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XXXI.—On the British Desmidieæ

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15. *Bothriocephalus* . Large intestines of skate (*Raia Batis*).
 16. _____*. { Small intestines of little grebe (*Podiceps*
 minor).
 17. _____.. Intestines of arctic tern (*Sterna arctica*).
 18. _____.. { Large intestines of red-necked grebe (*Podiceps rubricollis*).

appears from the disposition of the ovaries, but I have never succeeded in detecting the bothrii upon the head; in fact this part is inclosed in a kind of tubercle which is found upon the peritoneal surface of the pyloric appendages (the body of the animal lying loose in the intestines), and I have drawn this part out to a very fine point, but have not been able to determine its characters. My friend Dr. Drummond has also found this species in abundance in cod taken in the neighbourhood of Belfast.

* In the intestines of the little grebe (*Podiceps minor*) I found several specimens of a *Bothriocephalus* which does not appear to have been described, and which seems to unite the genus *Ligula* with the *Bothriocephalus*. It belongs to the first division in Rudolphi's arrangement, *Inermes*, and to the subdivision *Dibothrii*. The length is from an inch and a half to two inches; colour when recent reddish yellow. The head is somewhat subsagittate; the bothrii, two in number, are placed, one upon the dorsal, the other upon the abdominal surface of this part; they are long, slightly elliptical, or in the form of a simple fissure, extending the whole length of the head and reaching into the articulation next it. There is no neck. The articulations are broad, rugose, and very short. In the centre of the posterior articulations the circular orifices of the ovaries are seen, from each of which a *lemniscus* projects, which is long and clavate.

XXXI.—*On the British Desmidiæ.* By JOHN RALFS, Esq.,
M.R.C.S., Penzance*.

[With a Plate.]

TETMEMORUS, n. g.

Frons simple, elongated, straight, cylindrical or subcylindrical, slightly constricted in the middle; segments emarginate at the end, but otherwise quite entire.

I have instituted this genus for the reception of two plants which are placed in *Closterium* by Meneghini, but do not well agree with the other species in that genus.

The fronds are elongated as in *Closterium*, from which, however, this genus may easily be distinguished by the emarginate ends; the same character and the elongated fronds will separate it from *Cosmarium*.

From *Euastrum*, with which it agrees in the emarginate extre-

* Read before the Botanical Society of Edinburgh, April 11, 1844.

mities, it differs in being cylindrical or nearly so, and in the segments being neither lobed nor sinuated; the fronds are also free from inflated protuberances.

Starch is found in both species.

1. *T. Brebissonii*. Segments in the front view with parallel sides, but in the lateral view attenuated; the ends without any projecting processes. *Closterium Brebissonii*, Mngh. Syn. Desmid. in *Linnaea* 1840, p. 236. *Closterium* — (sp. 9), Bailey, Amer. Bacil. in Amer. Journal of Science and Arts, vol. xli. no. 2. pl. 1. fig. 38.

Ashdown Forest, Warbleton, Henfield, &c., Sussex, and near Tunbridge Wells, *Mr. Jenner*; Dolgelley, Carmarthen and Penzance.

Fronds about six times longer than broad, with a slight constriction in the middle; the front view shows the lateral margins of the segments nearly straight, with rounded and emarginate ends. The lateral view is more constricted in the middle, and the segments are attenuated towards the end.

The endochrome is dark green, and there is a series of large globules down the middle in a single row, either straight or with some irregularity.

The fronds, when empty, are found to be minutely punctate, the puncta being arranged in longitudinal rows.

This species differs from the following one in having its front and lateral views unlike each other, and its puncta arranged in longitudinal lines.

PLATE VIII. fig. 1. *Tetmemorus Brebissonii*: *a*, front view; *b*, side view; *c*, empty frond; *d*, segment.

2. *T. granulatus*. Fronds tapering both in the front and lateral views, and ending in a colourless projecting lip-like process. *Closterium granulatum*, Breb. in Mngh. Synop. Desmid. p. 236.

In boggy pools, Ashdown Forest and Henfield, Sussex; bogs at Fisher's Castle near Tunbridge Wells, *Mr. Jenner*; Dolgelley and Penzance.

Fronds cylindrical, about six times as long as broad, very slightly constricted in the middle, fusiform. The extremities always have a colourless projecting lip-like process which extends beyond the notch.

The colouring matter is dark green, and a few large green globules are arranged in a longitudinal row down the middle.

The empty frond is minutely punctated; the puncta generally form one or two transverse lines in each segment near the central constriction, and in the other parts of the frond they are not in rows, but scattered.

Under a low power of the microscope this species much resembles the preceding; but it may always be distinguished by the front and lateral views being similar and only differing in the

Raffin & K. Jenner del.

Tetramorus.

J.D.C. Sowerby sculp.

terminal notch, which is not seen in the lateral view. There is also beyond the notch a remarkable lip-like projection which is wanting in *Tetmemorus Brebissonii*, and the puncta seen in its empty frond are not arranged in longitudinal rows.

PLATE VIII. fig. 2. *Tetmemorus granulatus*: *a*, front view; *b*, side view; *c*, empty frond; *d*, fronds conjugated; *e*, spore fully formed; *f*, spore separated from the segments; *g*, side view of conjugate fronds.

P.S.—Since the preceding was written I have met with this species in a conjugated state. The specimens were gathered near Dolgelly, and formed a mucous stratum on the moist soil.

The fronds were smaller than usual; I did not observe any in the first state of union, but it appears that after conjugation the segments of the fronds are separated by the formation of a large, quadrate, central cell, in which all the endochrome of both fronds is collected and the empty segments remain loosely attached to the corners of this cell. The endochrome at first fills the cell, large starch globules being scattered throughout the minutely granular substance, but at length it becomes a dense, round, homogeneous spore of a dark green colour which finally changes to an olive-brown. In this stage the segments of the original fronds fall off, leaving the quadrate cell inclosing the spore.

In the front view, as stated above, the cell is nearly square, the sides are concave, and the angles rounded and slightly produced. A lateral view shows that the cell and spore are both compressed.

This is the first opportunity I have had of examining any of this family in a conjugated state, and I have described it at some length because it appears to me a very interesting and important fact in support of their claim to belong to the vegetable kingdom, exhibiting in the present instance a striking similarity to the change which takes place during the formation of similar spores in *Staurocarpus* among the *Conjugatæ*.

In *Staurocarpus* after conjugation a subquadrate cell is formed, within which the endochrome is collected. The latter is at first of the same form as the cell, but in one species at least is at length condensed into a large, compact, globular spore, and in every species the cell with the contained spore finally separates entirely from the filaments with which it is connected. In this separate state I know no character by which to distinguish the spore of the *Tetmemorus* from one belonging to a species of *Staurocarpus*; and in both, the spore, when tested by the tincture of iodine, is found to be almost wholly composed of starch*.

* Examples of the shape of the cell in species of *Staurocarpus* may be seen in the plate illustrating Mr. Hassall's valuable papers on the Fresh-water Algæ.—Annals of Nat. Hist. vol. xii. pl. 7.

MICRASTERIAS, Ag. (*Meneghini*).

Fronds simple, plane, orbicular, deeply divided into two segments, each of which is lobed; the lobes are radiant and inciso-serrate.

The fronds are simple, circular, flat, divided nearly to the centre, so that the segments are united only by a narrow chord. The segments are semiorbicular and in close contact with each other along their entire breadth; each is deeply divided into lobes which are arranged in a radiant manner; each lobe is regularly and deeply cleft, and the margin is dentate.

The orbicular, plane, and deeply incised fronds will distinguish this from all the other genera in this family. In *Euastrum*, the only one with which it can be confounded, the fronds are generally oblong, and the lobes are not incised.

Starch granules are very evident in this genus. Young fronds differ so much in appearance from the full-grown plant, that they may be mistaken for another species.

As the plants to which Agardh affixed the name of *Micrasterias* are probably all included under the above description, I have followed Meneghini in retaining that name for this genus, especially as it seems to me that not one of Agardh's species is contained in the *Micrasterias* of Ehrenberg, who intended by it a very different genus, the *Pediastrum* of Meyen*.

1. *M. rotata*. Fronds smooth; lobes broadly cuneate, approximate, the end lobe emarginate, the others deeply incised, the divisions notched and dentate. *Micrasterias rota*, Mngh. Syn. Desmid. in Linnæa 1840, p. 215. *Echinella rotata*, Grev. in Hook. Br. Fl. vol. ii. p. 398 (1830). *Eutomia rotata*, Harv. Br. Alg. p. 187. *Euastrum rota*, Ehr. Infus. p. 167. tab. 12. fig. 1; Pritch. Infus. p. 195. figs. 121 to 123; Bailey, American Bacillaria, pl. 1. fig. 22 and fig. 24. *Micrasterias*, Ag. Bot. Zeit. 1827?

In freshwater pools, probably common. Sussex, near Southampton, &c., *Mr. Jenner*; Henfield, *Mr. Borrer*; frequent about Barmouth, *Rev. T. Salwey*; Dolgelley, Cwm Bychan, Carnarvon; Carmarthen, Swansea; Dartmoor and Penzance.

This plant is not uncommon, and frequently occurs in considerable quantities, and unmixed with other algæ.

The fronds are large, and appear to the naked eye like minute green dots; they are nearly circular; each segment is deeply divided into five lobes. The end lobe is the narrowest, and in the

* "Nomen a cl. Agardh propositum et perperam ab aliis Pediastris affixum, et cum novo illo Euastrum commutatum servandum."—Menegh. Syn. Desmid. in Linnæa 1840, p. 215.

mature plant appears more turgid than the rest of the segment ; the other lobes are deeply bifid. All the lobes, as well as the divisions of each lobe, are cuneate ; all the incisions have their sides approximate and point towards the centre of the frond. The margin of the frond is dentated and is frequently colourless.

The young frond differs considerably from the adult form : its terminal lobes are very broad with convex and entire margins, whereas the other portions are dentate or spinulose-dentate at their margins ; the lobes not being yet divided there are no incisions, or very short ones, whilst a slight notch often points out the future clefts ; the younger the frond the more entire is its margin.

As in this plant the portion connecting the two segments is very narrow, the mode of increase by division is well shown. The central connecting portion elongates and becomes converted into two colourless rounded lobules, which increase in size, gradually acquire colour, and finally become lobed and miniature representations of the segments of the frond, and then two new fronds are formed by separation.

The new segments frequently acquire considerable size before they become lobed. As two fronds are formed by separation before the new segments are fully grown, specimens often occur in which the segments differ in size, and the lobes of the smaller one are sometimes not fully formed.

PLATE VI. fig. 1. *Micrasterias rotata* : a, full-grown fronds ; b, young fronds ; c, mode of increase.

Micrasterias apiculata, Mngh., which differs from this species in having its surface furnished with spines, has not been detected in this country.

2. *M. Melitensis*, Mngh. Frond smooth, all the lobes deeply bifid ; the divisions linear and bidentate at the extremity ; both the lobes and their divisions are divergent. Mngh. *l. c.* p. 216. *Euastrum Crux Melitensis*, Ehr. Infus. p. 162. tab. 12. fig. 3 ; Pritch. Infus. p. 196. fig. 124 ; Bailey, *l. c.* fig. 23 and fig. 29, young.

Amongst *Diatoma fenestratum* in a small pool a little below the outlet of Llyn Gwernan near Dolgelley : very rare.

This, which is a very beautiful plant, is much smaller than *Micrasterias rotata* ; the segments are deeply divided into five nearly equal lobes which diverge from each other, and are all deeply bipartite ; their divisions are linear, bidentate at the apex and also divergent.

The colouring matter is bright green and confined to the centre of the frond ; the linear divisions of the lobes being colourless.

I have not seen the young fronds of this species, but their

Micrasterias.

Euastrium.

figure in Ehrenberg shows a difference from the perfect plant so much greater than in *Micrasterias rotata*, that it looks like a distinct species, and is in fact so considered in the 'American Bacillariæ.'

PLATE VI. fig. 2. *Micrasterias Melitensis*: perfect frond.

XXXII.—On the genus *Xiphophora*, and, in connexion with it, Observations on this question: Do we find in the Fucaceæ the two Modes of Propagation which we observe in the Florideæ? By Dr. MONTAGNE*.

Xiphophora, Montgn., nov. gen.

Frons sterilis, ex qua surgit fertilis (seu receptaculum), dichotoma eaque brevior, compressa, flexuosa (en zigzag) apice truncata. Pars maxima frondis in receptaculum planum, elongatum, dichotomum, papulosum, olivaceo-nigrum, apicibus incurvis ensiformibus insigne, abiens. Conceptacula immersa, per totam frondem fertilem sparsa, globosa, poro pertusa, intus nucleum dimorphum foventia; in altero autem observantur sporæ obovatæ, luteo-brunnæ, limbo hyalino cinctæ, e cellulis parietalibus abortæ, paraphysibus gracilibus articulatis simplicibus concomitatæ; in altero vero fila adsunt ramosa, articulata, articulo extremo gemmam oblongam, granulosa repletam materie, tandem liberam et perisporio, ut sporæ genuinæ, vestitam includente. Habitus *Fuci*, at receptaculum *Himanthaliæ*. Nomen e *ξίφος*, ensis, et *φέρω*, fero compositum. *Prodr. nov. Phycæar. in itin. ad polum antarct.* p. 12. t. 7. f. 1.

Xiphophora Billardieri, Montgn., l. c.

Fucus gladius, Labill., Pl. Nov. Holl. t. 256.

Obs.—M. Hombron, principal surgeon of the *Astrolabe*, was the first to find the fructification of this Alga. Previous to this discovery, the plant from its habit had been ranked among the species of the genus *Fucus*, where I would have left it, had it not previously happened that the *Fucus Loreus* was separated on grounds which ought to have the same value in the case of *F. gladius*, Labill. In all the known species of *Fucus*, the receptacle, elliptical or lanceolate, terminates the frond or the branches, from which it is altogether distinct. Here we have, as in *Himanthalia*, a frond almost entirely converted into a receptacle; and in order to complete the resemblance, or at least the analogy, instead of a sort of fungiform body from which the receptacle originates, we find a frond very short, dichotomous, and remark-

* From the *Annales des Sciences Naturelles* for October 1842. Translated and communicated by Dr. Dickie.