described and figured under the names respectively of *Involutina silicea*, Terq., and *Involutina Jonesi*, Terq. & Piet. The first of these seems to be *Trochammina incerta*, d'Orb. sp., a very variable species, not uncommon in the Lower Lias, though seldom showing the septa so regularly or so completely developed as they are given in the figure. To the character indicated by the specific name '*silicea*,' appended to the description, but little importance need be attached; for, though the original shell-substance is calcareous, the amount of siliceous sand embedded in it may easily be sufficient to preserve the form of the shell even after it has been treated with strong acid. The latter, *Involutina Jonesi*, is the little shell to which Professor Jones had previously given the name *Nummulites liassicus*; but, as I have shown that it is not in any respect a Nummulite, it must bear the generic name assigned to it by M. Terquem.

I have as yet met with the species only in the *Lower Lias*. The specimens vary in size from $\frac{1}{15}$ down to $\frac{1}{70}$ of an inch in diameter.

I cannot close this notice without acknowledging the kind assistance I have received from my friend Mr. W. K. Parker, F.Z.S., whose many suggestions have been invaluable in determining the history of the little organism which has formed the subject of the present notice.

EXPLANATION OF PLATE IX.

- Fig. 1. *Involutina liassica*, Rupert Jones sp. Large specimen from the Lias Shale near Rugby, Warwickshire; side-view; magnified 33 diam.
 2. Similar specimen from the same locality; end-view; magnified 33 diam.
 3. Young specimen, out of Lias Clay from Defford, Worcestershire; magnified 33 diam.
 4. Specimen from the same locality, having the exogenous deposit covering the entire shell; magnified 33 diam.
 5. Transverse section, in a piece of the rock of Fretherne Cliff, Gloucestershire; magnified 44 diam.
 6. Horizontal section of a specimen from Worcestershire, showing irregular septation and indications of pseudopodial perforations on the inner surface of the shell-wall; magnified 44 diam.

II. DESCRIPTIONS OF SOME NEW PALÆOZOIC CRUSTACEA.

By HENRY WOODWARD, F.G.S., F.Z.S.

[Plate X.]

WE are indebted to Mr. David Page for having first pointed out two very well marked genera of Palæozoic Crustacea of the family *Eurypteridæ*, namely, *Slimonia* and *Stylonurus*. I gave a description of *Slimonia* in the 'Intellectual Observer'

H.B. Brady del. ad nat.

Kanhart imp.

G. Westrich.

INVOLUTINA LIASSICA (*magnifica*)

for November, 1863; and I now propose to point out the characters of *Stylonurus*.

Since Mr. Page figured *Stylonurus Powriei* in 1856,* then the one only species known, much better specimens have been found by Mr. James Powrie, of Reswallie, in Forfarshire, and Mr. Robert Slimon, of Lesmahagow, in Lanarkshire. A specimen of a new species of this genus, from the last-named locality, furnishes us with such interesting details that I subjoin a detailed description.

1. *STYLONURUS LOGANI*. Sp. nov. Pl. X. fig. 1.

Only one specimen, from Lanarkshire (Logan-Water, near Lesmahagow), is known of this genus, the *intaglio* half of which is in the Museum of Practical Geology, Jermyn Street, and the *relievo* half in the collection of Mr. James Powrie, of Reswallie. It is from the latter half that our figure (Plate X. fig. 1) is taken.

The specimen exhibits the carapace and the body-rings, as far as the 10th segment, united, and one of the long slender eight-jointed swimming-feet *in situ* on the right side; whilst on the left are seen the bases and portions of two more long appendages. Lying upon the slab, in various positions around the head, are four spiny eight-jointed palpi, or foot-jaws, one of which still retains its attachment to the carapace, although twisted and bent from its natural position.

Upon referring to the figure of *Stylonurus Powriei* in Page's 'Advanced Text-book' (3rd edit., p. 190, fig. 1), it will be seen that it has *two pairs* of long slender swimming-feet upon either side of the head. In the specimen here figured, from Logan-Water, there is also evidence of a second pair of long limbs, making, with the spiny palpi, four pairs of appendages; the fifth pair (absent), being the antennæ, were probably much smaller, as in *Eurypterus* (see GEOL. MAG., Pl. V. figs. 7-9). The form of the carapace in *Stylonurus* is well marked, and very different from any other genus in this singular family.

In the Logan-Water shales, although the finest and most delicate markings are often preserved, yet the specimens are so compressed as to give scarcely any idea of their original contour, except by comparison with those from the Old Red Sandstone of Forfarshire and elsewhere. The eyes are situated upon the surface of the carapace, somewhat near the anterior angles. They were reniform, and raised upon round prominent bosses; but these are now squeezed flat to the surface of the head.

The carapace is quadrate, with the anterior angles rounded; the sides present a slightly waving outline, contracting towards the posterior angles. The margin is double, having an inner ridge which circumvents the sides and front, and terminates in a rounded

* See Page's 'Advanced Text-book of Geology.'

elevation at the posterior angles. An inner border-line also passes up each side and around the front of each eye; reminding us of the cheek-sutures in the Trilobites.

No sculpturing is noticeable upon the surface of the carapace; but (as is the case with all the Logan-Water specimens) impressions of portions of organs are seen, the position of which is beneath the surface of the head.

The basal joints of several of the palpi are visible; and, underlying the 1st and 2nd thoracic segments, may be discerned the median appendage of the thoracic plate.

The body is extremely slender, as compared with *Pterygotus*; and the segments in this species (as in *St. Powriei*) had very small epimeral portions. The 11th and 12th segments, which are not preserved, were doubtless still narrower; and the telson was probably a long styliform appendage, as in *St. Powriei*.

Dimensions of *Stylonurus Logani*. —Swimming-foot:—Basal joint, 6 lines in length, and 5 broad; 2nd joint, 2 lines long, 4 broad; 3rd, 1 inch long, 2 lines broad; 4th, 10 lines long, 2 lines broad; 5th and 6th, each 8 lines long, 2 lines broad; 7th, 6 lines long, 1 line broad; 8th, 5 lines long, 1 line wide, terminating in a fine point. Carapace:—Greatest anterior breadth, 1 inch 3 lines; greatest length, 1 inch 2 lines; width between the eyes, 5 lines; breadth of inner raised margin, 1 line. Thoracic segments:—1st segment, 2 lines long, and 1 inch and 1 line wide; 2nd and 3rd, 3 lines long, and 1 inch wide; 4th, 4 lines long, and 1 inch 1 line wide; 5th, 3 lines long, by 1 inch wide; 6th, 2 lines long, and 11 lines wide. Abdominal segments:—7th segment, 2 lines long, by 10 lines wide; 8th, 3 lines long, by 9 lines wide; 9th, 3 lines long, by 8 lines wide; 10th, 3 lines long;—here the specimen is broken, and the 11th and 12th segments and telson are wanting. The posterior margin of each segment is ornamented by a row of minute spines along the border.

The form of the carapace and the position of the eyes are two very well marked features in this genus: these, and the two pairs of long slender oar-like feet, sufficiently separate them from the rest of the family; but even the long tail-spine is peculiar.

From the extreme rarity of its occurrence in a formation where other genera are so numerously represented, I am strongly inclined to believe this form to have been a larval condition of some other genus of the same group.

I have named it *Logani* after my friend Sir William Logan, the Director of the Geological Survey of Canada.

2. *STYLONURUS ENSIFORMIS*. Sp. nov. Woodcut (nat. size).

A tail-spine of *Stylonurus*, $3\frac{5}{8}$ inches in length (probably longer when perfect), $\frac{3}{4}$ of an inch in width, and deeply channelled through its entire length, from $\frac{2}{5}$ at its widest part to $\frac{1}{5}$ of an inch at its extremity, was found in the Old Red Sandstone, at one of the Turin Hill Quarries in Forfarshire.

This spine is so peculiar in its form, and so distinct from any other specimen as yet met with, that I have ventured to name it *Stylonurus ensiformis*. The specimen is in the collection of Mr. James Powrie, F.G.S., of Reswallie.

3. *PTERYGOTUS MINOR*. Sp. nov. Pl. X. fig. 2.

Associated with the great *Pterygotus anglicus*, in the Old Red Sandstone of Farnell in Forfarshire, Mr. Powrie has discovered the smallest *Pterygotus* known.

The specimen is only $2\frac{1}{2}$ inches in length, by $\frac{3}{4}$ of an inch in breadth.

It is evidently a new species, as it presents a remarkable difference from all other forms of this genus.

The eyes are within the margin; whilst in other species they are placed upon the latero-anterior angles. The position of the eyes has been considered by some palæontologists to be of generic importance; but I am inclined to believe it only of specific value; for in the larval stages the eyes do not occupy the same position as in the adult animal.

The specimen is entire, and exhibits the relative proportions of the head, thorax, and abdomen, as well as the telson or tail-joint, with its strong median ridge flattened down upon the surface of the shale. The swimming-feet can also be seen *in situ*.

Dimensions of *Pterygotus minor*.—Greatest length of carapace, 4 lines, width 6 lines; space between the eyes 2 lines.

1st segment (thoracic=1st to 6th), 1 line long, 6 lines wide; 2nd, 2 lines long, and 7 wide; 3rd, 4th, and 5th, $1\frac{3}{4}$ lines long, and 8 lines wide; 6th, $1\frac{3}{4}$ lines long, and 7 lines wide; 7th segment (abdominal=7th to 12th), $1\frac{3}{4}$ lines long, and 6 lines wide; 8th, $1\frac{3}{4}$ lines long, and 5 lines wide; 9th, $1\frac{3}{4}$ lines long, and $4\frac{1}{2}$ wide; 10th, 2 lines long, by 4 lines wide; 11th, 2 lines long, and $3\frac{1}{2}$ wide; 12th, 3 lines long, and 3 wide; telson, or tail-plate, 7 lines long, and 2 lines wide. Total length of swimming-foot, 6 lines.

The impress of the specimen is so exceedingly delicate, that it presents rather the appearance of a 'ghost' than of an actual reality, and requires to be held obliquely in a good light in order to make out even these details clearly. The eyes are the only parts slightly elevated above the surface of the shale.

The specimen which is here described is unique, and was obtained from the indurated shale overlying the 'Arbroath Paving-stone,' and from which Mr. Powrie has obtained so many new and interesting species of Fishes. The shale is very finely laminated, and breaks up throughout into cuboidal fragments.

Stylonurus ensiformis.
Tail-spine (nat. size). Old Red Sandstone, Forfarshire.

4. *EURYPTERUS BREWSTERI*. (Powrie MS.) Sp. nov.
Pl. X. fig. 3.

This new species of *Eurypterus* was obtained by the Rev. Henry Brewster, of Farnell, near Brechin, from the Old Red Sandstone of Kelly Den, near Arbroath, and it has been named after its discoverer by Mr. Powrie.

It consists of a carapace and a portion of the 1st thoracic segment, slightly displaced; close to which is seen an ovisac, in which are more than 20 ova, more or less compressed (fig. 3, *a*).

The carapace measures 2 inches 2 lines in breadth at its posterior border, and $\frac{3}{4}$ of an inch in length. The sides curve rapidly inwards, leaving the front border only 8 lines broad. The eyes, which are 1 line in length, are reniform, and within the anterior half of the carapace; they are 4 lines apart, and have their convex surfaces directed outwards. The margin of the carapace is slightly striated; and there is an inner elevated border in front, 1 line in breadth, which thins out and disappears on the lateral border. The surface of the carapace is slightly wrinkled, but not ornamented in any way.

This species agrees most nearly in general form with *Eurypterus lacustris* of Harlan,* from the Upper Silurian of New York; but the relative proportions differ considerably.

Interesting as this carapace is, it is rendered still more so by the ovisac associated with it. The so-called *Parka decipiens* may include many widely-different organisms; but I fully believe that the oviform bodies from the Old Red Sandstone are chiefly the eggs of Crustacea.

EXPLANATION OF PLATE X.

Fig. 1. *Stylonurus Loganii*, sp. nov. From Logan-Water, Lanarkshire.

Fig. 2. *Pterygotus minor*, sp. nov. From Farnell, Forfarshire.

Fig. 3. *Eurypterus Brewsteri*, Powrie MS. sp. nov.; *a*, Egg-bag. From Kelly Den, near Arbroath, Forfarshire.

All three specimens are in the collection of Mr. James Powrie, F.G.S., and are figured of the natural size.

III. ON THE LAURENTIAN FORMATION.† By J. J. BIGSBY, M.D.,
F.G.S.—PART II. THE RESIDUARY ELEMENTS OF LIFE IN THE
LAURENTIAN GROUP.

THE Laurentian Group is as complex in its composition as the younger fossiliferous metamorphic rocks; silica, alumina, lime, and carbon compose its beds, together with phosphorus, fluor, barytes, &c.; and it develops the same accidental minerals—staurotide, garnet, pyroxene, metallic compounds, &c. Why then should there not be in it the buried forms of life? It is found that, as we descend in the great sedimentary column, the organic remains gradually lose

* See Hall's 'Palæontology of New York,' p. 407, pl. 81, fig. 3.

† Continued from p. 158.

C West lith. ad nat.

PALEOZOIC CRUSTACEA. (nat. size)

W & N Hartman. imp.