

43. DESCRIPTION of a NEW GENUS of MADREPORARIA from the SUTTON STONE of SOUTH WALES. By ROBERT F. TOMES, Esq., F.G.S. (Read June 21st, 1893.)

[PLATE XX.]

IN vol. xlii. (1886) of this Journal is a critical and detailed description of a coral from the Sutton Stone of South Wales, which is there described as *Astrocœnia gibbosa*, Dunc. The paper in which it appears is, I need hardly say, by the late Prof. Duncan. But the specimen there described is not the type of the species, and, indeed, I do not know whether it had ever been specifically determined before the publication of the paper above alluded to; certainly there is no mention of it in the pages of the volume of the Palæontographical Society, in which *Astrocœnia gibbosa* was first characterized. It was collected by E. B. Tawney, is now in the Museum of the Geological Society, and after having been cut through horizontally and polished, was described by Prof. Duncan in the paper above mentioned.

A very hasty examination of the polished surface figured by Prof. Duncan sufficed to assure me that there were characters which neither he nor I had attributed to that or any other species of coral from the Glamorganshire Conglomerate. Some of the elongated or double calices presented much the appearance of fissiparous division, and I was anxious to examine them by means of thin sections and transmitted light, and at the same time to learn something of the structure of another part, the (apparently) much thickened walls. In accordance with my wish, the Society had a section made and submitted to me for examination. It consists of a slice taken horizontally from the bottom of the specimen, the upper surface, which was figured by Prof. Duncan, being left untouched. This section proves to be nearly all that could be desired, and exhibits structures which are directly at variance with all former determinations of the generic relationship. The corallites having more or less of a radiating arrangement, are cut through at all angles, and consequently give sections which are transverse, oblique, and even longitudinal.

It is always unsatisfactory to have to found a genus on a single species, however strongly marked its characters may be, on account of the difficulty of drawing the line between those which are generic and those which are merely specific; and still less satisfactory is it to do so when only a single specimen is available. I have long hesitated to make use of the only known specimen for such a purpose, but fortunately two other specimens from the same locality, that is, from the Sutton Stone of Glamorganshire, have been discovered. One of these is in the Museum of Practical Geology in Jermyn Street, and is attached to the same tablet as the specimen of *Astrocœnia gibbosa* figured by Prof. Duncan in pl. v. fig. 2 of the fourth part of his 'Supplement to the History of British Fossil Corals.' It was presented with the figured specimen, which is quite distinct from it,

both generically and specifically, by the Rev. H. H. Winwood, and is the larger specimen on the tablet. One part is dark in colour, having been discoloured by exposure to the elements, while the other part appears to have been freed from the matrix by the collector, and is quite light in colour. On the dark and weathered portion there is a distinct and raised space in the triangular interval where three calices meet, on which are indications of septa, being the commencement of a calice. This is so placed between the large calices, and so much above their level, as to leave no doubt that extra-calicular gemmation took place just as in *Stylocœnia* and *Bathycœnia*. There are several other small calices on the light-coloured part of the corallum similarly placed with respect to the larger ones, which are also very striking and conclusive, and are evidently the result of gemmation. Elongated and undoubtedly fissiparous calices also appear in places on the corallum, but they do not show division actually taking place so clearly as do some similar ones in another specimen to which I shall presently refer. Nowhere on this specimen is there the faintest indication of a calicular wall, but there is obvious continuity of the septa between the calices; indeed, there is in this specimen a remarkable departure from any of the characters hitherto assigned to any of the Sutton Stone Madreporaria.

The remaining recognized specimen was taken by me from the Sutton Stone in 1883, but has remained undetermined until the present time. It is small, barely 1 inch in diameter, but, being freed from the matrix, exhibits the form of the corallum with certainty. It may be described as tuber-shaped, with some gibbosities, and was attached by a small space on one of the longer sides. Excepting that it has a great number of small round calices scattered between the larger ones, undoubtedly the consequence of budding, and that it exhibits fissiparous increase of the calices at one place, it is less instructive than the other.

I now come to the examination of the thin section, taken from the specimen in the Museum of the Geological Society, having the polished surface which was figured by Prof. Duncan. This specimen, like the other two, has small rounded calices in the intervals between the larger and more angular ones, which are highly suggestive of extra-calicular gemmation. The elongated or double calices, figured by Prof. Duncan as instances of inter-calicular gemmation and as affording evidence of Astrocœnian relationship, are undoubtedly the result of fissiparous increase. Of the apparently extremely thick walls but little could be determined until they were examined by transmitted light; neither could the nature of the ornamentation on the sides of the septa, shown by fig. 9<sup>1</sup> of Prof. Duncan's plate, be any better understood. When, however, these parts were seen in thin section, the nature of both became apparent.

I will now proceed to give more in detail the results of my examination of the section just mentioned, without which the real

<sup>1</sup> Quart. Journ. Geol. Soc. vol. xlii. (1886) pl. viii.

affinities of this curious form would have probably remained in great obscurity. The thick walls, as such, have entirely disappeared, and no wall either thick or thin is present, the septa of one calice being continuous with those of another, just as in *Thamnastræa* and *Clausastræa*. (See Pl. XX., fig. 1.)

The ornamentation of the sides of the septa is resolved into pseudo-synapticulæ, having the character of those observed in the genus *Clausastræa*.

Several elongated calices furnish unquestionable proof that fissiparity took place, the operation being clearly observable in a more or less advanced state. (See Pl. XX., fig. 2.)

There are also a few calices which, though almost full-sized, are so nearly circular, and which encroach so visibly on the others, that they can only have been caused by extra-calicular budding. (See Pl. XX., fig. 6.)

The septa and their connecting costæ consist of a single trabecule, as in *Astræomorpha*.

The septal costæ are much swollen, and, coming into contact with each other laterally, are fused together between the calices, where there would be a wall in the *Astræidæ*, and the swollen part of each has a central portion, which, being more dense, is opaque when seen by transmitted light, and is consequently quite dark in thin section. This lateral fusing of the septal costæ gives solidity and strength to the corallum, and in reality takes the place of a wall.

All parts of the septal apparatus, including the columella, are composed of lines of granules passing upward and outward, very much like the webs of a feather.

There are a few weak and straight dissepiments between the septa.

The pseudo-synapticulæ are numerous, have little prominence, and appear on the sides of the septa as continuous horizontal ledges, greatly resembling those of *Clausastræa*. (See Pl. XX., fig. 4.) They are formed by the continuation outward at regular intervals of the lines of granules of which the septa are formed, and were mistaken by Prof. Duncan for mere lines of ornamentation.

The columella is large and formed by lines of granules passing upward and outward; into it all the primary septa pass, and blend without any evidence of the point of union.

The full number of primary septa in a large calice is ten.

I name and define the genus of which the present species is the sole representative as follows:—

#### Genus *STELIDIOSERIS*, gen. nov.<sup>1</sup>

Corallum compact, small, globose, or tuber-shaped, the corallites radiating more or less regularly from a basal point of attachment. There is no wall between the corallites, the septa being continuous between them. The septa are imperforate, each consisting of a single

<sup>1</sup> [I had originally selected the name *Styloseris*; but after the paper had been read, it was pointed out to me that the name was pre-occupied, and I have therefore substituted *Stelidioseris* for it.—July 15th, 1893.]

trabecule. They have pseudo-synapticulæ which are numerous, have little prominence, and closely resemble those of *Clausastræa*. The dissepiments are distant, straight, or oblique, and feebly developed. Columella large, and the primary septa fused into it. Increase takes place by fissiparity and by gemmation between the corallites, as in *Stylocœnia* and *Bathycœnia*.

In neither of the specimens examined are the external characters of the calices determinable. Whether the edges of the septa were denticulate, and whether the columella was prominent or the reverse, are particulars which can only be known when specimens having the external characters better preserved have been examined.

The genus will take its place near to *Clausastræa*, with which it agrees pretty closely, excepting in the very important particular of possessing a well-developed columella, and having both modes of increase, *i. e.* fissiparity and gemmation. In the latter particulars it differs from all the genera to which it is in any way related.

Although the present is obviously distinct as a species from that described as *Astrocœnia gibbosa* by the late Prof. Duncan, I retain the same specific name, and give the following definition :—

STELIDIOSERIS GIBBOSA, sp. nov.

*Astrocœnia gibbosa*, Duncan, Quart. Journ. Geol. Soc. vol. xlii. (1886) p. 101, pl. viii., not *A. gibbosa* of 'Suppl. to Brit. Foss. Corals.'

The septa are rather stout, straight, from twenty to thirty in number, of which ten pass into the columella, and all the others are more or less rudimentary. The inside or openings of the corallites are more or less polygonal, but with the angles so much rounded that they are often irregularly ovoid or even circular. The lateral fusing into each other of the septal costæ in the mural region varies from one-sixth of the diameter of the remaining opening in the corallite to nearly its whole diameter.

Diameter of a large calice =  $\frac{3}{2}$  inch.

*Hab.* The Sutton Stone of Glamorganshire.

EXPLANATION OF PLATE XX.

- Fig. 1. *Stelidioseris gibbosa*. A horizontal section of some calices magnified four times, and seen by transmitted light. The dark markings between the calices in this figure and in figs. 2 & 4 are due to greater opacity, and they represent the cycles of septa, which, however, are difficult to enumerate.
- Fig. 2. *Stelidioseris gibbosa*. Two contiguous corallites, cut through horizontally and seen by transmitted light. They show fissiparous increase very clearly, and are magnified eight times.
- Fig. 3. *Astrocœnia tourtiensis*, Bölsche. A horizontal section of some corallites seen by transmitted light, showing the thin rudimentary wall and the great development of stereoplasm within the corallites, reducing their diameter by nearly one half, and from a polygonal to a circular form. Magnified eight times.
- Fig. 4. *Stelidioseris gibbosa*. A corallite cut through very obliquely, and seen by transmitted light. In the fragments of septa on the right and left-hand of the figure the pseudo-synapticulæ appear as horizontal lines, as in the genus *Clausastræa*. The septa shown at the top and bottom

of the figure are cut though almost longitudinally, and in a manner to show their thickness and the prominence of the pseudo-synapticulæ. The columella exhibits the radiate arrangement of the lines of granules of which it is composed. The nature and frequency of the dissepiments are also shown in the figure. Magnified six times.

Fig. 5. *Astrocœnia ramosa*. A magnified representation of a section taken horizontally near the base, showing the central corallites with their well-defined and closely-attached walls, free from any intervening tissue, and showing also the addition of stereoplasm, which increases in quantity as the corallites approach the outside of the corallum. Magnified three times. A transverse section of these corallites taken near the calice would present much the same appearance as that shown by fig. 3 in pl. viii. of Reuss's fine work on Cretaceous Madreporaria.

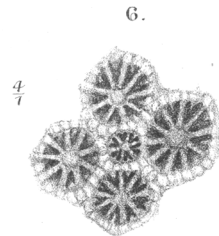
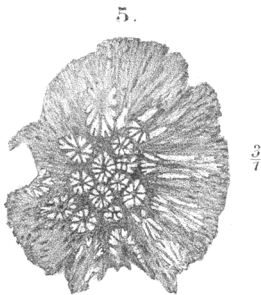
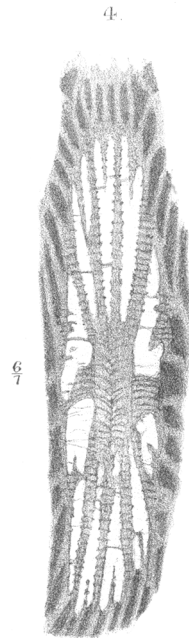
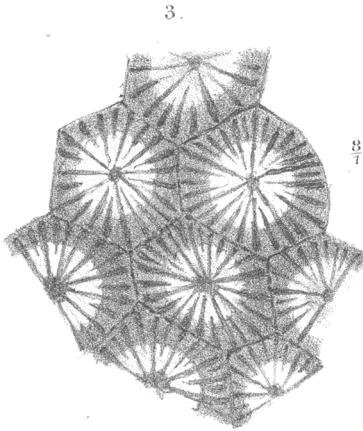
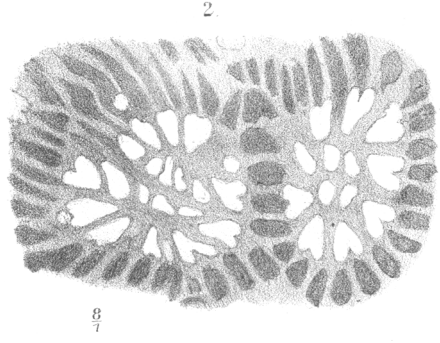
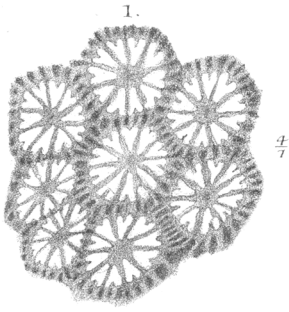
Fig. 6. *Stelidioseris gibbosa*. A portion of the upper surface, having a small gemmiparous calice between four of ordinary size, showing the mode of increase by budding. Magnified four times.

#### DISCUSSION (ON THE TWO PRECEDING PAPERS).

Mr. ETHERIDGE alluded to the difficulty attached to the better determination of the many British species of the genus *Astrocœnia*. No less than twelve forms are recognized as occurring in the Lower Lias of the Sutton Stone, near Brocastle, Glamorganshire. The affinities of the *Astrocœniæ* given in Mr. Tomes's first paper constitute an important addition to the literature of the genus and its distribution: six species are critically examined. The new genus *Styloseris* [*Stelidioseris*] proposed by Mr. Tomes, if published, would clear up certain anomalies respecting the *Astrocœniæ*. The speaker did not doubt that the critical research bestowed upon *Styloseris* [*Stelidioseris*], with its affinities and differences from *Astrocœnia*, would be accepted on close examination. The paper would facilitate the better classification and structure of this group of the *Astræidæ*.

Dr. G. J. HINDE appreciated the efforts of the Author to determine the real characters of the genus *Astrocœnia*, which could only be ascertained from a study of the typical species from the Cretaceous strata of Gosau. Much of the difference of opinion as to the nature and systematic position of the corals from the Lower Lias of Sutton which had been assigned by the late Prof. Duncan to *Astrocœnia*, Edwards and Haime, and subsequently by Mr. Tomes to the genus *Stylostrœa*, Fromentel, arose from the fact that microscopic sections of these forms had not been made.

It was a striking commentary on the importance of microscopic sections that the Author had now selected as the type of his new genus, *Styloseris* [*Stelidioseris*], the identical specimen which had been previously chosen by Prof. Duncan to illustrate the specific characters and to justify the position in the genus *Astrocœnia* in which he had placed it.



R.F. Tomes del. F.H. Michael lith.

Mintern Bros. imp.

ASTROCCENIA AND STELIDIOSERIS.