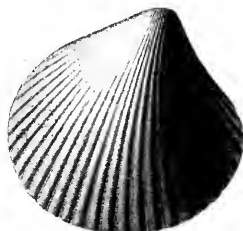
I have been disposed to regard these shells identical with *C. rhenanum* as described and figured by Beushausen [*op. cit.* p. 402, pl. 30, fig. 5-8]. There is agreement between the two in respect to size, form and radial markings but the lamellar surface structure is not defined in sufficient detail to determine whether it corresponds to that of the Dalhousie shell or that of *C. inceptum* Hall. As there is a palpable difference herein we have preferred to give these shells a distinctive designation. *Conocardium rhenanum* is from the Coblenz quartzite and the Upper Coblentian of the Rhine.

*Lower Devonian.* Dalhousie, N. B.

#### *Lunulicardium ? convexum* nov.

Cardiform, beak anterior, outline obliquely orbicular. Surface convex, elevated about the umbo, which is full and overarched, abruptly deflected on the anterior slope. Anterior marginal curve at first concave, thence rounding rather abruptly at the extremity, posterior curve much broader and postlateral surface somewhat

expanded. Surface bearing round, threadlike and simple radii separated by very narrow sulci. On the single right valve observed



*Lunulicardium ? convexum*

there are 26-28 of these radii which extend over the entire surface. Length and height equal.

This is a small shell which, with the general aspect of a *Lunulicardium*, fails to reveal the critical structural features of that genus.

*Middle Devonian.* Gaspé Basin, P. Q.

#### BRACHIOPODS

##### *Cryptonella ? ellsii* nov.

Shell elongate with relatively slender and projecting umbones and sloping cardinal margins. The beak of the ventral valve is arched but not incurved, the lateral slopes broad and excavated,



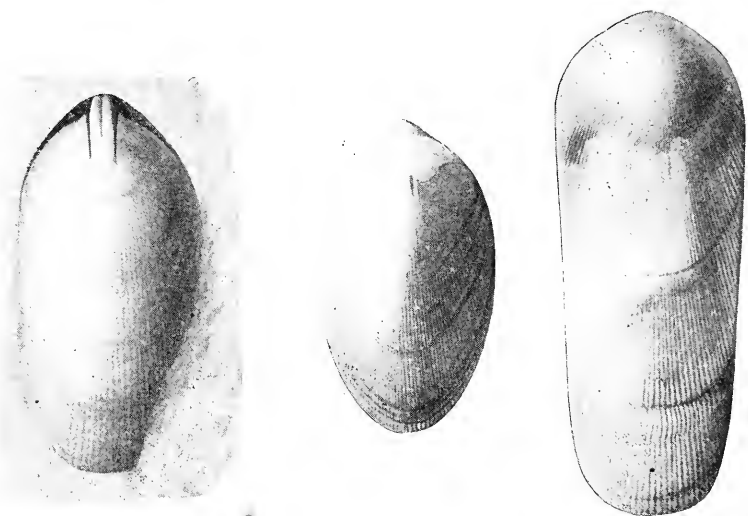
*Cryptonella ? ellsii*

bounded without by long cardinal ridges extending one half the length of the shell. The valves are subequally convex but the ventral valve is flattened toward the anterior margin. Width of valves to length as two to three.

*Lower Devonian.* Grande Grève, P. Q.

*Rensselaeria ovoides* Eaton (sp.) var. *gaspensis* nov.

Analyzed as to exterior characters this shell is a miniature of the great *R. ovoides* of the New York Oriskany, varying in proportion, dimensions, outline and convexity, much as that shell does, that is, frequently high-shouldered and broad across the umbones, rarely broadest in the pallial region, often with lateral margins vertical or slightly introverted specially about the umbones, but as often without this character, usually with the ventral valve medially elevated, and finally with a diversity in the character of



*Rensselaeria ovoides* var. *gaspensis*

Left hand figure, Gaspé sandstone; central, Grande Grève; right hand, Percé

surface striation which is due to the fact that the fine striae of early age maintain their simplicity but increase in width without additions, to that in old shells or progressed stages of relatively young shells where the surface may seem to be coarsely marked. On the other hand the shells are characterized by a prevailing narrow elongate-linguate outline with parallel lateral margins for a great part of their length. On the interior there are few notable and perhaps no constant differences, whether in respect to structure of musculature or cardinal plate. It is, however, here important to bring forward the fact which the writer has already expressed with some emphasis, that as between the genera *Rensselaeria* (as based on the type species *R. ovoides*) and its chronologic successor *Amphigenia*, there is a distinction solely in one structural

point. In form and nearly every detail of outline, surface and contour, in musculature, cardinal arrangement, brachial structure so far as known and in intimate shell structure they are homogenic. In *Amphigenia* however the converging dental plates do not reach the bottom of the valve but first unite and the resultant spondylium is supported on a short median vertical septum. In *Rensselaeria* the plates converging, fail to unite but meet the inner wall of the shell leaving between them a narrow surface, which is in effect the base of the spondylium. In this special feature which can hardly be accredited with high value as an anatomical differential, there is a definite indication of progress. The Gaspé shells show how frail is this conventional distinction. The convergence of the dental plates leaves only a very narrow space between and quite frequently they come together at the very surface of the shell wall. Even a single vertical septum may develop in the later forms of the Gaspé sandstone. It is natural to compare the small elongate shells from Gaspé with Hall's *R. marylandica* from the Cumberland Oriskany. They are shells of the same proportions but in respect to development of the dental lamellae the latter is rather less progressed than *R. ovoides*.

In view of the evidence presented by these Gaspé shells it seems to us very desirable to regard *Amphigenia* essentially synonymous with *Rensselaeria* and indicating as we have said a progressed condition of one feature only. *Rensselaeria* has many specific expressions and among the forms now referred to it are several more significant departures than that presented by *A. elongata*.

*Lower Devonian.* Grande Grève and Percé.

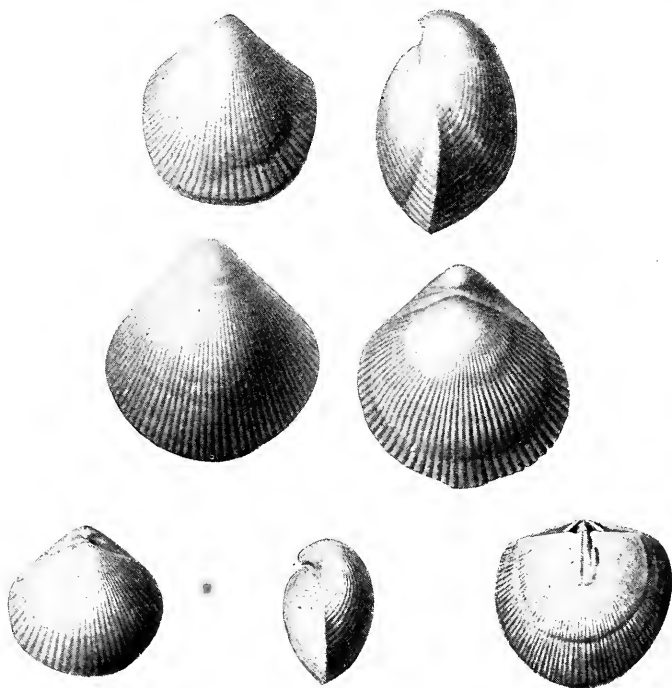
*Middle Devonian.* Gaspé Basin, P. Q.

### ***Rensselaeria stewarti* nov.**

Shell naviculate, the unequal convexity of the valves being very marked. The ventral valve is highly convex and arched, the line of greatest curvature being median from which the slope is somewhat abrupt to the sides giving the valve a subcarinate exterior. The umbo of this valve is high and overarched, projecting far beyond the hinge line, the apex being incurved and truncate. The cardinal area is represented by a flattened triangular area free of striae and rather definitely delimited. The dorsal valve is gently and evenly convex with low and inconspicuous umbo and beak. The surface of both valves is covered by abundant subequal radial riblets all of which are simple and continuous from beak to margin

except in rare instances where additions are introduced. There is considerable difference in the coarseness of the radial marking in mature shells, the number being as low as 40 and as high as 80 to 90 on each valve.

The radial lines are crossed by exceedingly fine concentric striae. On the interior the ventral valve shows a deep muscle scar and strong dental plates, the former not being striated by the plications



*Rensselaeria stewarti*  
The four upper figures somewhat enlarged

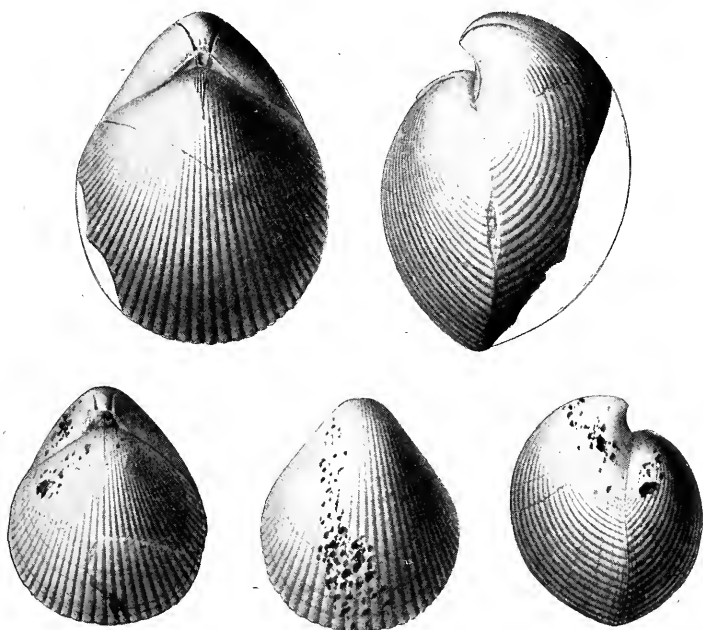
of the shell. On the dorsal valve is a defined cardinal area, perforated hinge plate and narrow elongate muscle area divided by a faint median septum.

We have spoken elsewhere of the relations of this and similar shells to *Trigleria* and of the presence of such forms both in the Oriskany and Helderberg faunas. We have identified in the Cumberland Oriskany, *Trigleria gaudryi* Oehlert [see *Paleontology of New York*, v. 8, pt 2, pl. 76, fig. 6, 7] and *T. portlandica* Billings from Square Lake, Me. is a somewhat similar shell. Both however lack the specific characters of the shell before us.

*Lower Devonian.* Dalhousie, N. B.

*Rensselaeria callida* nov.

On other pages we have entered into some discussion of the species of *Rensselaeria* of Trigeriellike form occurring in Aroostook county and at Dalhousie and have indicated their affinities with the Coblentzian species *R. strigiceps* and *R. crassicosta*. We have before us now extensive representations of two additional species occurring in association which while presenting some aspects of similarity to the species referred to (*R. atlantica* and

*Rensselaeria callida*

*R. stewarti*) are not in full agreement with them. One of these here designated as *R. callida* occurs in various stages of growth but the adult form is of considerable size, attaining a length of 50 mm and upward. Its valves are full, convex with a tendency to gibbosity, the ventral valve being broadly and faintly keeled and the dorsal valve slightly flattened medially, the ventral umbo elevated and arching but not incurving over the other. The outline is quite regularly oval. Beneath the beak the incurvature shows no evidence of flattening into a cardinal area as in the species cited nor is there evidence of such area on the dorsal valve. There are a well defined foraminal opening and tube and the dental plates are considerably developed extending from one fourth to one

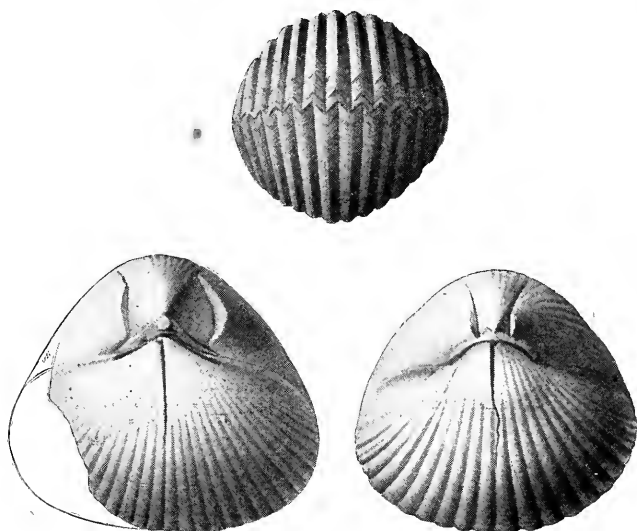
fifth the length of the valve though without thickening. There is no impressed muscular scar and no thickening of the shells in the umbonal region. In the dorsal valve, though there is a median septum extending about one third the length of the shell, there is no thickening at the beak and the hinge plate is so slender that we have been unable to make it out. All these details are in notable contrast to *R. atlantica*, *R. stewarti* and the Coblentian species referred to.

They are in closer correspondence to the Helderberg species *R. aequiradiata* Hall and indicate, irrespective of their considerable size, an entirely primitive condition of development. The markings of the surface consist of simple rounded or slightly flattened plications seldom with concentric growth lines or other interruptions. There are about 50 of these simple plications on each valve, the number varying very little with size and age.

*Lower Devonian.* Misery stream, first dam in town of Sandwich; Brassua lake, opposite Moose river, Me.

#### *Rensselaeria diania* nov.

This species retains the contour and simple structure of *R. callida* but differs wholly in its exterior which carries 20 to 30



*Rensselaeria diania*

very coarse and broad, sometimes quite sharply keeled plications which meet in sharp interlocking angles at the edge. Its similarity

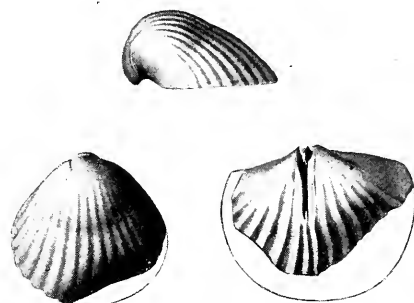
to *R. crassicosta* Koch of the Siegen greywacke is undeniable.

*Lower Devonic.* Misery stream, first dam in town of Sandwich, Me.

### *Rensselaeria* cf. *crassicosta* Koch

See Koch. Neues Jahrb. für Mineral. 1881. p. 237, and other German authors

There are a few shells of small size in a quartzite at the above cited locality which are coarse ribbed and hardly to be distinguished



*Rensselaeria* cf. *crassicosta*

from specimens of *R. crassicosta* which I have received from Professor Kayser. The dorsal valves show a long and much thickened septum with a divided hinge plate.

*R. crassicosta* is from the Taunas quartzite and Siegen beds of the Coblentzian.

*Lower Devonic.* Misery stream, first dam in town of Sandwich, Me.

### *Rensselaeria atlantica* nov.

*Rensselaeria mainensis* Williams, U.S. Geol. Sur. Bul. 165. 1900. p. 80, not described or figured.

The *Rensselaerias* of the Chapman Plantation faunas are of singular interest for the type of structure they present. They occur both in the Presque Isle stream outcrops and at Edmunds Hill but there is a difference in the forms from the two localities which is expressible in terms of development only.

The Chapman Plantation shells have a naviculoid contour, that is, the ventral valve is highly arched and elevated medially, the beak conspicuous and overarching the hinge, the lateral slopes of this

valve abrupt while the dorsal valve is but gently convex, its beak being so depressed that it is obscure and the valve has a shouldered appearance on account of the broad regular convexity across the posterior part, from which there is a gentle slope anteriorly. The marginal outline is subcircular. In the more progressed type expressed in the Presque Isle outcrops the large and thickened hinge plate is fully developed and was completely perforated at maturity. Likewise the strong adductor muscle scars separated vertically by a low septal ridge have quite the expression they display in fully developed specimens of *R. ovoides* and they even show the peculiar divergent vascular markings over the posterior



*Rensselaeria atlantica*

slopes which have been heretofore recorded only in a single example of *R. ovoides* [Pal. N. Y. v. 8, pt 2, pl. 75, fig. 5].

These are structural features important to emphasize for no other species thus far described reproduces these details of that well known Oriskany shell so well. In the ventral valve, also, mature shells bear the expression of *R. ovoides* in their fully developed dental lamellae and deep pedicle pit. The shells of this species in early stages are transverse or subcircular rather than elongate, the increase of length being an acquisition of later growth. The hinge line is straight and extends for the full diameter of the shell giving the latter a semicircular outline.

On both ventral and dorsal valves a distinct and prominent cardinal area is present. The straight hinge line extending for nearly the entire width of the valve makes this a conspicuous feature, on the dorsal valve the area maintaining its notable width to the extremity of the cardinal line and then quickly losing it on the hinge angles. In the ventral valve this feature is made

more prominent by the greater elevation of the beak and consequent greater width of the area.

To a certain degree this structure is comparable to that observed in the subgenus *Beachia* H. and C. (type, *R. suessana* Hall, Oriskany, Cumberland, Md.). In this shell "the cardinal margin beneath the beak [of the ventral valve] is flattened into a well defined pseudoarea" [Pal. N. Y. v. 8, pt 2, p. 259]. Here however is a high development of a cardinal area to a degree far beyond that expressed in *Beachia*. Furthermore in *Beachia* "the short inflection of the margin beginning here [on the hinge line] is continued along the lateral portion of the shell where it meets a similar marginal inflection from the opposite valve. These produce the sharp introversion of the lateral margins which is also one of the characteristics of the genus *Megalanteris*." No such reentrant margins occur in the shells under consideration. I would not refer the species to the subgenus *Beachia* lest thereby its real affinities be obscured.

The kindness of Prof. E. Kayser of Marburg has enabled me to compare my material with typical examples of the *Rensselaerias*, *R. strigiceps* F. Roemer and *R. crassicosta* (Koch) Kayser, of the lowest arenaceous Devonian of the Rhine, and my lamented friend, the late Dr L. Beushausen of the Landesanstalt, Berlin compared some specimens from the Presque Isle stream fauna with examples of the species mentioned, in the collections of that institution.

The evidence at hand is very clear that while the specimens currently referred to *R. strigiceps* are quite variable in degree of surface striation, yet this species also bears a cardinal area upon the valves. This feature is particularly well shown by a valve from the Taunus quartzite of Katzenloch near Idar in the Rhine province. In the main the specimens of this species are somewhat more finely striated than those from the Presque Isle but this is a difference notable only in the older shells where by obsolescence of the lateral striae the riblets become apparently less.

An internal cast of *R. strigiceps*, somewhat distorted, from the Siegen greywacke at the iron mine Alte Mahlscheid near Herdorf illustrates the immature character of certain of the generic structures. Thus the hinge plate and cardinal process are thin and not perforated, the dental plates and pedicle pit rather inconspicuous and the muscular impression not sufficiently strong to eradicate the marks of the shell plications. Such an expression of

these structures is immature in the sense that they characterize this primary manifestation of species of *Rensselaeria*. This is their expression, for example, among the species of the Helderbergian fauna. On the other hand the *Rensselaerias* from Presque Isle stream are in these respects up to the full development of the type of the genus, *R. ovoides*. These characters in such condition do not therefore indicate a primitive phase nor an early stage in the history of the genus.

The shells from Edmunds Hill are of more primitive expression, especially in hinge structure, the plate not being thickened though well developed and separated medially or perforated, in this respect having the structure of the early species of the genus, such as occur in abundance in the beds of the Helderbergian of New York. This shell is in a general way smaller and carries within itself the expression of retarded development with reference to the larger forms at Presque Isle. I will not venture the statement that the small forms do not occur at Presque Isle but the larger have not been observed at Edmunds Hill.

The similarity of these smaller forms with the *R. stewarti* of Dalhousie is very close yet it seems to me improper to unite the shells, for such union would lead to the identification of the still simpler Dalhousie shell with the progressed form from Presque Isle. At Dalhousie the species seems to have become fixed in its primitive details; conditions in the Chapman Plantation region have permitted progress beyond the expression of *R. stewarti*.

The especial expression of the generic type of *Rensselaeria* afforded by these two closely allied species is repeated in the shell *R. portlandica* Billings from the Square Lake limestone of Maine. The last opportunity which the writer had for critical examination of the type of this species was while studying an extensive series of *Rensselaeria* and brachiopods allied thereto, in the preparation of *Paleontology of New York*, volume 8, part 2. It was then observed that the species *Terebratula gaudryi* d'Orbigny, the type of Bayle's genus *Trigeria*, was probably present in the Oriskany fauna of Maryland. This is a strongly plicated rensselaeroid, throughout of similar aspect to these under consideration save in minor details. To the same group *R. portlandica* belongs and in the work cited was referred to the genus *Trigeria*.

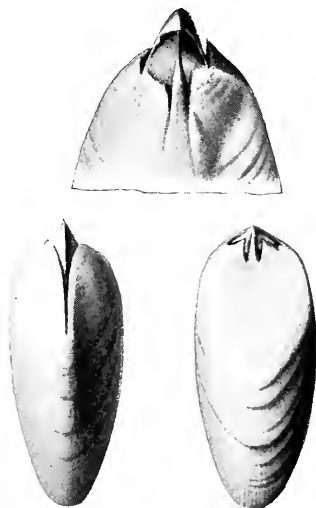
The genus *Trigeria* means a strongly plicated rensselaeroid with the hinge plate in an elemental condition, i. e. perforated, but with cardinal process slightly developed if present at all, and a cardinal area more or less distinctly retained on both valves. The genus

stands to *Rensselaeria* (*R. ovoides*) in the relation of a neanic to an ephebic condition. *R. atlantica*, in its progressed expression even though retaining the primitive structure of the cardinal areas, can not be brought within that group, and *Trigeria* can not be construed as a valid generic term in the face of the facts here adduced.

In the closest association with the Edmunds Hill and Dalhousie shells are specimens which I have received from Prof. E. Kayser labeled *R. strigiceps* Roem. from the Siegen greywacke, at Siegen (Coblentzian). Though the shell is persistently smaller than those referred to, it is of the same contour, degree of plication and interior structure, emphasizing again the "*Trigeria*" characters. Precisely what is the relation of this small form from Siegen to the large, elongate, more characteristic examples of *R. strigiceps* from the Taunus quartzite at various localities which bears so strong a resemblance to *R. atlantica*, the writer is not in position to say, but it may prove to be the same as that we have here indicated.

*Rensselaeria* (*Amphigenia*) *parva* nov.

A small, sometimes quite elongate species often presenting the appearance of a miniature of *A. elongata* Conrad. In the



*Rensselaeria* (*Amphigenia*) *parva*

ventral valve the median septum is strong and the spondylium well developed, the lateral surfaces of the bottom of the valve vascular

or pitted. In the dorsal valve there is a large perforated hinge plate, the foramen apparently always open in contrast to the condition of old specimens of *A. elongata*. The external surface is marked by rather strong concentric lines with some radial lines along the middle of the valves.

*Lower Devonian.* Moose river at Stony brook and Moosehead lake, Baker Brook point, Me.

*Beachia amplexa* nov.

*B. suessana* and *Megalanteris ovalis* Hall are two very similar brachiopods in the Oriskany fauna. Whenever a considerable number of specimens of both are available, those of the latter are, as Professor Hall noted in 1859, generally larger, more compressed and proportionally broader. Further differentials are found in the more broadly rounded anterior margin of the latter, the absence of introverted margins except at the cardinal shoulders and a low radial surface striation, coarser but more obscure than in *Beachia*, and restricted to the marginal regions rather than covering the entire shell as in that genus. The critical distinction in



*Beachia amplexa*

the genera however is an internal one based on the structure of the cardinal process. These features have been elaborately illustrated by Hall and Clarke<sup>1</sup> whose figures show that in *B. suessana* this process is distinctly rensselaeroid and consists of two flattened subtriangular plates fused medially and thickened or cushion-shaped at the sides with a median foramen beneath the beak which is closed only by excessive calcification. In *M. ovalis* this cardinal process is stout, subcylindrical, doubly grooved at the extremity and rising from a flat hinge plate, as though in effect the single cylindrical process were superinduced on the hinge plate of a *Beachia*.

<sup>1</sup>Pal. N. Y. 1894. v. 8, pt 2, pl. 77.

The shells under present consideration which afford such characters as those specified, are wholesome looking individuals of the aspect of *Megalanteris*, averaging larger than specimens of either *B. suessana* or *M. ovalis* and yet they have a predominant similarity to the latter. They combine however in most instructive manner the characters of both these species and genera, and we endeavor to express this relation by comparison in tabulated form with the distinctive characters of each.

## BEACHIA SUESSANA

## MEGALANTERIS OVALIS

|                                                                                                                                                |                                                                                                                  |
|------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| <i>Outline elongate</i>                                                                                                                        | <i>Outline subcircular</i>                                                                                       |
| Margins introverted deeply at side and slightly in front                                                                                       | <i>Margins introverted but slightly at the cardinal shoulders</i>                                                |
| Surface finely striated                                                                                                                        | <i>Surface smooth</i><br><i>Coarse internal striations interlocking at front margins</i>                         |
| <i>Shell punctate</i>                                                                                                                          | <i>Inner shell layer punctate</i>                                                                                |
| <i>Cardinal plate composed of two cushioned crural bases cemented medially. Foramen usually open except in old stages. No cardinal process</i> | Cardinal plate flat and thickened bearing a stout cylindrical process doubly grooved at the summit. Foramen lost |
| Ventral adductor scar shallow and faintly defined                                                                                              | <i>Ventral adductor scar deep, long, sharply divided</i>                                                         |
| No vascular markings                                                                                                                           | <i>Vascular markings</i>                                                                                         |
| Dorsal muscle scar extremely faint                                                                                                             | <i>Dorsal muscle scar well defined and clearly divided</i>                                                       |

We may fairly summarize the above by the statement that the shells under consideration essentially agree with *M. ovalis* in all respects save that which has been regarded as the basis of the generic distinction, namely the structure of the hinge plate. Hence the shells are to be referred to *Beachia* rather than to *Megalanteris*.

This statement however obscures with words the actual relations. If we analyze the structural features in order of ontogenic values it is evident that *M. ovalis* simply represents a greatly progressed condition of which *Beachia suessana* is a prim-

itive expression and that here concerned an intermediate stage. Regarding the last named this condition is evinced in a usually greater thickening of the hinge plate than prevails in *Beachia*, and a less strong development of the muscular scars than in *M. ovalis*.

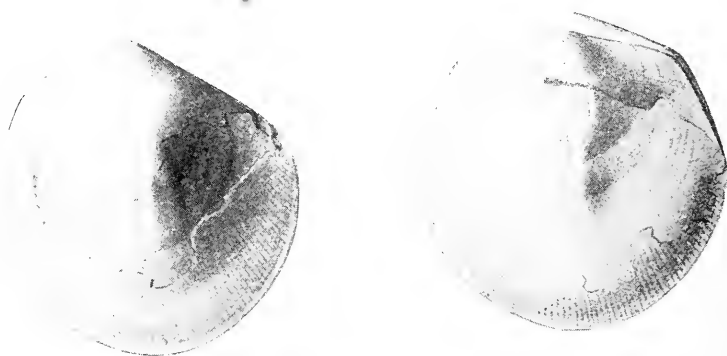
*B. suessana* is an Oriskany species of the Cumberland basin, Maryland. The specimen which has been identified therewith in the Oriskany at Rondout is familiar to the writer but there is no particular reason for assigning it to *Beachia* rather than to *Megalanteris*. The simplest expression of these shells is therefore the most southerly.

For the sake of an expression therefore the term applied to this species will serve. It is evident that the generic distinction between *Beachia* and *Megalanteris* is a fugitive one and of little value. Probably it will be found wise to withdraw the former term altogether and express the relations here indicated by specific terms which are even then too exacting. It is not a matter of record that these species have the same character of brachial processes but specimens are before me from the Glenerie Oriskany which show this to be the case.

*Lower Devonian.* Grande Grève and Percé rock, P. Q.

### ***Megalanteris thunii* nov.**

Shells having the aspect of *M. ovalis* Hall often with more convex ventral valve and distinguished chiefly by numerous gen-



*Megalanteris thunii*

erally fine radial plications covering the entire surface except the umbones. This last feature is highly developed and is not connected by gradation with the smooth exterior of *M. ovalis*.

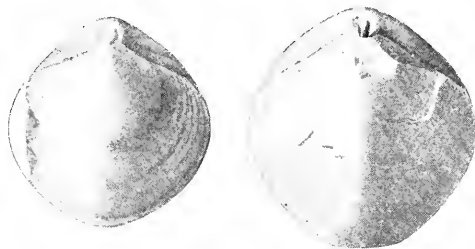
The internal markings are essentially as in the other species, the ventral adductor scar being even more conspicuous, the cardinal plate less developed.

*Lower Devonian.* Grande Grève and Percé rock, P. Q.

***Meristella champlaini* nov.**

Specimens of *Meristella* are among the commonest fossils in the Grande Grève limestones. Adult forms of this species share with immature individuals a well defined habit which can be readily distinguished from the known characters of one and another of the many species of the genus which have already been described from the faunas of about this age.

Into immediate comparison with these shells we bring the following known forms: *M. laevis*, *M. arcuata*, *M. sub-*



*Meristella champlaini*

*quadrata* of the Helderbergian fauna; *M. lata* and *M. vascularia* of the Oriskany fauna. Comparisons therewith are introduced *seriatim*.

*Meristella laevis* Vanuxem (*Atrypa laevis* Vanux., Geol. N. Y.: Rep't on Third Dist. 1842. p. 120, fig. 2; *Merista laevis* Hall, Pal. N. Y. 1859. 3:247, pl. 39, fig. 3, 4; *Meristella laevis* Hall & Clarke, Pal. N. Y. 1894. v. 8, pt 2, pl. 43, fig. 3-6) is a rather elongate shell with long cardinal slopes making a relatively small angle with each other. Both valves are moderately and subequally convex, the ventral valve faintly sinuate medially in old stages with a broad and rather short linguat extension on the front margin, which when slightly broken, as in most of Hall's figures, gives the front a subtruncate appearance. The dorsal valve has a broadly defined median ridge in all stages, but obscure near the margin in the adult. On the interior there is seldom any trace of vascular impressions departing from the muscular area.

*M. champlaini* ordinarily has less sloping cardinal margins and it is uniformly a proportionally broader shell. The convexity of the valves is persistently greater and specially so in late stages. Like *M. laevis* it carries a medial ventral sinus and a dorsal median ridge with depressed lateral slopes, but the linguulate extension at the margin is greater. On the interior the vascular markings are highly developed.

*M. arcuata* Hall [see Pal. N. Y. 1859. 3:249, pl. 41, fig. 1a-t; Hall & Clarke, *idem*. 1894. v. 8, pt 2, pl. 43, fig. 1, 2; pl. 44, fig. 5] has a much larger umbonal angle than *M. laevis* and this is well expressed in *M. champlaini*. It likewise has the deeper valves of the latter, the ventral being specially curved at the umbo and arched at the beak. Here too we mark the deep lingua on the front margin as large or larger than in the Grande Grève shell. Differences in the two species are obscure but on the whole *M. arcuata* is less elongate, less sharply ridged on the dorsal valve and the interiors are without vascular markings.

*M. subquadrata* Hall [see Pal. N. Y. 1859. 3:249, pl. 40, fig. 3] expresses a condition in which the form of the shell is squared by the truncation (casual?) of the antelateral margins, making the median dorsal ridge quite prominent, a condition which is sometimes approached accidentally by *M. champlaini*.

*M. lata* Hall [Pal. N. Y. 1859. 3:431, pl. 101, fig. 3a-w], an Oriskany shell, differs from *M. arcuata* chiefly in size and the tendency to acquire a breadth unusual to that species. The prolongation of the anterior margin and the depression of the ventral umbo are also distinctive features and in both of these respects the shell is not the same as that in hand.

*M. vascularia* (described as *M. ? vascularia* Clarke, N. Y. State Mus. Mem. 3. 1900. p. 45, pl. 6, fig. 12-14) comprises large shells with the proportions of *M. lata* but having the pedicle scar greatly developed and bounded by high dental plates, and the large adductor scar common to all these species obscured almost to obliteration by the pallial ridges and sinuses. The latter are here much more highly developed than in *M. champlaini* where the muscle scar suffers no obscuration therefrom.

*M. champlaini* is the designation which, in view of the peculiarities mentioned, we propose for the shells under consideration. It serves to express the fact that they share the features of a series of essentially contemporaneous forms in the American province and at the same time combine these in such a way that,

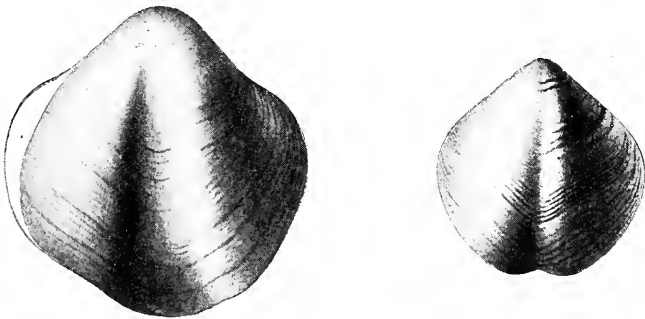
considered ontogenetically, they are always distinguishable from those, while on the whole most nearly allied to the later expressions in the Oriskany sandstone.

*Lower Devonic.* Grande Grève, P. Q.

***Athyris hera* nov.**

The sandstones at Gaspé Basin afford casts of ventral valves, one of them of noteworthy size, of subcircular outline, considerably arched at the umbo but depressed on the slopes, and with a narrow deep and evenly rounded median sinus; the surface of the valve bears only the concentric lines of growth and very fine radial striae visible only in the sinus. The valve has a length and width of 45 mm.

The larger specimen suggests a *Spirifer* allied to the rare type of *S. laevis* of the Ithaca (Portage) fauna of New York, though



*Athyris hera*

more orbicular and with more pronounced sinus. That species has been regarded as a fimbriated shell, but the fine radial lines of this specimen have less the character of fimbriae than of the lines on *S. radiatus* Sow. which, without plications, is the starting point of a considerable series of radiate-plicate shells. The general approach of both our specimens to species of *Athyris*, such as *A. spiriferoides* of the Hamilton fauna indicates a more probable relation therewith.

*Middle Devonic.* Gaspé Basin, P. Q.

***Spirifer perimele* nov.**

This is a shell, abundant though poorly preserved in some of the sandstone blocks, which I should identify with *S. carinatus* Schnur were it not for the presence of fine and crowded lamellae

which cover the surface. *S. carinatus* has been often described and illustrated from the Coblentzian, most recently by Kayser in *Fauna des Hauptquartzeits*, 1889, page 24, plates 1, 10, 14 and Scupin, *Die Spiriferen Deutschlands*, 1900, page 26, plates 2, 3. *S. perimele* is a shell of medium proportions with relatively narrow cardinal area extending to the full width of the shell; its fold and sinus are conspicuous and rounded, relatively narrow, the fold sometimes becoming angular near the front. There are 10



*Spirifer perimele*

to 12 rounded, closely appressed plications on each lateral slope, with narrow intervals. The sculpture when well preserved, which is not often, consists of subequidistant concentric elevated lines without trace of radii or fimbriae. The interior of the ventral valve shows a narrow but rather long ovate muscle scar which is not deeply depressed and is bounded by short dental lamellae. Fuller description of the shell can not now be given but these features are sufficient to indicate a dissimilarity with any known American *Spirifer* of this horizon.

*Lower Devonian.* Moosehead lake, Baker Brook point, Me.

### *Spirifer subcuspidatus lateincisus* Scupin

*Spirifer subcuspidatus* var. *lateincisa* Scupin. *Die Spirif. Deutschlands*, p. 19, pl. 1, fig. 13, 14. *Palaeontolog. Abhandl.* 1900. v. 8

Under this term is separated by the writer quoted, certain shells which have heretofore passed as *S. hystericus* Schloth., among them those identified by Beushausen from the *Spirifer* sandstone of the Kahleberg. It is with these shells, many of which were collected by the writer in the Hartz when in company with the late Professor Beushausen, and which are now before me bearing his label, that I undertake to identify the *Spirifer* prevailing at Presque Isle stream. The critical feature from which the varietal term here used is derived is the long and divergent dental plates of the ventral valve, *lateincisus* being a term which has no significance in application to the organism but only to its mechanical surroundings. This *Spirifer* is a form not represented

in the Appalachian Devonian; comparisons therewith are thus needless. Agreement with the specimens from Hahnenklee and Rammelsberg in the Hartz is found in the following particulars:

1 *Size*. The average in this respect is slightly larger for the adult German specimens.

2 *Outline*. The hinge is not extended, and the cardinal angles not produced; less than or equal to 90 degrees. The margins are gently rounded and gradually approximate to the front. The cardinal area is moderately high and slightly curved making an arched ventral valve.

3. *Plication*. The median sinus in each has the width of five to six lateral furrows. The lateral plications are eight to nine on



*Spirifer subcuspidatus lateincisus*

each side of fold and sinus and they are narrow, round, separated by furrows of similar width. The concentric markings are growth lines which may show a tendency to rugosity near the front.

4 *Fold and sinus*. The sinus is moderately deep and angulated. It is more sharply angulated on the Maine specimens; in some of the German specimens this angulation is apparent only in later growth. The fold is the counterpart of these characters.

5 *Internal characters*. Most notable independently and in point of agreement are the very long dental plates, which diverge rather more in the German than in the American form. In the Hartz specimens these plates lie uniformly in the first radial grooves and hence diverge at the angle of divergence of the radii. In the American shells they are quite as uniformly subparallel to each other and thus are not parallel with the radii but transect the proximal end of first sulcus and plication. This is a slight but persistent difference. The muscle area in both shells is but faintly defined on the ventral valve.

*Lower Devonian*. Presque Isle stream, Chapman Plantation, Me.

### *Spirifer cymindis* nov.

This is a shell belonging to an extensive group of early Devonian species which I presume are all minutely fimbriate (as in *S. concinnus* Hall) though not in all have the surface characters been

fully determined. Distinctions are refined in this series of fossils and the differentials of the shell before us can best be indicated by comparisons with other members of this series.

In a general way, however, it may be said that *S. cymindis* is a shell of larger size and stouter proportions than *S. subcuspidatus lateincisus* of the Presque Isle outcrops. The form is short-winged with a prominent and arched ventral beak, well developed subangular median sinus and fold, the width of the former equaling the distance between three to four radial furrows; of the latter that of three plications. Both sinus and fold have abruptly sloping sides and a narrow bottom and top. The primary plications are conspicuous by their elevation beyond the rest. The radial plications are rounded on the exterior with sharp and narrow furrows, sharper on the internal cast with broader furrows.



*Spirifer cymindis*

There are seven to eight plications on each lateral slope. In rare instances there is a faint median plication in the sinus. Fine concentric growth lines with traces of fimbriae cover the surface.

The dental lamellae are short divergent and inconspicuous, the muscle scar of the ventral valve small, well defined, deeply divided by the median sinus. The shell is not greatly thickened about this area and the inner surface adjoining is rarely pustulose.

*Comparisons.* *S. concinnus* Hall. In this Helderbergian form we have a shell of like proportions but with much more elevated ventral beak and broader cardinal area, more abundant plication, 10 to 12, greater width of fold and sinus and extended projection of the sinus on the anterior margin.

I am here again indebted to Professor Kayser and Dr Drevermann for affording facilities and suggestion for comparison with European species of the early Devonian.

*S. arduennensis* Schnur [see Schnur. *Brachiopoden der Eifel*; *Palaeontographica*. 1854. 3:199, pl. 32, fig. 3; Kayser, *Fauna des Hauptquartz*. 1889. p. 33, pl. 2, fig. 1-4; pl. 9, fig. 3; pl. 12, fig. 5; pl. 16, fig. 1-9].

This species with which I was at first disposed to identify the shells in hand is usually of small extended form with a very regularly convex ventral valve and broadly rounded plications. Though distinct in outline and contour it often represents the aspect in external and internal surface of *S. cymindis*.

*S. decheni* Kayser [see Kayser. Fauna d. aeltest. Devon-Ablag. des Harzes. 1878. p. 165, pl. 22, fig. 1, 2].

This is a very large species but its smaller expressions, of which I have specimens from the Kellerswald, are like *S. cymindis* in degree of plication, though here it is the second rather than the first pair of lateral plications that dominate the rest. The ventral valve is uniformly convex but the umbo is not strongly arched.

*S. nerei* Barrande [as identified by Walther].

Specimens from the upper Coblentian of Marburg very like this shell in general aspect are somewhat more numerous plicated but a distinctive feature lies in the very long dental plates such as are present in *S. lateincisus*.

*Lower Devonic.* Presque Isle stream, Chapman Plantation, Me.

### *Spirifer cymindis* var. *sparsa* nov.

Associated with *S. cymindis* and quite as abundant, is a shell distinguished in gross by its sparser plication. Our material here



*Spirifer cymindis* var. *sparsa*

presents us chiefly with a series of internal casts in which there are some differences of expression, noted in particular in the following enumeration:

1 *Size.* The shells are of medium size, uniformly approaching *S. arduennensis* and *S. cymindis* in dimensions. Differences in size and age are expressed on the internal cast by a clearer definition in the younger and thinner shelled examples.

2 *Outline and contour.* The marginal outline is subtriangular, the hinge being long and sometimes extended at the angles, the

lateral margins rather directly convergent. The ventral valve is elevated at the beak, the cardinal area being rather high and curved, and the median part of the shell elevated.

3 *Surface*. The median sinus has a width of from two to two and five tenths lateral furrows, its sides being highly divergent, sloping abruptly to the bottom which is sometimes quite sharp. The primary plications are conspicuous and elevated. On the sides there are four, rarely five, plications, in extreme cases greatly subordinated to the median ones and separated by broad furrows. The sculpture of the surface consists of rather coarse and moderately distant concentric lines which may become lamellose.

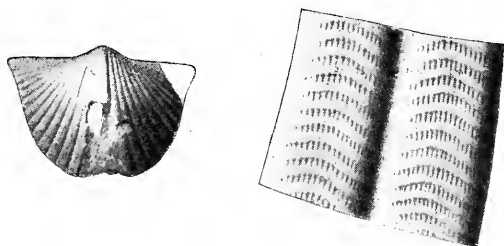
4 *Interior*. The dental plates are as in *S. cymindis*. The muscle scar of the ventral valve is deeply impressed and sharply defined, specially in old shells where the test is thickened in the umbonal region. The removal of this thickened shell leaves internal casts with a prominent muscle area, the surfaces adjoining which are pustulose. There is no median septum in this valve. In young shells the ribs are sharp on the internal cast but are rounder on old shells.

The features here summarized constitute an expression not represented in the Appalachian faunas and so far as we can ascertain not exactly reproduced in the Coblentian.

*Lower Devonian*. Presque Isle stream, Chapman Plantation, Me.

### ***Spirifer aroostookensis* nov.**

This shell is characterized by its broad, flat ribs with very narrow, radial furrows, in which respect it is remarkably similar to



*Spirifer aroostookensis*

*S. mesastrialis* Hall of the Upper Devonian (Ithaca group) of New York. Of these lateral ribs there are 10 to 12 on each

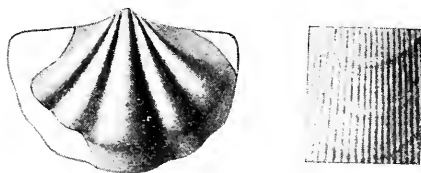
side and each of the large ones bears a slight furrow along its flat top. The median fold is relatively narrow and not highly elevated. The shell is short-hinged and rotund in form. The surface is covered with close concentric fimbriate lines which bend backward at the middle of each sulcated rib. I have seen but a single dorsal valve of this interesting species but its differential characters are very distinct.

*Lower Devonic.* Edmunds Hill, Chapman Plantation, Me.

### *Spirifer macropleuroides* nov.

The Chapman Plantation fauna carries a representative of the Radiati or group of *Spirifer plicatellus* in a species which has the aspect of a small *Sp. macropleura* Conrad,<sup>1</sup> an extreme expression of the form presented by *S. togatus* Barrande and variety *subsinuata* A. Roemer<sup>2</sup>; the first from the New Scotland Helderbergian of New York and the others from the lowest Devonian of the Hartz and Bohemia.

In *S. macropleuroides* the shell is more sharply plicate than in the others, the plications being two or three in number



*Spirifer macropleuroides*

on each side of the median fold or sinus. Neither of the latter is extremely developed, being broad and regularly rounded; the lateral plications are strong and broad, evenly rounded and with narrow grooves. The surface is covered with very fine longitudinal striae. The shell is distinct from *S. macropleura* in its smaller size and stronger plications, in which respect it is the most progressed of all the three forms above mentioned.

*Lower Devonian.* Edmunds Hill, Chapman Plantation, Me.

<sup>1</sup>Hall. Pal. N. Y. 3:302, pl. 27, fig. 1a-p; pl. 28, fig. 8a-d. Hall & Clarke. *ibid.* v. 8, pt 2 pl. 21, fig. 22-24, 27.

<sup>2</sup>Kayser. Aelt. Devon-Ablag. d. Harzes. pl. 21, fig. 3 and fig. 1, 2, 7.

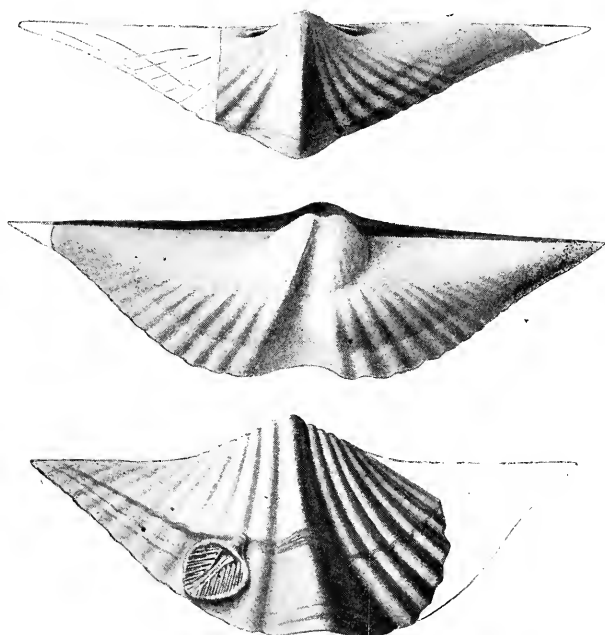
*Spirifer primaevus* Steininger var. *atlanticus* nov.

For comparison consult:

- Morris & Sharpe.** Geol. Soc. Quar. Jour. 1846. 2: 276, pl. 11, fig. 3. (*S. orbigny*)
- Steininger.** Geognos. Beschreib. der Eifel, 1853. p. 72, pl. 6, fig. 1. (*S. primaevus*)
- Sharpe.** Geol. Soc. Lond. Trans. 1856. Ser. 2, 7: 206, pl. 26, fig. 1, 2, 5. (*S. antarcticus*)
- Hall.** Palaeontology of New York. 1859. 3: 422, pl. 97. (*S. arrectus*)
- Kayser.** Fauna der aeltest. Devon-Ablagerungen des Harzes. 1878. p. 165, 168, pl. 22, 23, 35. (*S. decheni*, *S. hercyniae*, *S. primaevus*)
- Ulrich.** Neues Jahrb. für Mineral. Beil. Bnd. 8. 1893. p. 65, pl. 4, fig. 19, 20. (*S. chiquisaca*)
- Scupin.** Die Spiriferen Deutschlands. 1900. p. 84-88, pl. 8. (*S. primaevus*, *S. fallax* Giebel, = *S. decheni* Kayser, *S. hercyniae* Giebel. *S. hercyniae* var. *primaeviformis*)
- Clarke.** N. Y. State Mus. Mem. 3. p. 46, pl. 6, fig. 26, 30. (*S. murchisoni* Orbigny)
- Reed.** An. South African Mus. 1903. v. 4, pt 3, 7, p. 180, pl. 22, fig. 4. (*S. orbigny* Morris & Sharpe)

The identity of species in the group represented by *S. arrectus* (*S. murchisoni*) and *S. primaevus*, is involved with obscurities of a kind which seem to indicate that in the considerable variety of species names from many countries some are synonymous terms and the majority, perhaps all the rest, are local expressions. The general type of structure is that of a sparsely ribbed *Spirifer* with the plications usually broadly rounded, a prominent fold and sinus without plication in the latter and the entire surface finely fimbriate. The interior of the ventral valve has a very strong muscular scar appearing in the cast as a sulcate cordiform prominence and the plications lose themselves posteriorly on account of umbonal thickening of the valve. The shells now before us from central Maine are identified as a variety of the widely diffused Coblentzian species *S. primaevus*, not because of structural resemblances that can be fixed upon from the descriptions given of that species and its close allies in the Coblentzian, *S. decheni*, *S. hercyniae* and its variety *primaeviformis*, but the determination is based on comparisons with specimens of these species from Stadtfeld, Kellerwald and elsewhere kindly supplied and identified by Prof. E. Kayser. These shells are of large size with subtriangular outline, the anterolateral margins being

rather direct and not convex. Usually they are of considerable length fore and aft but specimens are found showing no apparent distortion that are quite narrow and elongate. The hinge is the longest measurement of the shell and the ribs number from 7 to 11 on each lateral slope, the smaller number prevailing in the usual preservation. It may be noted that the first pair of ribs bounding the sinus is the highest as this is in contrast to some specimens of the New York Oriskany classed as *S. murchisoni*, where



*Spirifer primaevus* var. *atlanticus*

the first pair is lower than the second. A comparison of these specimens with those referred to *S. arrectus* of the Oriskany by Hall and well illustrated in the work cited, shows that there is a close approach in structure among the larger forms of those. In a previous publication [N. Y. State Mus. Mem. *op. cit.*] I have referred to the probability that the *S. murchisoni* of the New York Oriskany is an unstable form putting on the aspect now of one and now of another species elsewhere localized. Scupin has with more detail pointed out this condition suggesting that some of Hall's drawings are of forms equivalent to *S. antarcticus*, *S. chuquisaca*, *S. orbigny* and *S. capensis*,

from the Falkland Islands, Bolivia and South Africa and that others, principally the smaller forms express the local value of *S. murchisoni*. There are excellent reasons for these views, and though shells like *S. primaevus* var. *atlanticus* are apparently absent from the New York province yet there is no wide divergence between them and the larger examples of *S. murchisoni*. It will be understood that a proper interpretation of the congeries passing as *S. murchisoni* in the Oriskany is possible only in terms of well defined localized expressions.

*Lower Devonian.* Baker Brook point, Moosehead lake, Me.

### *Cyrtina chalazia* nov.

We are presented in these shells with a departure from the usual aspect of the Devonian Cyrtinas. They are mostly multiplicate shells and in the early stages of this time conform quite generally to the same expression in contour, size and ribbing. Here we have a pauciplicate shell, the dorsal valve of which presents the characters



*Cyrtina chalazia*

which we have noticed as a feature of *Spirifer plicatus* of the Grande Grève limestones; few, broad and blunt ribs. The shells are of the small size quite characteristic of the genus with trihedral form and erect or but very slightly curved cardinal area, flat dorsal valve, median sinus and fold well developed, the former having the width of the next two adjoining lateral plications. There are four to five plications on each ventrolateral slope and three to four on the dorsal, the ones nearest the hinge being always very faint. These are in the main broad and smooth and concentric growth lines are usually crowded near the front margin.

*Lower Devonian.* Dalhousie, N. B.

### *Trematospira perforata* Hall var. *atlantica* nov.

Species of *Trematospira* are almost exclusively of Helderbergian age and the species described are pretty well defined on the basis of their sculpture. In the form before us we have one more nearly

allied in this respect to *T. perforata* Hall than to any other though it differs substantially even from that. This shell has the following characters: The ventral sinus is not bounded by the median primary pair of plications but by the primary pair just outside the median, the latter in later growth making a pair on the slopes of the wall of the sinus. Likewise the median rib on the dorsal valve, while constituting the crest of the median fold is accompanied by a pair of ribs of primary age which modify the slopes of the fold. At the beak and continuing for one third the length of the shell without modification the number of plications on the ventral valve is 12, on the dorsal valve 11. From this point outward the ribs irregularly dichotomize into two or sometimes three, fold and sinus being affected like the rest of the surface.

The shell is transverse with straight hinge and without cardinal areas. The ventral beak is abruptly perforate and the shell substance punctate.

*Lower Devonian.* Dalhousie, N. B.

### ***Chonetes impensus* nov.**

A large shell having the aspect of *Leptostrophia oriskania* but with coarser striae. The single specimen observed of this species is a ventral valve, regularly convex, with very fine sub-



*Chonetes impensus*

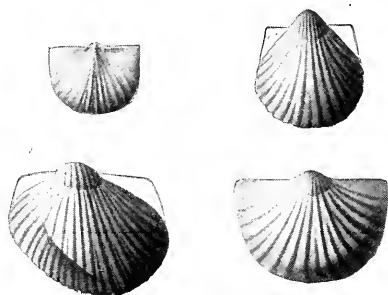
equal striae for about one half its length followed beyond a distinct growth line by much coarser striae. Hinge margin cornute, Height 21 mm, length 28 mm. Specifically unlike any form known to the writer.

*Lower Devonian.* Moosehead lake, 7 miles north of Kineo, Me.

### ***Chonetes nectus* nov.**

A small coarse ribbed species, transversely elongate in form and having 14 to 16 striae, each of the larger of which is divided at variable distances from the middle to the margin of the valve. It is but slightly convex compared with *C. hudsonicus* Clarke

and does not attain a length of more than 11 mm. A peculiar feature of the species is the general prevalence of a deep con-



*Chonetes nectus*

centric constriction in the ventral valve which is present in every such valve yet recognized.

The interior of the dorsal valve is highly radio-pustulate, there being two strong central diverging ribs traversing the valve.

*Lower Devonian.* Misery Stream, first dam in town of Sandwich; Moose river at Stony brook, Me.

***Chonetes aroostookensis* nov.**

Shell transversely subrectangular, length to width as two to three, hinge line straight, making almost the full width of the shell; cardinal angles 90 degrees or a little more, the lateral mar-



*Chonetes aroostookensis*

gins expanding gently outward for a very short distance; lateral margins direct at first then broadly curved to the anterior margin which is transverse. Ventral valve gently and quite uniformly convex, somewhat depressed to the cardinal angles. Cardinal area

carrying a row of spines, five in number on each side of the beak, the outer ones attaining considerable length. Surface markings consisting of fine threadlike radii increasing rapidly by bifurcation, the striae and intervening grooves being of subequal size. There are three or four of these in 1 mm. A notable feature is the predominant size of the median stria on this valve. There are also suggestions of concentric or oblique undulation near the cardinal extremities. The surface sometimes shows a broad undefined depression with others at the side which may produce a gently undulated surface. This, however, is not a persistent feature. The dorsal valve is concave and on the interior shows a small bifurcate cardinal process flush with the cardinal area. The sockets and socket walls rest on a greatly thickened ridge just within the hinge line and subparallel to it. This notable ridge has an abrupt posterior slope leading down to the muscular area which is divided by three short and divergent ridges.

*Dimensions.* The average example has a length of 16 mm, width of 23 mm.

In seeking comparison of this very well defined species with allied forms we may note the following:

With *Chonetes canadensis* Billings of the Grande Grève fauna, it is more closely related than with any other, in outline and proportions. Like that it carries a conspicuous median stria. But the species are not to be confounded; *C. aroostookensis* is a stouter and heavier shell with a much coarser surface striation and a more convex ventral valve. It is less delicate and tenuous and never attains the notable dimensions of that species. With *C. nova-scoticus* Hall from the Arisaig series of Nova Scotia, it agrees in the development of the median stria but the resemblance there ceases. *Chonetes latus* v. Buch as identified by Sowerby from the Tilestones of Horeb Chapel, with which it has been compared, has not even remote relation with it. Davidson long ago pointed out that most of the Silurian *Chonetes* which had been referred to *C. latus* are identical with *C. striatellus* Dalman but he specially excepted the forms from Horeb Chapel. Neither the one nor the other presents any features for comparison here, the Tilestones shell being small, convex and minutely striate. *C. sarcinulatus* Schloth., from the Spiriferensandstein and other horizons of the Coblentian is somewhat similar in form but is more evenly striate, without large median stria and is notably convex. Schnur's variety of this species, *planus*, from the same beds is little known but appears to be a shell of less width.

Of all the species of early Devonian age *C. falklandicus*, Morris and Sharpe<sup>1</sup> presents the closest similarity though of smaller size and rather less subrectangular outline. One might with reason regard the Aroostook species a varietal expression of *C. falklandicus*. This species has been recently identified in the Bokkeveld beds of Cape Colony and figured by Reed<sup>2</sup> and these figures also show a narrower shell than that under discussion though attaining its full dimensions.

*Lower Devonian.* Edmunds Hill, Chapman Plantation, Me.

***Chonetes paucistria* nov.**

This is a rare shell associated with the foregoing, distinguished therefrom by the fewer and coarser striae, barely more than one half the number in *C. aroostookensis*, increase therein aris-



*Chonetes paucistria*

ing from implantation near the margins. The outline also is not subrectangular but subelliptical, the greatest width at the hinge and the margins converging quite rapidly in a broad curve. These differences are expressed in our figures.

*Lower Devonian.* Edmunds Hill, Chapman Plantation, Me.

***Chonetes billingsi* nov.**

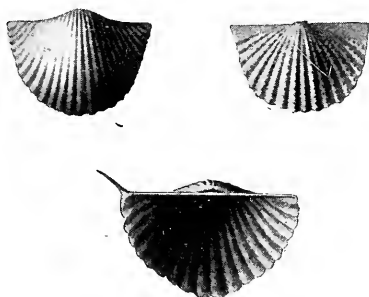
*Chonetes laticosta* (Hall) Billings. Palaeozoic Fossils. 1874. v. 2, pt 1, p. 20

These shells are characterized by the high gibbosity of the central region and abrupt slopes to the margins in the pedicle valve and the coarse rounded ribs separated by interspaces of about the same width. The ribs are usually simple, extending from beak

<sup>1</sup> Geol. Soc. Quar. Jour. 1846. 2: 274, pl. 10, fig. 4.

<sup>2</sup> An. South African Mus. 1903. v. 4, pt 3, p. 169, pl. 20, fig. 9, 10.

to margin and number from 16 or less in small individuals to 26 in the largest shells seen. In full growth of the shell the median rib becomes more pronounced than the rest on the anterior margin and thus makes a low median angle at this margin. Extremely fine concentric lines are visible under favorable preservation. The cardinal area is narrow and only in rare instances are spines retained or developed at the cardinal extremities. On the interior the brachial valve has a small erect V-shaped cardinal process and short thin outer socket walls. On each of the simple coarse ribs which correspond to the furrows of the exterior is a single row of sharp pustules the median row being the most depressed, and the two adjoining the most prominent. No trace of reniform or other lateral depressions is evident. In all such small and coarse ribbed species represented by *C. billingsi*, *C. laticosta* Hall and



*Chonetes billingsi*

*C. mucronatus* Hall, there is a natural similarity of expression extending even to the interior characters of the brachial valve, but the distinctive differences of *C. billingsi* consist in its gibbosity, angulated front margin at maturity, stronger, coarser and more uniformly simple ribs. In respect to these characters in all the shells they are the most pronounced in that before us and become progressively decreased in the upward range of the group, so that it serves the purposes not only of paleontologic but also of geographic distinction to recognize distinctively this early manifestation of features which are less pronounced in *C. laticosta* of the Onondaga limestone and still further diminished in *C. mucronatus* of the Marcellus and Hamilton.

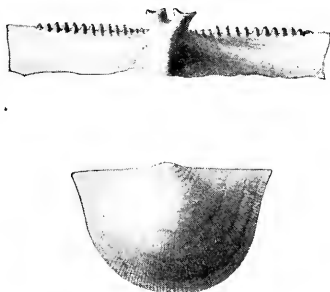
*Dimensions.* A full sized example has a width on the hinge of 13 mm. and a length of 11 mm. From this the size ranges downward to a length of 2 mm.

*Lower Devonic.* Grande Grève, P. Q.

*Middle Devonic.* Gaspé Basin, P. Q.

***Stropheodonta hunti* nov.**

Shell small, regularly convexo-concave. Ventral valve most convex along the median line, where the curvature is evenly arched and well elevated; lateral slopes depressed, at times slightly concave. Hinge line long, straight, often with cardinal extensions; the length of hinge is to the length of shell as three to two. The surface of the valve is uniformly smooth, usually appearing nacreous and without lineation but well preserved exteriors show an extremely fine radial striation hardly visible to the naked eye. About the umbo are a few low corrugations, three or four in num-

*Stropheodonta hunti*

ber and these become extinct over the body of the valve. The dorsal valve shows the same degree of corrugation as the ventral and cardinal area of conjoined valves indicates nearly complete closure of the delthyrium and a fine denticulation extending almost to the cardinal angles. The species has been observed frequently.

The shell suggests both in size and in the aspect of its nacreous surface the well known *S. nacre*a from the Hamilton of New York<sup>1</sup> for which Hall and Clarke introduced the subgeneric term *Pholidostrophia*.<sup>2</sup> Other representatives of this group are known, namely an undescribed shell from the Onondaga limestone of New York and Ohio and probably the *Strophomena lepis* Bronn of the Eifel Middle Devonian.

*Lower Devonian.* Grande Grève, P. Q.

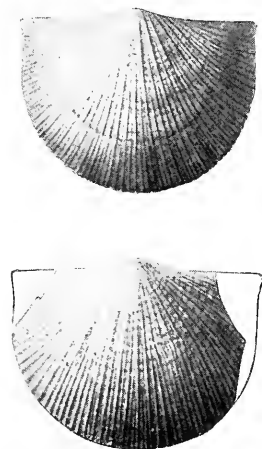
<sup>1</sup> According to Schuchert this is the same shell as that described by Owen as *Chonetes? iowensis* from the Middle Devonian of Iowa and if this is the older species name it should take precedence.

<sup>2</sup> Palaeontology of New York, 1892, v. 8, pt 1, p. 287.

***Stropheodonta patersoni* Hall prototype *praececedens* nov.**

See *S. patersoni* Hall and *S. inequiradiata* Hall. *Palaeontology of New York*. 1867. 4: 87, 90

Professor Hall noted in his description of the two species cited above, both from the Schoharie grit and Onondaga limestone that while in normal forms distinction is readily made, many shades of transition in style of surface sculpture are found. The shells are both regularly convexo-concave species with denticulate hinge with the surface ornament fundamentally consisting of fine elevated and fasciculate striae, each pair of larger ones including 6 to 10 finer, multiplication of the larger consisting in the superior development of the median stria in the fascicle. These lines are finely



*Stropheodonta patersoni* prototype *praececedens*

reticulated by concentric elevated striae. Superinduced on this ornament are, as a species character in *S. patersoni*, concentric discontinuous corrugations affecting chiefly the intervals between the primary striae. These occur faintly and sporadically in *S. inequiradiata*. Billings figures [*Palaeoz. Foss.* pl. 2, fig. 3] from division 1 of the Gaspé series, between Cape Rosier and Grande Grève a specimen identified as *S. varistriata* Conrad in which such corrugated exterior is present, and we have already commented on this structure. He also insists that there is no distinction between this shell (and species) and *S. inequiradiata* except that the former is of smaller size. Comparison of typical material representing these species however demonstrates that notwithstanding the common possession of the cor-

rugations, *S. varistriata* is not only smaller but more nearly square in outline with nearly rectangular cardinal angles (*S. rectilateralis* being one of Conrad's synonyms) while in the other species the outline is more elongate, semielliptical, the lateral and anterior margins form a continuous easy curvature and the cardinal angles are more acutely rounded. These differences produce a notable distinction in the general habit of the species. The Grande Grève limestone shells palpably express the characters of *S. inequiradiata* and *S. patersoni*; but in so far as differences in these two are concerned it is to be noted that in the former the fasciculation is best expressed over the middle parts of the shells, but in later growth about the periphery this fasciculation gradually becomes lost or passes into an irregularly unequal striation. The corrugations are restricted to the fasciculate area.

*S. patersoni*, holding its fasciculate character throughout growth, is in an arrested condition with reference to this species. The Grande Grève shells seem rarely to pass the stage in which the fasciculation of the striae is obscured as in *S. inequiradiata* but neither do they always present the corrugations of *S. patersoni*. These corrugations are usually present, sometimes very strongly developed, again obscure, but they may be altogether absent leaving the simply fasciculate exterior so prevalent in the Strophomenidae throughout their history. In view of these facts we prefer to designate the Grande Grève shells as a variation or prototype of *S. patersoni*.

*Dimensions.* Fully developed examples attain a length of 25 mm and a width on the hinge of 40 mm.

*Lower Devonian.* Grande Grève, Indian Cove and Little Gaspé, P. Q.

***Stropheodonta patersoni* Hall prototype bonamica nov.**

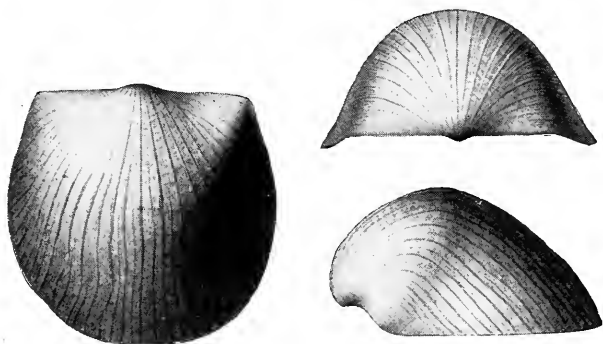
We have noted the difference in the Grande Grève form of *S. patersoni* and the typical expression of the species in the Onondaga limestone of New York. In the shell before us we have a quite different expression of this type, rare in American waters. The type itself, we may briefly reiterate, is expressed in the highly convex form, the strong fasciculation of the striae and the corrugation of the umbonal portion of the valves. We are here presented by a relatively small and quite narrow shell with a short, straight hinge, prominent cardinal extremities, highly convex or gibbous curvature (ventral valve) and greatly produced

anterior margin. These are distinctly mutational characters which constitute very notable differences in the shells. The surface characters are more distinctly indicative of progressional phases of development and may be thus tabulated for the three different expressions of the species:

Primary fascicles at the beak { 19-25 *patersoni*  
10-14 *precedens*, *bonamica*

Intercalation of striae apicad of summit { frequent—*precedens*  
less frequent—*patersoni*  
occasional—*bonamica*

Anterior slope { finely and  
subequally lobed—*patersoni*, *precedens*  
coarsely and  
strongly fasciculate—*bonamica*



*Stropheodonta patersoni* prototype *bonamica*

The umbonal corrugation appears to be differently developed according to individuals, but generally is coarsest in *precedens*, smaller and more numerous in *patersoni*. The summarized evidence indicates the phylogenetic relation of these species to be thus: *bonamica* retains the most primitive expression throughout supplemented by the character of its hinge which is denticulate only near the delthyrium; *precedens* is still more primitive than *patersoni* in respect to striation, but less so than *bonamica*. The relation indicated seems to be in accordance with the actual time relations of these shells.

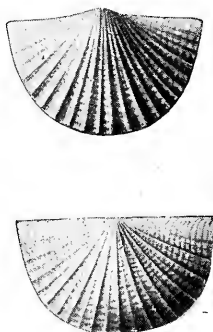
Students of the Brachiopoda recognize in the fasciculate-crenulate type of surface structure a recrudescence in these early Devonian shells of characters which appeared among the Strophomenoids in the Lower Silurian and except for the crenulation became prevalent. This later expression is never common nor did

it last long. The typical *S. (Orthis) interstriatus* Phillips is shown by Davidson<sup>1</sup> to carry at times the umbonal crenulations and the large and fine *S. nobilis* McCoy<sup>2</sup> exemplifies both characters in very simple expression, both of these species being recognized as of Middle Devonian age. The former species is commonly regarded as present in the Eifelian.

*Lower Devonian.* Dalhousie, N. B.

### ***Stropheodonta rosieri* nov.**

This is a small shell characterized by its simple, relatively coarse and highly angular plications which increase by implantation starting with 8 to 10 at the beak and becoming twice that number at the margin. Over these and in the intervals are fine radiating



*Stropheodonta rosieri*

surface lines. The umbonal region is crenulated by undulating concentric lines which may sometimes extend over the whole surface. The shells have thus some of the characters of *S. patersoni precedens* of the Grande Grève limestones and of those known in the New York rocks as *S. varistriata*, but the divergence from either is apparently fixed.

*Lower Devonian.* St. Alban beds, Cape Rosier Cove, P. Q.

### ***Stropheodonta crebristriata* Conrad (Hall) prototype simplex nov.**

See Hall. Palaeontology of New York. 1867. 4:86, pl. 11, fig. 12, 13, 18-21

On comparing with the hypotypes of this species illustrated in the work cited, a few shells from Grande Grève, we observe that

<sup>1</sup> Monogr. Brach. 85, pl. 18, fig. 15-18.

<sup>2</sup> *idem.* p. 86, pl. 18, fig. 19-21.

the young condition of *S. crebristriata* (a Schoharie grit species in New York) represented by the original of plate II, figure 13 [*op. cit.*] corresponds remarkably in size, contour and surface with these. The shells in hand are quite regularly convex having the greatest width along the hinge, a semielliptical marginal outline and the surface bears 8 to 10 sharp angular but not elevated plications, which increase in number by implantation so that the margin bears at least four times as many plications as the beak. In *S. crebristriata*, as referred to, there are about the same number of plications though they are individually less prominent and their duplication begins somewhat earlier. This specimen shows a fine interlineation which we observe only at the margin of the Gaspé shell.

We construe this shell as a simple and early expression of *S. crebristriata*, probably not attaining greater size or more progressed development in surface feature than expressed in our specimens.

*Dimensions.* Length, 13 mm; width on hinge, 16 mm.

*Lower Devonian.* Grande Grève, P. Q.

### ***Stropheodonta parva* Hall prototype *avita* nov.**

*See* Hall. Palaeontology of New York. 1859. 4: 85, pl. 11, fig. 5, 11

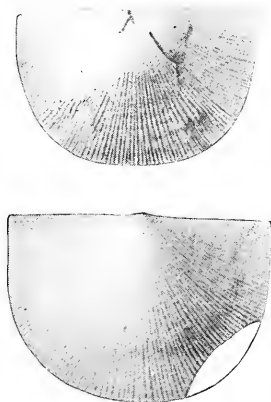
Several brachial valves show at first the median groove and four to five simple strong ribs on each side, such as characterize *S. galeata* Billings and change this expression by the simple bifurcation of these ribs at about one half their length, and, close upon the margin, by the subdivision of one or the other of these branches. This is the character of *S. parva* Hall of the Schoharie grit of New York, a rare species, and comparison of the Gaspé shell with the single exterior of the brachial valve figured or known [*op. cit.* pl. 11, fig. 5] shows similarity of dimensions to be accompanied with the like character of surface. In *S. parva* the ribs are not so strong and bifurcation begins sooner, that is, the period of simplicity continues longer in the Gaspé shell and hence gives it more primitive expression, in accordance with its antecedent date.

*Lower Devonian.* Indian Cove, Gaspé, P. Q.

### ***Leptostrophia tardifi* nov.**

Shell of uniformly medium size, averaging about that of *L. perplana* (Conrad); flat or broadly convex in the umbonal

region, hinge line straight and not extended, commissural margin subcircular. Surface radii numerous, composed of rounded lines with very narrow interspaces, the former increasing quite irregularly by bifurcation but keeping a subequal appearance throughout. The surface seems to have been early subject to irregular growth



*Leptostrophia tardifi*

from injury or pathologic condition of the mantle, rapid duplication of the striae following each of these cicatrices. These striae are covered by extremely fine concentric lines. Attention is directed to the differing expressions of the surface markings on these allied species, *L. tullia* Billings, *L. magnifica* Hall, *L. irene* Billings and *L. tardifi*.

*Dimensions.* Average specimen 35 mm in width on the hinge, length 25 mm.

*Lower Devonian.* Percé rock, P. Q.

***Leptostrophia magnifica* Hall prototype *parva* nov.**

This shell may be best expressed in terms of the widespread *L. perplana* Conrad and *L. blainvillii* Billings, for it approaches these in all general features. Analysis of its structural details however shows:

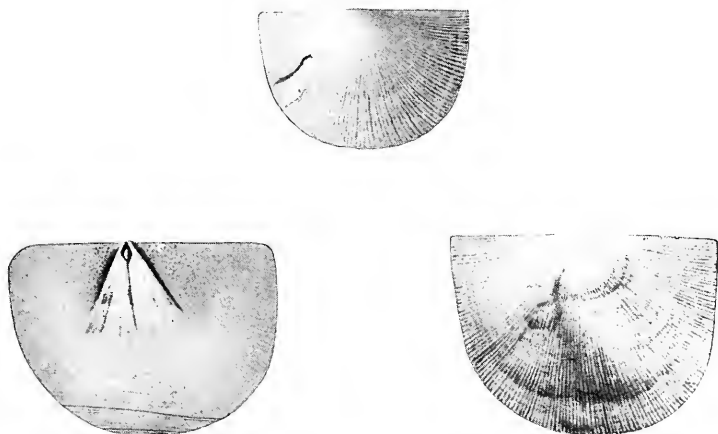
1 The surface striae, fine, threadlike and crowded, exhibit some diversity of size in early growth and this becomes intensified later so that about the margins there is either an inclination to irregular swelling or to fasciculation, the latter at times being quite pro-

nounced. These are characters of *L. magnifica* not of *L. perplana*. Concentric wrinkles on the shell are altogether absent.

2 The cardinal area is denticulate to its extremities though narrow and but slightly cross striated; the delthyrium is open.

3 The muscle scars are not greatly divergent but, as in *L. magnifica*, are contracted at the beginning though they extend more than halfway across the shell.

The shell is essentially a diminutive expression of that species, its fundamental structure being quite in harmony with it and its



*Leptostrophia magnifica* prototype parva

lesser variety *tardifi* from the Percé rock. In our material an occasional specimen indicates the presence of individuals larger than these we have figured. Dr Drevermann, after examination of these specimens, finds this shell closely approaching *L. explanata* Sowerby of the Coblenzian though that shell attains more nearly the dimensions of *L. magnifica* and has flatter rather than threadlike striae on the surface.

*Lower Devonian.* Edmunds Hill, Chapman Plantation, Me.

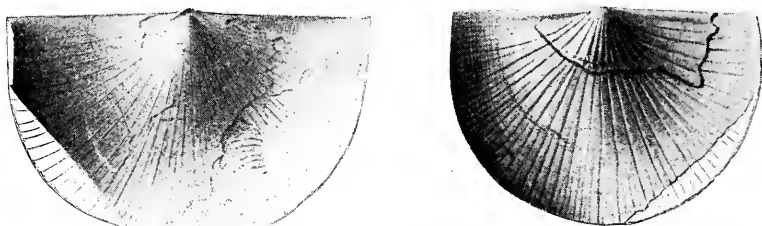
### ***Strophonella* (*Amphistrophia*) *continens* nov.**

*Strophomena punctulifera* Conrad, var. Billings. Palaeoz.  
Foss. 1874. v. 2, pt 1, p. 32

Shell rather strongly concavo-convex, the normal convexity of the ventral valve being continued for about one third the length of the shell. The reversal is gradual but becomes abrupt specially

in final stages. The hinge line is straight and the cardinal angles very slightly extended, subangular or even rounded; cardinal area narrow, not striated vertically, denticulate but slightly and only near the delthyrium of the ventral valve. The opposite valve receives this denticulate edge in a narrow crenulated groove. The muscle scar of the ventral valve is short and broadly flabellate with somewhat thickened and elevated margins. The deltidium is usually but partially developed. In the brachial valve the cardinal process is strongly bifid, the separate parts being widely separated; dental sockets shallow.

The surface of the valves is marked in the umbonal region by 16 to 20 sharp angular plications, simple throughout the normal contour of the valves. These primary plications with those of the secondary series eventually constitute over the body of the



*Strophonella* (*Amphistrophia*) *continens*

shell a series of fine threadlike lines separated by flat spaces in which lie fascicles of lesser order, sometimes but a single series consisting of six or more lines, sometimes three or more subordinate series. The general expression of the surface ornament however is that of fine sharply fasciculate striation. On the interior of the valves the surface is highly pustulose throughout except on the muscle areas, the pustules being arranged in radial rows.

These are the usual characters of the adult shell. The young of the species are readily recognized as normally convex shells with sharp and strong plications and this is a condition which when maintained to maturity is expressed in such species as *Stropheodonta arata* of the Schoharie grit of New York.

Variant *equiplicata*. We find a few of these forms in which the simple sharp plication of growth is not broken up into fascicles but continues sharp over the body of the shell with very sparse intercalations, so that the surface conveys the expression of subequal plication and not of fasciculation. Such forms are at once distinguished by their exterior. The initial striae are a

few more in number than in the normal of the species, but the variation may be interpreted as one due to the protracted continuity of the simple plicated condition of infancy.

Variant 2 *senilis*. Occasional expressions occur in which the fasciculation becomes well pronounced as a secondary condition following the sharp plication of early growth but finally is obscured or lost by rapid intercalation so that the peripheral surface carries a great number of fine subequal radii. This expression doubtless represents the extreme development of the specific characters beyond the point usually attained in the normal growth of the species.

Variant 3 *equalis*. Again, in certain full grown shells the primitive coarsely plicate stage is so early suppressed as to be scarcely noticeable and fasciculation is at once inaugurated and continued throughout the shell growth. This is a very early assumption of mature characters unaccompanied by evidences of senile growth in final stages.

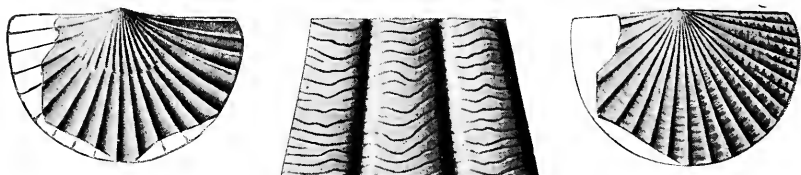
*Lower Devonian.* Grande Grève, P. Q.

*GASPESIA* gen. nov.

*Gaspesia aurelia* Billings *sp.*

*Orthis aurelia* Billings. *Palaeoz. Foss.* 1874. v. 2, pt 1, p. 34, pl. 3, fig. 3

The singular valves which Mr Billings described under the name cited are strophomenoidlike shells with straight hinge extending the full width of the valves, central beak, which is slightly produced beyond the hinge line, a generally semielliptical outline, and the surface marked by sharp distant and sparse radial ribs. The



*Gaspesia aurelia*

substance of the shell is tenuous and none of the specimens shows any trace of hinge structures or muscle scars and none were noted by Billings. Billings remarked that the shell "closely resembles *O. pectinella* Conrad of the Trenton limestone." In the apparent suppression of hinge structure we have suspected the affiliation of this species with the nearly symmetrical and thin-

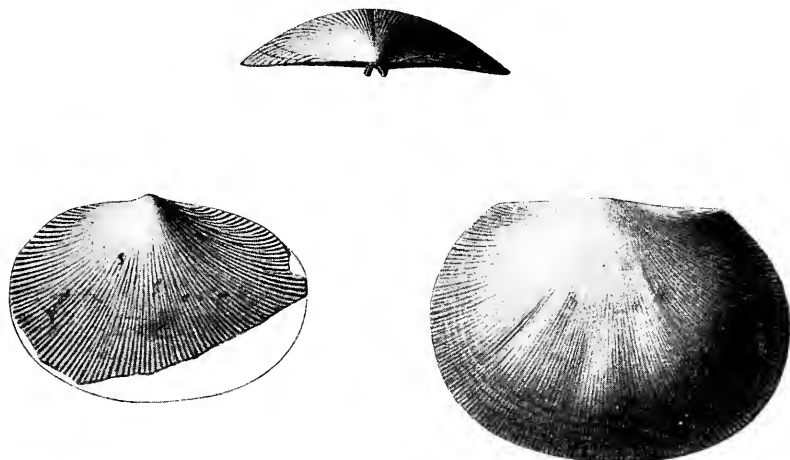
shelled lamellibranchs of the genera *Halobia* and *Daonella* and yet there is no positive evidence that the beaks are not axial nor of any specialized anterior part which can be construed as an auricle. They are probably to be regarded as an aberrant strophomenoid, slightly convexo-concave, but the character of the shells is so peculiar as to prevent their admission to any of the recognized brachiopod genera. The strongly ribbed surface bears from 20 to 25 narrow radial plications separated by broad flat sulci which in old shells may show traces of intercalary ribs but the primary ribs are all simple. These interspaces are crossed concentrically by wavy inosculating elevated lines like the fine lines on many crustacean carapaces. We should not venture to say that the shells are of Siluric type for the comparison made by Billings is only remote, but there is a certain similarity both in form and sculpture to the species described by Hall and Clarke as *Orthis ? glypta* from the Niagaran dolomites of Milwaukee [see Pal. N. Y. 1894. v. 8, pt 2, p. 359, pl. 84, fig. 8, 9] which has been compared with *O. loveni* Lindström from the Swedish Upper Siluric. One of the specimens appears to have cardinal spines near one extremity but this appearance is probably misleading as the shell may have here suffered an injury which has distorted growth.

*Lower Devonian.* Grande Grève, P. Q.

### ***Hipparionyx minor* nov.**

The recognized distinction between the genera *Hipparionyx* and *Orthothetes* or *Schuchertella* lies chiefly in the orthoid form of the former and its very short hinge line. In respect to this character the specimens before us are pronounced. The ventral valves, small in comparison with those of *H. proximus*, have a short and low cardinal area, but in the dorsal valves the hinge line is apparently longer than correspondence with the opposite valve requires and these valves convey the impression of a straight and tolerably long line extending more than one half the width of the shell. On examination of the inner surface of this valve it is seen that this area is really short and confined to the apical part of the valve while the extended extremities are a thin expansion of the lateral parts of the valve which make a rather sharp turn at the cardinal angles. There is other divergence in the shell away from the type of *Hipparionyx* and toward that of *Orthothetes* as represented by such shells as *Streptorhynchus umbraculum* Schlothheim and its variant expressions.

In further detail, the ventral valve is subcircular or transverse with strongly defined and thickened adductor and divaricator scars. These are not however as large as in *H. proximus*. The beak is convex and slightly elevated but the rest of the valve is depressed or flat with a tendency to turn up about the margin and with indications of a broad and low median fold. The striae are



*Hipparionyx minor*

sharply elevated, increase very rapidly by implantation and on the cardinal slopes curve forward, out and back, in very characteristic manner. Very fine concentric lines are visible in the intervals between the striae. The dorsal valve is highly convex; the beak is not prominent, the convexity is generally uniform with slightly depressed cardinal slopes and sometimes a trace of a median groove. On the interior is a strong bifid cardinal process and a short median septum.

*Lower Devonic.* Edmunds Hill, Chapman Plantation, Me.

***Orthothetes (Schuchertella) woolworthanus* Hall**

mut. *gaspensis* nov.

See *Strophomena woolworthana* Hall. Pal. N. Y. 1859.  
3: p. 192, pl. 17, fig. 1, 2; and

*Orthothetes woolworthanus* Hall & Clarke. Pal. N. Y.  
1892. v. 8, pt 1, pl. 11, fig. 25-29, 31

It is not easy to discriminate species differentials in members of the genus *Schuchertella* (*Orthothetes*). In the forms before us we are presented with a shell which approaches in general aspect

*O. woolworthanus* of the Helderbergian (New Scotland) shaly limestone; it has the long and straight hinge, subsemicircular rarely subelliptical outline, sometimes elongated and in the character of the surface there is comparatively little difference. We observe, however, that in *O. woolworthanus* the ventral beak is rarely greatly elevated and distorted while this distortion is present in *mut. gaspensis*, giving the valve at times the aspect of *O. deformis* Hall (New Scotland beds). The shell substance is much the thicker in the mutation and the pallial surface is vascular. In the dorsal valve the muscle scar of the mutation is larger, sharply subdivided and the pallial surface strongly marked with impressions of mantle vessels, the trunks of which are median, departing forward from the front end of the muscle area. In *O. woolworthanus* the shell is so thin as to seldom show these scars. In both valves the plications are sharply defined about the periphery. On the exterior the mutation shows a rather regular inequality in the striae which in total are probably less in number. The differences are sufficient to indicate a modification of the earliest type expressed in *S. woolworthanus*.

The shell attains considerable size, fully that of large examples of *O. woolworthanus*.

*Lower Devonian.* Grande Grève and Shiphead, P. Q.

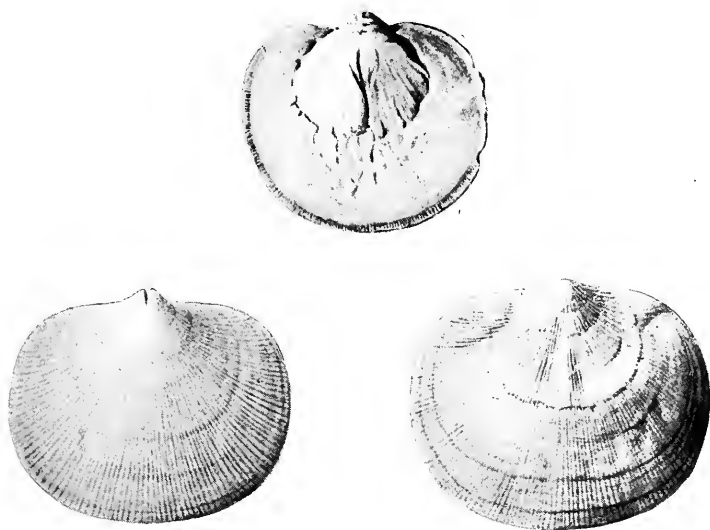
### *Rhipidomella logani* nov.

Prob. *Orthis oblata* Logan (Billings) Geol. Can. 1863. p. 393  
*Orthis livia* Billings (in part). Palaeoz. Foss. 1874. v. 2, pt 1,  
p. 32

Lens-shaped, subcircular shells, subequally convex in the posterior region, the ventral valve depressed anteriorly while the dorsal maintains its convexity. The slope of the surface of the dorsal valve is even in all directions and much more abrupt than in the ventral valve, the former is hence considerably the deeper valve. Little value can be laid upon the characters of the external markings which are in all these species fine, subequal, rounded and sharply elevated lines.

In the ventral valve the cardinal area is high and rather narrow, the delthyrium broad and the teeth well defined but not conspicuously elevated. The adductor scar is broad and flabelliform, extending one half the length of the shell and inclosing narrow and elongate oval diductors. The pallial region is well marked by pallial ridges which inosculate freely.

In the dorsal valve the cardinal area is narrow and not long enough to materially modify the almost circular outline of the valve. The crural processes are conspicuous and divergent and the car-



*Rhipidomella logani*

dinal process rather diminutive, curved forward, trifold at its end which does not project beyond the hinge.

In size, a width of 34 mm and a length of 29 mm is an average maximum and the limit of variation in size is not far from this.

*Lower Devonic.* Grande Grève, P. Q.

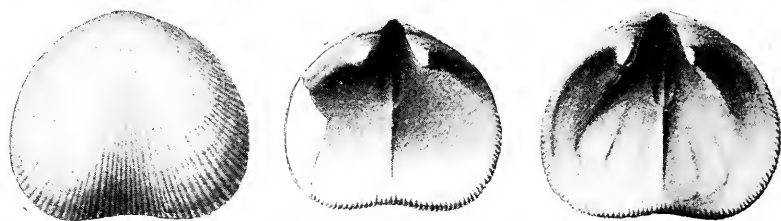
***Rhipidomella lehuquetiana* nov.**

Shell small lenticular or subplanoconvex. General outline sub-circular, a little wider than long. Ventral valve depressed, beak generally obscured or resorbed, umbo depressed; a broad and low sinus begins in the umbonal region, widens outward and becomes deep on the anterior margin making a strong sinuosity or tongue extending upward into the other valve. The surface at the sides of the sinus is broad and flat except about the margins where it is more abrupt.

Surface radii fine, rounded, numerous and subequal and cardinal area moderately high and curved downward at the sides. On the

interior the delthyrium is relatively broad and has encroached upon the beak, the pedicle cavity is deep, the teeth stout and thick. The adductor scars are very long, flabellate and extend almost to the anterior margin. They are bounded at the sides by the thickened extension from the teeth but in front they are not deeply impressed. They are divided by a median septum which almost reaches the margin. The diductor scar is elongate oval and posterior.

The dorsal valve is more regularly convex though flattened medially with angular slope in all directions. It is sinused on the anterior margin. The beak is blunt and the margins slope away from it at a low angle. On the interior the socket walls are stout



*Rhipidomella lehuquetiana*

and high, the sockets moderately deep and the cardinal process rather feebly developed, being fused with the adjoining walls and not projected beyond the hinge line; it is not divided. The muscular scars are posterior in a single or double subcircular pair separated longitudinally by a broad low and short ridge.

*Dimensions.* These shells measure in full growth about 15 mm in width by 12 mm in length.

This peculiar little shell which is quite abundant, bears the characters of senility as expressed in its thickened shell and shell processes and the usual resorption of the beak by the delthyrium. It has the general characters of *Rhipidomella* modified to the expression presented by *Orthis dubia* of the St Louis limestone [see Pal. N. Y. v. 8, pt 1, pl. 6A, fig. 18-22] which is a gerontic form with such outline.

*Lower Devonian.* Lehuquet's beach, Grande Grève, P. Q.

### *Rhipidomella hybridoides* nov.

But for the extravagant size this shell attains at full growth it would be quite impracticable to distinguish it from American forms.

of Sowerby's well known Upper Siluric *Orthis hybrida*. In its immature stages it is essentially that shell; at full growth



*Rhipidomella hybridoides*

its characters have changed by progression and indicate thereby a Postsiluric age.

*Lower Devonic.* Dalhousie, N. B.

### *Rhipidomella numus* nov.

A shell directly comparable to *R. (Orthis) oblata* Hall of the Helderberg fauna, agreeing therewith in form and contour of valves though perhaps never attaining the size of that species. It differs therefrom: (1) in the slightly greater length of hinge, but principally (2) in the very much coarser and sparser plication of the surface. In *R. oblata* the radial striae are fine and crowded; in a typical example I find about 70 at a distance of 10



*Rhipidomella numus*

mm from the beak and at the anterior margin in a shell 32 mm long, 190. In the largest example of *R. numus*, 24 mm long, there are 40 at 10 mm from the beak, 106 at the margin. Thus there are practically two striae in *R. oblata* to every one in *R. numus*; those of the latter angular, multiplying rapidly. When compared with the rarer Helderberg species *R. eminens*, its plication is still much coarser, its hinge not so long and it lacks the elevated ventral beak of that shell.

The species is quite abundant.

*Lower Devonic.* Dalhousie, N. B.

**Rhipidomella musculosa** Hall var. **solaris** nov.

These are all small shells with the enormous adductor scar in a state of high development. The shells are somewhat less circular,



*Rhipidomella musculosa* var. *solaris*

more transverse than in the New York and Grande Grève Oriskany specimens of *R. musculosa*, but their specific identity is not greatly veiled.

*Lower Devonian.* Moosehead lake, Baker Brook point; Brassua lake, east side; Moose river at Stony brook, Me.

**Schizophoria?** **amii** nov.

Shell of medium size, transversely subelliptical in outline. Ventral valve with slightly prominent beak which is not depressed but from the umbonal region departs a low median sinus which widens posteriorly and covers one third the width of the valve at the anterior margin. The dorsal valve is the more convex specially



*Schizophoria ? amii*

in the median region which is elevated into a broad ridge corresponding to the concavity of the ventral. From this central ridge the sides slope somewhat abruptly and with a slight depression post-laterally. The surface is marked by fine angular radii very like those of *Dalmanella lucia* Billings (sp.) and are rapidly increased by implantation. Sometimes these striae are seen to end abruptly in elongate punctae as in some species of *Rhipidomella* (*R. penel-*

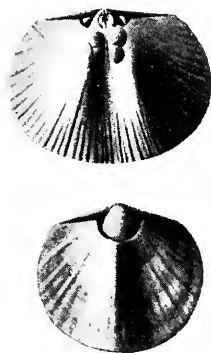
ope Hall, Hamilton). The surface is crossed by fine and obscure concentric lines. On the interior the ventral valve bears flabellate muscle scars but it is not known whether the scars of the dorsal valve conform to those of *Schizophoria*. Specimens of this species are easily confounded with those of *Dalmanella* but the contour of the two is exactly reversed.

*Dimensions.* A normal specimen measures 18 mm in length and 20 mm in width.

*Lower Devonian.* Grande Grève, P. Q.

### *Orthostrophia canadensis* nov.

Valves subcircular with a straight hinge; in contour the ventral valve is the shallower but bears a high median ridge, while the deeper dorsal valve carries a broad and low median sinus. Inside, the ventral valve has the muscular area concentrated pos-



*Orthostrophia canadensis*

teriorly into a single scar not more extensive than the single pedicle scar in more typical orthids; the dorsal valve has a thin erect cardinal process and four distinct adductor scars.

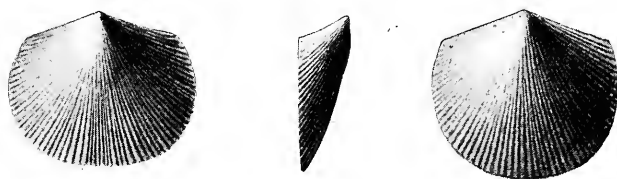
The surface is marked by radial striae of unequal size.

*Lower Devonian.* St Alban beds. The Grande Cavée, and Cape Rosier Cove. This species is also known to occur in the Square Lake limestone of Northern Maine.

### *Dalmanella penouili* nov.

This is a small circular shell without median depression or elevation but with an elevated ventral valve and high cardinal area, simulating in this regard a *Schuchertella* but without the deltidium

and having a short hinge line. The species is of the type of the *Orthis lepidus* Hall of the Hamilton shale fauna but is of larger size than that little species is known to attain. The surface



*Dalmanella penouili*

of the valves is finely striate, the elevated radial lines differing in size, a few being considerably larger than the rest.

*Dimensions.* The average among several examples has a width of 8 mm and length of 7 mm.

*Middle Devonian.* Gaspé Basin, P. Q.

### *Dalmanella drevermanni* nov.

Cf. *Orthis tectiformis* Walther. Neues. Jahrb. für Min. Beil. bnd 17, 1903. p. 164, pl. 3, fig. 4 a-c

*Orthis circularis* Sow. mut. *postuma* Frech. Lethaea Paleoz. 1897. v. 2, pl. 24 b, fig. 8. *nom. nud*

*Orthis circularis* Sow. D'Archiac & deVerneuil. Trans. Geol. Soc. Lond. 1842. v. 6, pl. 38, fig. 12 (*non auctorum*)

*Orthis subcarinata* Hall Pal. N. Y. 3: 169, pl. 12, fig. 7-21

This shell, the only one of its type in the fauna, is essentially a diminutive expression of *Orthis subcarinata* Hall of



*Dalmanella drevermanni*

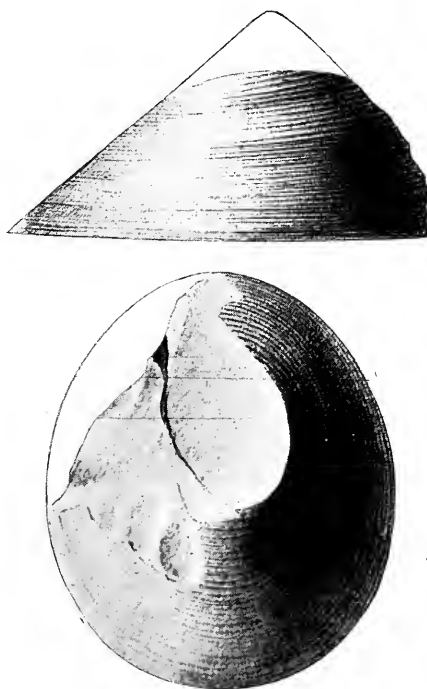
the New Scotland beds. It has however affiliations with other species, as cited above but the conditions of its occurrence oblige us to regard the form as wholly mature; though with reference to others its expression is immature. The exteriors of our shells indicate fine and somewhat unequal striation, with rapid multipli-

cation of the sharp riblets, an almost flat dorsal valve with low broad median depression and a medially elevated ventral valve with broad not acute keel. It is closely similar to *Orthis tectiformis* Walther, as cited, from the upper Coblentzian of the Haiger.

*Lower Devonian.* Edmunds Hill, Chapman Plantation, Me.

***Orbiculoidea montis* nov.**

Shell very large, brachial valve highly elevated, suberect, much longer on the posterior than on the anterior slope. Posterior curvature concave beneath the arched beak; in front of the beak the surface is convex, the shell being uniformly expanded in the



*Orbiculoidea montis*

pallial region. Marginal outline subcircular. Surface bearing fine distant elevated concentric striae which may undulate and inosculate. These are crossed by very fine radial lines which probably do not pertain to the epidermal layer.

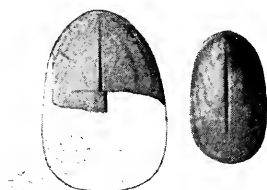
The pedicle valve is concave exteriorly though the beak is elevated and the pedicle slit does not extend to the margin.

*Dimensions.* One brachial valve, virtually uncompressed, has a diameter of 57 mm and its original height was about 35 mm. Another which has undergone compression apparently had a diameter of about 65 mm. A pedicle valve has a diameter of 45 mm.

*Lower Devonian.* Grande Grève and Percé rock, P. Q.

### **Lingula elliptica nov.**

Shell of moderately large size, outline elongate and regularly elliptical, there being for the dorsal valve very little difference in the curvature of the umbonal and distal extremities, the latter being very slightly transverse, the former quite regularly curved. Sides direct, for a very short distance only partaking of the curvature of



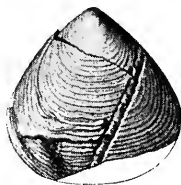
*Lingula elliptica*

the rest of the outline. Surface low and evenly curved, margin bordered all the way round by a narrow flattened area; exterior marked by concentric lines of the usual style. On the interior of the dorsal valve is a long and low median ridge or septum, but in the ventral valve there is no such feature. Length 19 mm, width 10 mm.

*Lower Devonian.* Grande Grève and Percé rock, P. Q.

### **Glossina acer nov.**

Shell of relatively large size, subtriangular, with acute and prominent beak from which the margins diverge rapidly for more than



*Glossina acer*

two thirds the length of the shell, the distance across the pallial surface being four fifths the length of the shell. Anterior margin broad and nearly transverse. Surface covered by sharply elevated

and distant concentric lines which are mostly continuous though somewhat undulated but these frequently inosculate and become separated by narrower intervals toward the anterior margin. Length 17 mm, greatest diameter 13 mm.

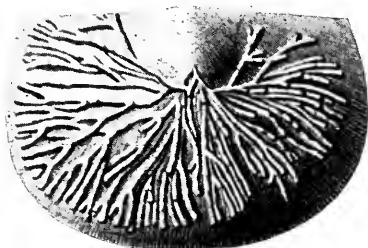
This shell is like *L. perlata* Hall and *L. spatiosa* Hall of the Helderbergian as the outline of those species has been represented but in this respect conjoined with the peculiar character of its surface markings, I am unfamiliar with any other species like it.

*Lower Devonian.* Grande Grève, P. Q.

### BRYOZOANS

#### *Hederella blainvillii* sp. nov.

This very interesting bryozoan incrusts the shells of *Leptostrophia blainvillii* Billings and, so far as our observation has extended, seems to attach itself always to the ventral or upper valve at an early stage in the life of the brachiopod and grow out-



*Hederella blainvillii*

ward from the parent cell in all directions, keeping the apertures of the cells at or just a little distance above the margins of the shell. This habit evinces a true commensal condition not often shown in other cases of attached bryozoa; the water currents set up by the ciliated mantle of the brachiopod have helped to feed the members of the bryozoan colony, most of which stand in an attitude of readiness for this service. This species occurs with extraordinary frequency on these brachiopod shells and seems to grow on no other save for an occasional simply branched stock on an upper valve of *Chonetes hudsonicus*. *Hederella ramea* which I have described from the Oriskany of Becraft mountain, N. Y. elects attachment to *Leptostrophia oriskania*, always keeping its apertures toward the opening of the shell valves. From

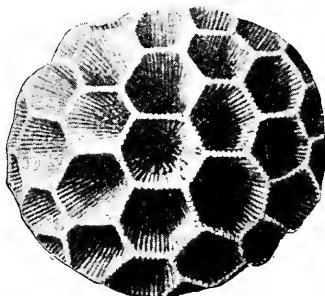
that species *H. blainvillii* differs in its much more rapidly branching zoarium and consequent shorter cells, producing a fuller and denser stock.

*Middle Devonian.* Gaspé Basin, P. Q.

### CORALS

#### *Pleurodictyum lenticulare* Hall var. *laurentinum* nov.

*Pleurodictyum lenticulare* is a species of the Helderbergian (New Scotland) fauna characterized by its very large and few cells, the walls of which are strongly marked by nodose and broken septa. A central cell, hexagonal in form, is bounded by six others and it often happens that the development of this spe-



*Pleurodictyum lenticulare* var. *laurentinum*

cies does not pass this primitive expression. The form before us has the same form and size of cells which are marked by radial nodose and denticulated septa, these being most prominent and most irregular at the base. The lenticular corallum however grows to larger size, showing three cycles of cells about that which may be taken as central. In the measurements of the cells the New York and the Gaspé forms are alike.

*Lower Devonian.* Grande Grève and Percé rock, P. Q.

### GRAPTOLITES

#### *Chaunograptus gracilis* nov.

A shell of *Leptostrophia magnifica* Hall has affixed to it an irregularly branching black conchiolinous repent fossil which in structure and substance seems to be congeneric with the peculiar organism described and figured by Hall as *Dendrograptus* (*Chaunograptus*) *novellus* from the Waldron (Niagaran) fauna [Geol. Sur. Ind. 11th Rep't. 1881. p. 225, pl. 1, fig. 1, 2; before in Alb. Inst. Trans. 1879, v. 10, abstract, p. 2]. A com-

parison with the two types of this species in the State Museum, shows that the Gaspé and Waldron forms are specifically different, the Gaspé form being coarser and the apparent cells larger. Since



*Chaunograptus gracilis*

no other form of this still problematic group of supposed repent graptolites is known, the Gaspé form is apparently new.

Its characters are: Conchiolinous, delicate, frequently and irregularly branching fronds, which are closely attached to foreign bodies and consist of curved, commalike bottle-shaped cells or branch segments, which are 1.4 mm long and .3 mm wide in their distal part and bud in such a fashion from the preceding that the branches become slightly zigzag-shaped.

*Lower Devonian.* Grande Grève, P. Q.