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# THE OPERCULATE MADREPORARIA RUGOSA OF NEW SOUTH WALES.

By R. Etheridge, Junr.

(Plate xxx.)

The first mention of an Australian Operculate Rugose Coral, was, I believe, made by the late Rev. W. B. Clarke, F.R.S., in the third edition of his "Sedimentary Formations of New South Wales,"* wherein the discovery of *Calceola* is mentioned in the supposed Devonian rocks of Mount Froome, Co. Phillip. In the fourth edition of the same publication† this locality is again referred to, and *Calceola* is also said to have been found "along the Yass and Murrumbidgee Rivers." The Clarke specimens are not unfortunately, now extant for reference but previous to the destruction of the collection, the late Prof. de Koninck described from Rock-Flat Creek (probably near Cooma) a *Calceola*-like Coral, termed by him *Rhizophyllum interpunctatum*,‡ and it is more than probable that the fossil, formerly referred to by Clarke as *Calceola*, to which it bears a very strong resemblance on a macroscopic examination only, is a species of *Rhizophyllum*. The specimen described very briefly by De Koninck is said to be a semi-cone shaped cast, bearing on the curved surface fine granulated radiating ridges. The flat side is only provided with ridges towards the lower part, and they are smooth, whilst in the middle line is the impression of the well developed large median septum.

In 1880 I described another Operculate Rugose Coral from near Yass, sent to me by Prof. A. Liversidge, F.R.S., and possessing a similar general resemblance to *Calceola*. This I also referred to Lindström's genus *Rhizophyllum* as *R. australe*,§ pointing out, however, that "one of the three specimens is more *Calceola*-like than the other two, which again resemble *Rhizophyllum* to a greater extent."

I am now indebted to Messrs. J. A. Wall and J. Mitchell for an opportunity of examining a much larger series of these corals from Yass and Silverdale, and they have been good enough to

* Mines and Min. Statistics of N. S. Wales (N. S. Wales Intercol. and Philadelphia Internat. Exhib., 8vo., Sydney, 1875—by Authority), 1875, p. 159.

† Remarks on the Sedimentary Formations of New South Wales. Fourth Edition (8vo., Sydney, 1878—by Authority), p. 16.

‡ Foss. Pal. Nouv. Galles du Sud, Pt. 1, 1876, p. 61.

§ Journ. R. Soc. N. S. Wales for 1880 (1881), xiv., p. 248.

present specimens to the Museum Collection. A careful study of these induces me to believe that under the name of *R. australe*, I included two species as foreshadowed in the above quotation. In other words, this name must be restricted to Fig. 7 of the plate cited from the "Journal of the Royal Society of N. S. Wales," whilst Fig. 8 of the same reference will require separation under a distinct name, and will be now described as *Rhizophyllum interpunctatum*, De Koninck.

Operculate Rugose Corals are also known to me from Queensland. Mr. George Sweet, F.G.S., collected one at Reid's Gap, apparently differing from either of the preceding, and I saw rather indifferently preserved examples of a small form in the Geological Survey Museum at Townsville. These will be ultimately described elsewhere.

The following are the descriptions of the two N.S.Wales species:

Genus RHIZOPHYLLUM, *Lindström*, 1865.

(K. Vet. Akad. Forhandl., 1865, No. 5, p. 287.)

Rhizophyllum australe, *Etheridge, fil.*

(Pl. xxx., figs. 1 – 6.)

*Rhizophyllum australe*, Etheridge, fil., Journ. R. Soc. N.S.Wales for 1880 [1881], xiv., p. 248, pl., f. 7 (2 figs.), *non* fig. 8.

*Rhizophyllum australe* (pars), Lindström, Bihang K. Vet. Akad. Handl. Stockholm, 1882, vii. No. 4, p. 29.

*Sp. Char.*—Corallum elongately-pyramidal, more or less curved, not greatly expanded above, acutely pointed or truncated below, the curvature always towards the convex side; lateral angles rounded and obtuse, when pointed the apex flattened from before backwards, not laterally; section roughly semicircular. Dorsal surface moderately convex in the middle, rather flattened at the sides; ventral surface quite flat transversely, but well curved longitudinally. Calice, in depth equal to about one-third the height of the corallum; edge or margin horizontal or slightly oblique; infilling vesicles very numerous, but small; ventral margin or hinge line sharp and bevelled inwards, a few indistinct crenulations representing septa; cardinal septum not visible, counter septum prominent, distinct, in a very shallow fossula. Operculum semicircular, thick. Epitheca bearing sub-imbricating laminæ and fine transverse ridges, which slightly crenulate the lateral angles; exothecal outgrowths apparently absent.

*Obs.*—In my first description of *R. australe*, the septal characters were derived from the structure of the conical form, now described as *R. interpunctatum*. On clearing out the calice of the present species, I find that with the exception of the counter septum the septa along the ventral margin are confined to a few obscure crenulations, and that so far as can be seen there is no

outward manifestation in the calice of the cardinal septum. The vesicles filling the former extend quite up to its margin.

The position of the counter septum is indicated on the flat ventral side by the slightest appearance of a ridge, causing an almost imperceptible angularity to the surface. The same is even the case on the dorsal, or convex side, indicating the position of the cardinal septum, although it is not visible in the calice. But when the epitheca is removed by weathering the counter septum stands out as a thickened ridge extending from the hinge line to the basal apex. This is remarkably well shown in a fractured base, where also the vesicular tissue is apparent, but of a much larger mesh than in the higher portion of the corallum; and again the indistinct septa, but the cardinal septum is not to be seen.

One specimen has a partially preserved operculum *in situ*, sufficient remaining to show that it had a similar method of articulation to that described by Dr. Lindström on the bottom valve of *Goniophyllum*, and the single valve of *Calceola*.* Neither the nucleus nor the sculpture are preserved.

*Rhizophyllum australe* appears to have for its nearest ally *R. elongatum*, Lindström, from the Upper Silurian of Gotland and China.

*Locality and Horizon.*—Hatton's Corner, near Yass; Upper Silurian, probably Wenlock (J. A. Wall).

*Collections.*—Australian Museum, and J. A. Wall.

### Rhizophyllum interpunctatum, *De Koninck.*

(Pl. xxx., figs. 7 – 15.)

*Rhizophyllum interpunctatum*, De Koninck, Foss. Pal. Nouv. Galles du Sud, Pt. 1, 1876, p. 61, t. 1, f. 10.

*Rhizophyllum australe*, Etheridge, fil., Journ. R. Soc. N.S. Wales for 1880 [1881], xiv., pl., f. 8 (2 figs.), *non* fig. 7.

*Rhizophyllum australe* (pars), Lindström, Bihang K. Vet. Akad. Handl. Stockholm, 1882, vii. No. 4, p. 29.

*Sp. Char.*—Corallum semi-conate, curved, short, moderately expanded above, acutely pointed below, generally *Calceola*-like; section semi-circular; lateral angles generally sharp, but occasionally rounded and obtuse; dorsal and ventral surfaces as in the last species. Calice shallow, highly vesicular, the vesicles large; margin more or less oblique; ventral margin sharp, bevelled inwards, and bearing about twenty vertical, granulated septa, and at the lateral angles, and on the dorsal side are about twelve fine and highly granulated curved septa, which all descend into the calice beneath the vesicles; cardinal septum not apparent; counter septum large, projecting forwards as a triangular knob, placed in a shallow fossula. Operculum unknown. Epitheca

* Geol. Mag., 1871, viii., p. 124.

coarsly wrinkled and striate, slightly imbricately laminate, crenulating the lateral angles. Exothecal outgrowths not observed.

*Obs.*—The principal characters of *R. interpunctatum* are its remarkable *Calceola*-like outline, prominent counter septum, and highly and coarsely vesicular structure. The relation in which *R. interpunctatum* stands with regard to *R. australe* has already been commented on, but the form, and more highly developed septa will tend to separate the species.

In outline *R. interpunctatum* approaches nearest to *Rhizophyllum gotlandicum*, F. Roemer, * and *R. tennesseense*, F. Roemer, † but it is a smaller species, and the longitudinal curve of the corallum is proportionately greater in relation to its size.

The septa in *R. interpunctatum*, unlike those of *Goniophyllum pyramidale*, are completely hidden by the highly developed vesicular tissue, instead of passing over the latter and disappearing at the bottom of the calice. Mr. Mitchell's specimens are in the form of internal casts of the calice, with the vesicular tissue removed, precisely in the same condition as De Koninck's were. The septa on the ventral side are vertical and increase in length from the lateral angles towards the counter septum. They are very finely granulated, and when in the least degree worn, with their angular inner sides rubbed off, appear double. No doubt Lindström's suggestion that each is composed of two laminæ satisfactorily accounts for this. In counting the septa this feature must be taken careful note of, otherwise the total number will be accepted as exactly double. At the lateral angles and on the dorsal side of the calice the septa are represented by minutely granulated, very fine ridges, the granules in a single row, conforming in the curvature to the outline of the corallum.

*Locality and Horizon.*—Hatton's Corner, near Yass (J. A. Wall), Silverdale (J. Mitchell); Upper Silurian, probably Wenlock.

*Collections.*—Australian Museum, J. A. Wall, and J. Mitchell.

*General Remarks.*—Both *Rhizophyllum australe* and *R. interpunctatum* agree with the genus *Rhizophyllum*, rather than *Calceola*, in the highly and openly vesicular nature of the corallum. On the other hand, the total apparent absence of exothecal structures in the form of anchoring stolons from the flattened under surface show a departure towards the last named genus, in which there is no trace of them. The arrangement of the vesicular tissue of the corallum is precisely similar in both our species to that seen in *Goniophyllum*—infundibuliform layers, with the convexities of the vesicles directed upwards and inwards. This structure is particularly well shown in one of Mr. Wall's specimens of *R. interpunctatum* (Pl. xxx., Fig. 7), from which the epitheca has been removed by weathering. It is also apparent

* Lindström, Bihang K. Vet. Akad. Handl. Stockholm, 1882, vii. No. 4, t. 3, f. 4.

† Sil. Fauna Westl. Tennessee, 1860, p. 77, t. 5, f. 1.

that along a line answering to the position of the cardinal septum, the corallum is split, and the ends of these layers are turned or tucked inwards, towards the interior of the visceral chamber. In another example there is a similar incision on the ventral face, answering to the counter septum, thus separating the corallum as it were into two triangular halves. A similar division is sometimes visible in *Goniophyllum pyramidale*,* and it is also shown in Bayle's figure of *Rhizophyllum gervillei*,† on the ventral face, although in this instance the epitheca seems to be preserved. On the other hand I have failed to detect any division along the lateral angles as described by Lindström in the calice of *Goniophyllum*,‡ separating the corallum in that genus into four portions. Both in *R. australe* and *R. interpunctatum*, when epithecate, the above incisions, as previously mentioned, are replaced by a faint angulation or ridging of the surface, but this does not approach anything like the definite rib seen on Lindström's beautiful figure of *Rhizophyllum gothlandicum*.§

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## NOTES ON THE STRUCTURE OF *PEDIONOMUS TORQUATUS*, WITH REGARD TO ITS SYSTEMATIC POSITION.

By Hans Gadow, Ph.D., M.A.,

Strickland Curator and Lecturer on the advanced Morphology of Vertebrata in the University of Cambridge.

The Trustees of the Australian Museum have, besides many other valuable birds forwarded through the Curator, Dr. Ramsay, to the Cambridge Museum of Zoology, sent two well preserved spirit specimens of *Pedionomus torquatus*, and Dr. Ramsay has more than once expressed the wish that I should determine the affinities of this peculiar bird. Although I have much pleasure in making the following communication, I do so with some reluctance, because of the incomplete state of my investigations. Two intact specimens of *Pedionomus* would be of course sufficient for an extensive and amply illustrated monograph, if such were desirable,

* Lindström, Bihang K. Vet. Akad. Handl. Stockholm, 1882, vii. No. 4, t. 5, f. 1.

† Expl. Carte Géol. France, 1878, iv. Atlas, t. 17, f. 13.

‡ Geol. Mag., 1866, iii. p. 358.

* Bihang K. Vet. Akad. Handl. Stockholm, 1882, vii. No. 4, t. 3, f. 4.

## DESCRIPTION OF PLATE XXX.

RHIZOPHYLLUM AUSTRALE, *Etheridge, fil.*

Fig. 1. The corallum, dorsal view, × 2.

„ 2. „ ventral view, × 2.

„ 3. „ lateral view, × 2.

„ 4. Remains of an operculum, seen from above, × 2.

„ 5. The corallum lateral view, displaying the vesicular tissue, × 2.

„ 6. Section of the apex, showing the septa, cardinal septum and vesicular tissue, × 3.

RHIZOPHYLLUM INTERPUNCTATUM, *De Koninck.*

Fig. 7. The corallum, dorsal view, with the epitheca removed, displaying the infundibuliform layers of vesicular tissue, × 2.

„ 8. „ ventral view, × 2.

„ 9. „ lateral view, × 2.

„ 10. The calice, filled with vesicular tissue, × 2.

„ 11. Another calice, with the counter septum and worn septa exposed on the ventral wall, × 2.

„ 12. The corallum, ventral view, showing the position of the counter septum, and transverse bands of growth, × 2.

„ 13. A similar view, × 2.

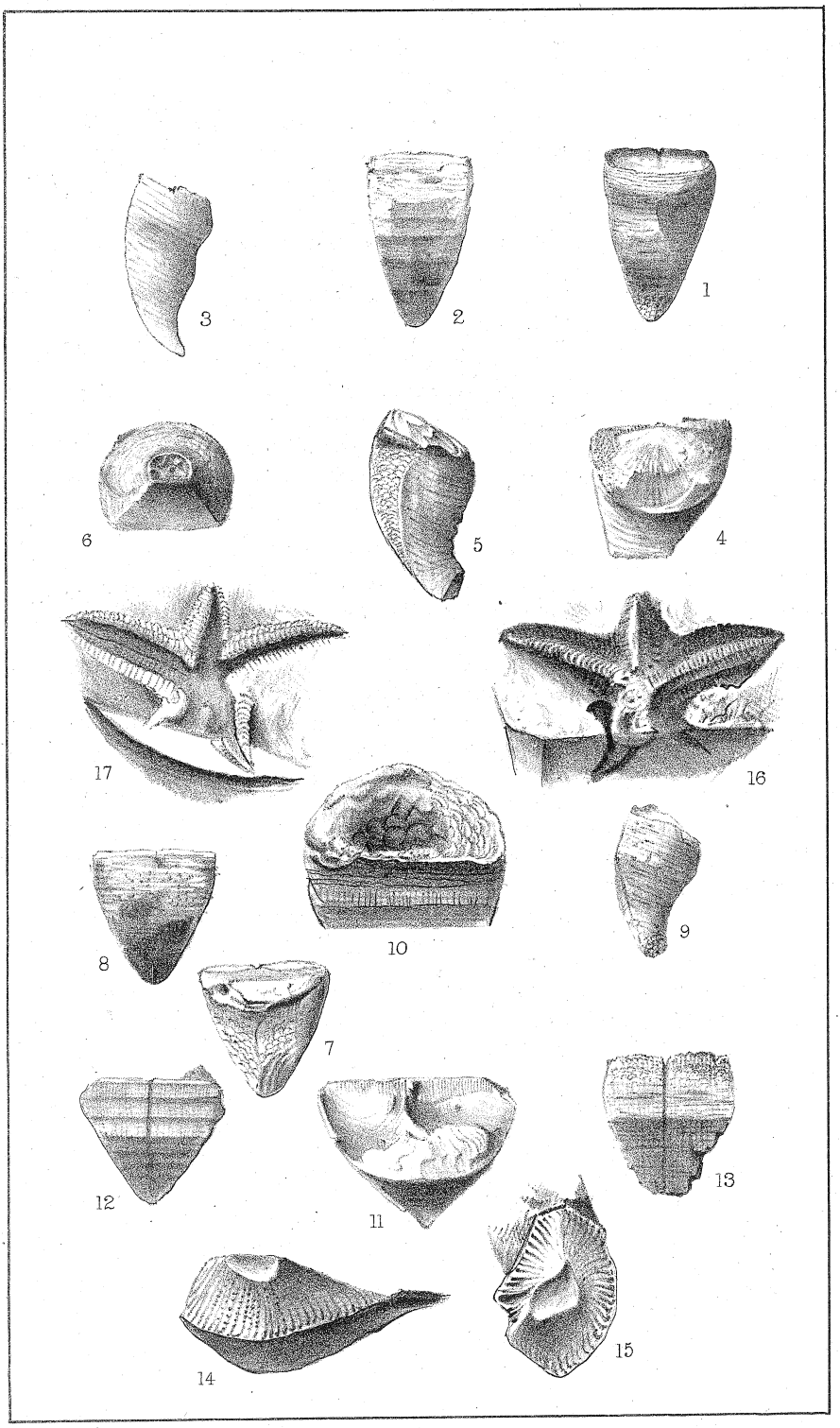
„ 14. Internal cast of the calice, ventral side, with the granulated entire septa, × 2.

„ 15. The same seen from below, showing both the dorsal and ventra septa.

PALÆASTER MERIDIONALIS, *Eth. fil.*

„ 16. Impression of the actinial surface, × 2.

„ 17. Mould taken from specimen, × 2.




G. H. BARROW, del.