

EXPLANATION OF THE FIGURES.

PL. XXI.

PTERYGOTUS PROBLEMATICUS.

- Fig. 1 *a*. Part of the claw of *Pterygotus problematicus*, Agass., from the Upper Ludlow Rock of Hagley Park, Herefordshire:—this is probably the fixed finger, and shows the striated spines of unequal size.
Fig. 1 *b*. Some of the spines, magnified.
Fig. 2 *a*. From the same slab:—a portion probably of the spinous edge of the abdomen, with one of the lateral appendages (*) attached.
Fig. 2 *b*. The appendage, fig. 2 *a**, magnified, to show the radiating striæ and lateral teeth. This large spine or appendage may possibly be a terminal joint of one of the feet, pressed against the fragment, fig. 2 *a*, but not articulated with it.

3. *Description of some GRAPTOLITES from the SOUTH of SCOTLAND.*
By J. W. SALTER, Esq., F.G.S.

MR. HARKNESS has been so good as to send me specimens of many Graptolites he has collected, and information respecting several of the localities mentioned in his paper, on the Silurian Rocks of the South of Scotland, which appears in this Number of the Journal.

He has added one very interesting species to the British list, by finding the *Diplograpsus teretiusculus*, Hisinger, a species characteristic of the alum slates of Sweden, at Glenkiln, Dumfriesshire. He has also found *D. ramosus*, Hall, at Hartfell in the same district: this previously was only known in Wigtonshire.

Numerous specimens collected by him of the *Rastrites triangularis*, Harkness, prove it, as Prof. M'Coy had surmised, to be only the younger portion of *Grapt. Sedgwickii*, Portlock. A large series too of *G. incisus*, Harkness, enables us to refer that species to *G. sagittarius* of Hisinger, of which there are good specimens in the Society's Museum, and which has been lately well-figured by Geinitz†. A figure of its young and full-grown stages are given, Pl. XXI. fig. 8.

Mr. Harkness also permits me to correct an error into which he was led in his previous memoir‡. The strata of South Kirkcudbrightshire have been hitherto referred to the age of the Wenlock shale, but the species of Graptolites quoted by Mr. Harkness from that locality, would invalidate this reference; viz. *Graptolites (Diplograpsus) foliaceus*, Murch., *G. tænia*, Salter, and *G. ludensis*, Murch.

With regard to the first species, the evidence when examined turns out to be quite inconclusive, and there is, as yet, no instance in Britain of a double-graptolite being found above the Caradoc sandstone.

G. tænia of his list proves to be an indeterminable fragment, and the species itself, founded as it was on an imperfect specimen, must be cancelled§. Geinitz has already referred it to *G. sagittarius*.

† Verstein. Grauwackenform. Sachs. Heft 1. Die Graptolithen, t. 2. figs. 2-7.

‡ Quart. Journ. Geol. Soc. vol. vii. p. 55.

§ The same must be said of *Grapt. laxus*, Nicol, described, but not figured, in the Quart. Journ. Geol. Soc. vol. vi. p. 64. Most of the specimens are scalariform impressions, and offer very little to distinguish them from *G. sagittarius*.

G. ludensis, therefore, only remains, as quoted by me in the list given in Prof. Nicol's paper*. It is accompanied however by another species, apparently an undescribed form, with cells closely set, each with a long decurved spine from its upper edge. I have called it *G. Flemingii*, and figures and a description are subjoined.

DIPLOGRAPSPUS TERETIUSCULUS, Hisinger, sp. Pl. XXI. figs. 3, 4.

Prionotus teretiusculus, Hisinger, *Lethæa Suecica*, Supp. 2 (1840),
p. 5. t. 38. f. 4.

G. teretiusculus, Scharenberg (1851), *Ueber Graptol.* t. 2. f. 17-32.

G. personatus, Scharenberg, *ibid.* t. 1. f. 12.

G. teretiusculus, Geinitz (1852), *Verstein. Grauwack. Sachs. heft i.*
p. 26.

SPEC. CHAR. Cylindricus aut subcompressus, insuper et subter lineâ medianâ rectâ vel subundulatâ exaratus; cellularum oribus transversè oblongo-ovalibus, diametrum suum verticalem sese distantibus, simplicibus, nec ad marginem inferiorem prominulis, subtus in lineam impressam brevem utrinque excedentibus.

Cylindrical, rather quickly tapering at the small end, smooth, marked down the upper and lower side by an impressed median line, which is generally straight, but sometimes a little wavy between the two rows of cells. The mouths of the cells are transverse, oval-oblong, a little curved down on each side so as to be obscurely lunate, their edges not at all projecting from the general surface; they are placed nearly their own breadth apart from one another in the full-grown part, and there appear to occupy the whole width of the tube (in the young part they are smaller and more distant proportionally). From the base of the mouth on each side a short impressed line extends downward, but not so far as to the succeeding cell-mouth, and either parallel to the median line or very slightly inclined towards it. The surface shows transverse lines on all parts.

We have compared this well-marked species with excellent specimens, from the alum slate of Scandinavia, in the collection of the Geological Society. Hisinger's figure is a very bad one.

The axis of this species, as in *G. bicornis*, Hall, and some others of the same group, is narrower than the general thickness, so as in this case to be visible only as a longitudinal constriction or impressed line.

This Graptolite, like the *D. rectangularis*, M'Coy, which very possibly may also belong to the species we are describing, is remarkable for having the cell-mouths simply excavated in the sides,—the lower edge not at all projecting as it does in all the other foliaceous Graptolites; indeed, in this species the openings are a little sunk beneath the general surface, so as to render the interspaces somewhat tumid.

Locality. Glenkiln, Dumfriesshire. The species occurs also in Anglesea, N. Wales, in considerable perfection.

* Quart. Journ. Geol. Soc. vol. vi. p. 54 & 64.

GRAPTOLITES FLEMINGII, n. sp. Pl. XXI. figs. 5, 6, 7.

SPEC. CHAR. Linearis, plures uncias longus, lineam latus, dentibus confertis; cellulis obliquis brevibus, canalem communem æquantibus, ore lato, insuper in spinam acuminatam satis longam decurvatam producto, subtus inermi.

Description.—Long, linear, about a line broad, the young part narrower. Edge closely dentate, the cells being about four in the space of a line, oblique, and not occupying in their depth above half or a little more of the entire breadth of the shaft; they are straight, not curved at their base, and are furnished at their upper edge with a strong acuminate spine, which is curved downwards almost from its origin and overhangs the wide concave margin of the mouth. The latter at its lower edge abuts directly against the succeeding cell, and is not at all produced. The curved spine is, in full-grown specimens, equal in length to three-quarters the breadth of the shaft; in younger and narrower specimens it is equal to it. Axis distinct, narrow.

The spines vary a little in degree of downward curvature, but they are never direct, nor are they so short as in *G. Chimæra*, Barr., a species with which ours is closely connected; moreover in that species the length of the cells is greater in proportion to the width of the shaft, and the lower edge of the mouth is shortly produced. We do not feel justified therefore at present in uniting them, but it is quite possible that other specimens may show that the Bohemian species varies in these characters. M. Barrande, on a cursory view of the fossil now described, considered it to be his *G. colonus*; but in that species, besides the spine being shorter, it is placed on the lower edge of the mouth, and the long cells have a curve at their base, as in *G. priodon*. It should be compared with the species figured as *G. Sedgwickii* by Geinitz (*loc. cit.* pl. 3. fig. 2).

Our numerous specimens present constant characters. We have figured with the usual full-grown form (fig. 5 *a*, 5 *b*) a specimen or two squeezed laterally (figs. 6, 7), in which the cells consequently appear oblique and elongated. These specimens have the cells longer, taking their origin nearer to the back of the shaft, which also shows a shallow depression down it, where the axis was placed. The spines are very much decurved. These obliquely crushed specimens show at the base of each cell the impression of the opening, or rather of the edges of the opening, into the common canal: this structure was first explained by M. Barrande, and is that which gives the scalariform appearance to the single graptolites. It is more completely shown in our figure of *G. latus* (Pl. XXI. fig. 9), and is also figured by Geinitz without explanation (*l. c. t. 2. f. 35, 36*).

Loc. Balmae, Kirkcudbright, in great plenty. (Wenlock shale?)

GRAPTOLITES SAGITTARIUS, Linn. Pl. XXI. f. 8.

Prionotus sagittarius, Hisinger, Lethæa Suecica, Supp. p. 114. t. 35. f. 6.

G. incisus, Harkness, Quart. Journ. Geol. Soc. vol. vii. pl. 1. f. 8.

G. sagittarius, Geinitz, *l. c. t. 2. f. 2-7*.

G. Barrandei, Scharenberg, *l. c. t. 1. f. 5-7*.

G. virgulatus, Scharenberg, *l. c. t. 1. f. 8-11*.

This has been compared with good specimens in the Society's collection from Sweden, and no difference can be detected. Mr. Harkness has favoured the Geological Survey with an excellent suite, of all ages, and, in one or two, spines were observed projecting from the lower edge of the cell, as in Hisinger's species. Prof. M'Coy also quotes *G. sagittarius* from this district.

Description.—Young specimens have the breadth of the notches or cell-mouths greater than that of the shaft; in middle age the notches are considerably less deep, although the oblique lines of division between the cells extend far inwards and leave but a narrow canal; in old specimens, which are frequently 1 line broad and a foot long, the depth of the notches is about one-third of the whole breadth or scarcely so much. The spine in our best-preserved specimens is longer than in those we have seen from Sweden; but as so few spines are present, we cannot say if this is constant.

Localities. Glenkiln; Bran Burn; Duffkinnell, &c.

Note.—The species called *G. sagittarius* by Portlock (Geol. Rep. pl. 19. f. 8, and pl. 20. f. 1) has very narrow and crowded cells, placed very obliquely, and hardly projecting at all as distinct teeth. I find that Col. Portlock has proposed for it the name of *G. Conybeari* in MS. with a description as follows:—"The axial space wide and flat, the serratures closely pressed together, their points appearing very little beyond the axis."

Mr. Sowerby has used this name in his MS. Catalogues of the Collection of the Geological Society; and it will, I suppose, be generally adopted.

Pl. XXI. fig. 9.

Of *G. laxus*†, Nicol (Quart. Journ. Geol. Soc. vol. vi. p. 64), it is thought desirable to give a figure, in order that a comparison may be made with similarly compressed specimens of *G. sagittarius*.

These admirably show the scalariform appearance produced by the somewhat oblique compression of the canal and cells, as explained in Barrande's treatise on the Graptolites of Bohemia, p. 45-47. And I think that this condition is what has chiefly given rise to Prof. M'Coy's idea, that there is at the base of each Graptolite-cell a diaphragm which nearly closes the base. When the fossil is laterally compressed, the basal edges of the cells, which are placed obliquely by pressure, frequently run in straight lines as in fig. 9 *a*; when the compression has taken place more in the plane of the mouths, a double series of oval marks is the result, as shown in fig. 9 *b*.

Locality. Thornielce, Selkirkshire. Collected by Prof. Nicol.

DITHYROCARIS? APTYCHOIDES, n. sp. Pl. XXI. fig. 10.

This remarkable little fossil is figured rather to call attention to it than to assign it a true position. It is exceedingly like in form to a pair of the fossils called *Aptychus*, but there is a slight indentation in each plate, just at the umbo or inner angle (*), which does not

† See above, p. 388, note.

exist in *Aptychus*. It cannot be a bivalve shell, but most likely belongs to Crustaceans,—the Phyllopoda.

Loc. Duffkinnell, Dumfriesshire, in company with Graptolites.

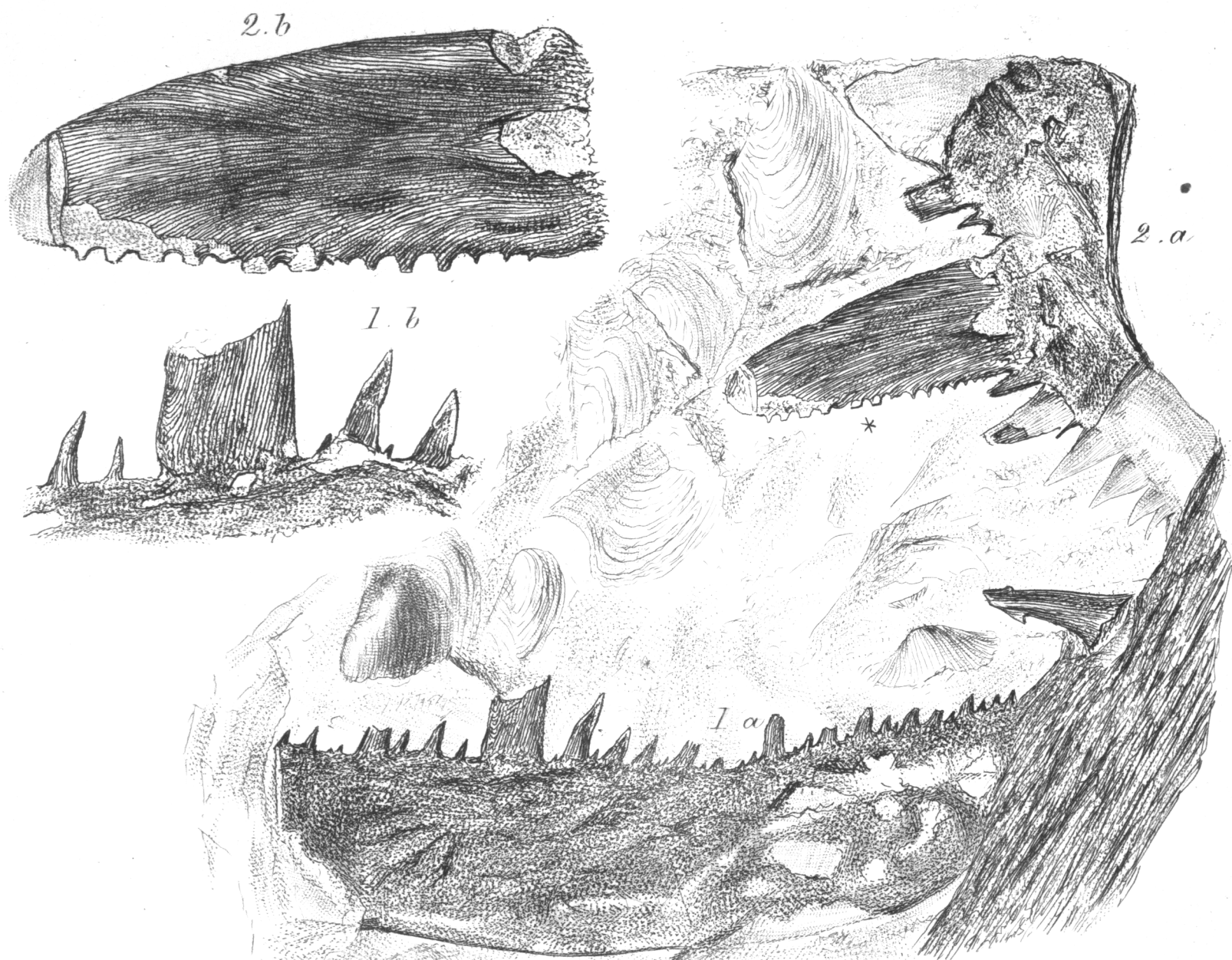
EXPLANATION OF PLATE XXI.

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- Fig. 1 *a*. Part of the claw of *Pterygotus problematicus*, Agass., from the Upper Ludlow Rock of Hagley Park, Herefordshire:—this is probably the fixed finger, and shows the striated spines of unequal size.
 Fig. 1 *b*. Some of the spines, magnified.
 Fig. 2 *a*. From the same slab:—a portion probably of the spinous edge of the abdomen, with one of the lateral appendages (*) attached.
 Fig. 2 *b*. The appendage, fig. 2 *a**, magnified, to show the radiating striæ and lateral teeth. This large spine or appendage may possibly be a terminal joint of one of the feet, pressed against the fragment, fig. 2 *a*, but not articulated with it.

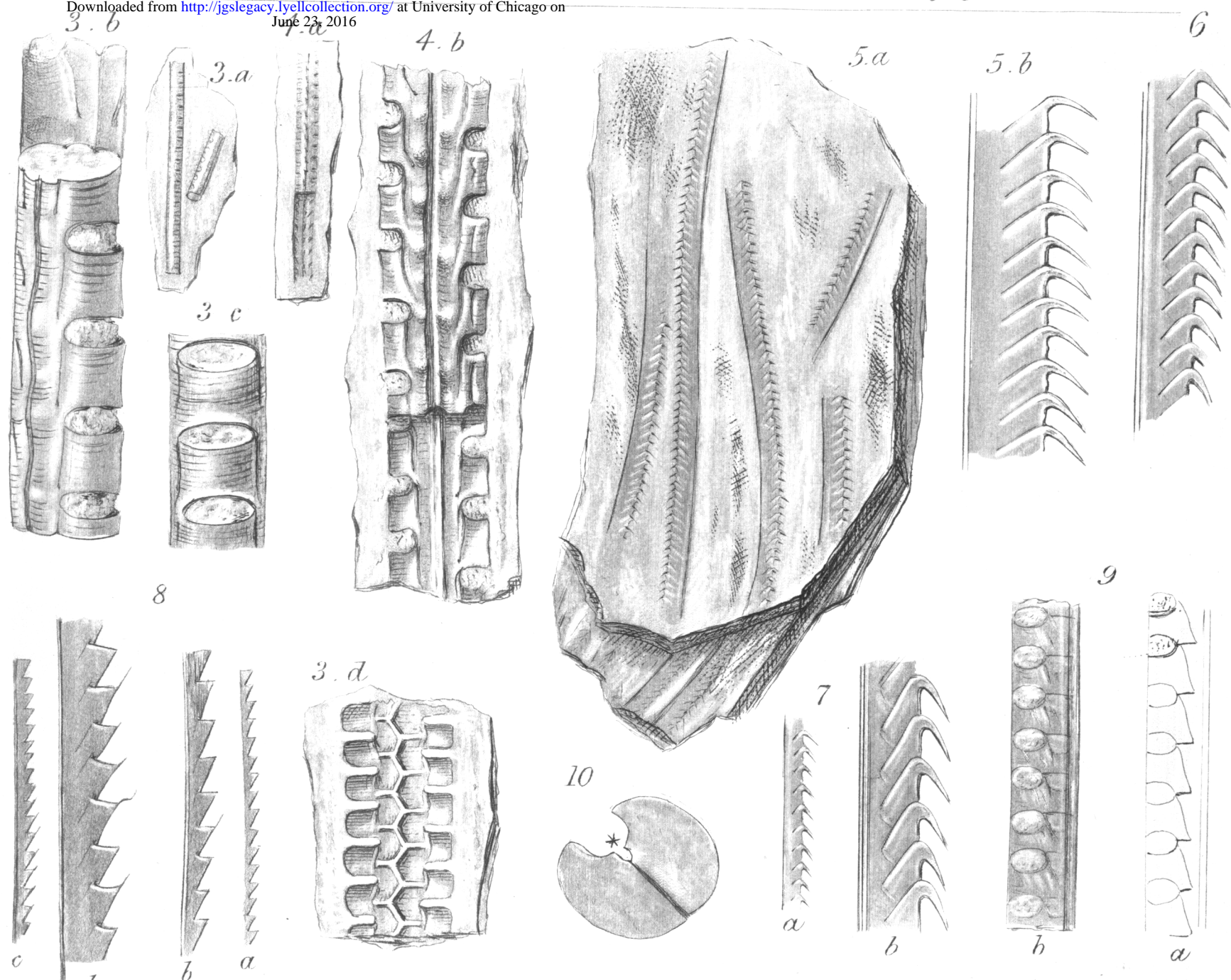
GRAPTOLITES.

- Fig. 3 *a*. *Diplograpsus teretiusculus*, Hisinger, sp. A cylindrical specimen from Anglesea, Collection of Mus. Pract. Geol. Natural size.
 Fig. 3 *b*. —————. The same, magnified.
 Fig. 3 *c*. —————. Lateral view, to show the cell-mouths. Magnified.
 Fig. 3 *d*. —————. A hollow mould in slate, from the same locality, much pressed in a longitudinal direction, so as to shorten all the cells and press them into a zigzag form.
 Fig. 4 *a*. —————. A compressed specimen, from Dumfriesshire. Natural size.
 Fig. 4 *b*. —————. The same, magnified;—the cell-mouths forming right-angled notches on the margin.
 Fig. 5 *a*. *Graptolites Flemingii*, sp. nov., from S. Kirkcudbrightshire. Nat. size.
 Fig. 5 *b*. —————. The same, magnified;—the spines moderately decurved.
 Fig. 6. —————. A specimen much pressed laterally, so as to render the cells more oblique, and the spines more decurved. Magnified.
 Fig. 7 *a*. —————. A variety with less crowded cells, similarly, but more strongly compressed: the spines very much decurved. In this specimen, as well as the last, the impression of the base of the cells is marked by a transverse line. ♦Natural size.
 Fig. 7 *b*. —————. The same, magnified.
 Fig. 8 *a*. *Graptolites sagittarius*, Linn. A young specimen from Dumfriesshire. Natural size.
 Fig. 8 *b*. —————. The same, magnified: the cells occupy more than half the entire width.
 Fig. 8 *c*. —————. An older specimen, from the same locality. Natural size.
 Fig. 8 *d*. —————. The same, magnified: some of the cells bear spines on the lower edge of their mouths.
 Fig. 9 *a*. —————? (*G. latus*, Nicol). Magnified view of an obliquely pressed specimen, showing the oval mouths and transverse impressed line at the base of the cells.
 Fig. 9 *b*. —————. Scalariform impression of the same species, showing the mouths and the oval openings from the base of the cells into the common canal.
 Fig. 10. *Dithyrocaris? aptychoides*, sp. nov. Natural size. The valves are quite flat, and show the notch (*) at their upper angles.



Pterygotus problematicus. Upper Ludlow Shale. Hagley Park.

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Graptolites. &c. Silurian Shales, Dumfriesshire.