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STUDIES ON AUSTRALIAN BRYOZOA.

No. 2[1].

BY

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(Pl. xlvi and Fig. 1.)

FURTHER STUDIES ON MEMBERS OF THE GENUS CONESCHARELLINA.

CONESCHARELLINA CRASSA (*Tenison-Woods*).

Lunulites (*Cupularia*) *crassa* Tenison-Woods, Trans. Proc. Roy. Soc. S. Austr., iii, 1880 (1879-80), p. 5, pl. 1, figs. 1a-c.

Bipora crassa Whitelegge, Proc. Linn. Soc. N.S. Wales, (2), ii, 1887, p. 343.

Lunulites crassa Jelly, Syn. Cat. Rec. Marine Bryozoa, 1889, p. 140 (synonymy).

Bipora crassa Kirkpatrick, Sci. Proc. Roy. Dublin Soc., vi, pt. x, 1890, pp. 612, 622, pl. xvii, fig. 5.

Conescharellina crassa Livingstone, Rec. Austr. Mus., xiv, 3, 1924, p. 212.

Like its allies, this species has been referred to many genera, and parts of its structure have been misinterpreted by previous authors. The large pores situated far above the peristomial apertures, and which I prove to be filament pores, have been mistaken for vibracular cells by Tenison-Woods; the same pores were obviously mistaken by Whitelegge for the small special pores, characteristic of the genus, and which are usually found situated just above the peristomial apertures. The type specimens of *Lunulites crassa* Ten. Wds. are housed in the Macleay Museum at the University of Sydney, and I have been able to examine them critically in association with a worn specimen from Murray Island, Torres Strait, and a series of fresh specimens from off the coast of New South Wales. The special pore is present in all, but is clearly seen *within* the distal border of the peristomial aperture, a unique position which apparently distinguishes this species from all others of the genus.

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[1] For No. 1. See Rec. Austr. Mus., xiv, 3, 1924.

Its unusual situation evidently caused Whitelegge to misinterpret its real nature, and that which he believed to be the special pore characteristic of the genus *Conescharellina* was another into which the base of a long filamentous process was inserted. This last evidently functions as an organ of attachment, and can be seen *in situ* in freshly preserved examples, but is so delicate that it is very easily dislodged when the specimen is handled.

Tenison-Woods' figure of *C. crassa* is a little misleading, as he has shown the zooecia and filament pores (called in his paper "vibracular pores") to be too regular and too close together in relation to their size. The shape of the true zooecial aperture, however, is correct.

Revised description.—Zoarium solid, roundly conical and somewhat depressed; the whole covered by a thin transparent membrane. The zoarium between the peristomial apertures is covered by low calcareous elevations with corresponding depressions and irregularities occurring mostly in the neighbourhood of the apex. These are supplemented by minute pores unevenly distributed over the surface. Zooecia undefined, their apertures and peristomes serving to indicate only approximately their position; the arrangement of the zooecia is in regular linear series.

The zooecial aperture is deeply sunk, pyriform in shape, and with a well defined sinus in its proximal border. The operculum is yellowish and chitinised, fitting perfectly into the aperture and sinus. In general appearance the operculum much resembles that of *C. anguloporą*, but it is considerably wider[2].

The peristome is greatly produced at the sides, much as in *C. angulopora,* and on zooecia near the edge of the colony it is prolonged into a tubular structure. Both the normal zooecia and the growing zooecia on the edge of the colony have slit-like peristomial apertures which are much narrower distally than proximally, though the shape of the latter is subject to slight variation.

The special pore is situated above and outside the zooecial aperture, but directly within the narrow distal portion of the peristomial aperture. In some zooecia it is hardly discernible, while in others on the same colony its presence is unmistakable. It extends downwards as a tube from the top of the peristome, through the peristomial aperture, and towards the zooecial aperture. The wall of the tube is yellowish in colour and is of a chitinous nature.

The special filament pores, which may be found later to correspond with the lunoecia found in other species, are situated between the zooecia over the whole upper surface of the colony; they have a circular margin and are almost as big as the peristomial apertures

[2] For figure, see Kirkpatrick (*loc. cit.*).

nearby. These filament pores expand below into cup-shaped cells, which have no connection with the surrounding zooecia except by means of communication pores; these are present on the basal wall of each cell, irregularly spaced, and from two to four in number.

The few filaments still remaining attached to the colony arise from the filament pores, are yellowish in colour, and appear to be incomplete; the longest of these measures about 1 mm.

The avicularia are elliptical or almost rounded; they are irregularly scattered over the surface of the zoarium and sometimes occur conspicuously at the bases of the low calcareous elevations on the zoarium. Each avicularium possesses a distinct crossbar upon which is a well developed central lingula, but this latter structure is sometimes found to be obliterated by wear. The mandibles of the avicularia are semicircular or almost elliptical in shape.

The ooecia are present only on the smallest specimen before me and are very peculiar in shape and structure. They differ from those of *C. philippiensis*[3] in not being smooth all over and globose in shape, though they are external and occupy the same position in relationship to the zooecial aperture as in that species. They are curved and somewhat bean-shaped; their tops are flattened, and at the curved distal end of this flattened area there is a thin, blade-like, calcareous extension bordered by a row of elongated pores. The external surface of the curved distal and lateral ooecial walls is smooth, while the flattened frontal wall is distinctly granulated.

Colour.—Uniform dull yellow as described by Tenison-Woods.

The foregoing description is prepared from several specimens ranging in size from 9.5 mm. by 5 mm., to 3 mm. by 1.5 mm.

Variation.—The smallest juvenile specimen, the only one on which ooecia occur, differs from the adult form in having a greater abundance of avicularia; the produced peristome is present only on zooecia at the extreme edge of the colony, and is not nearly so well developed as in the adult.

The special pore, generally seen within the distal border of the produced peristome of fully developed zooecia on adult colonies, cannot be detected in the young example.

Notwithstanding the variation noted above, I believe the small example to be referable to *C. crassa,* the series at my disposal clearly showing transitionary stages between the small and the large specimens.

[3] Like Maplestone (Proc. Roy. Soc. Vict., (n.s.) xxiii, pt. i, 1910, p. 6) I cannot see the ''fimbriated stigma in front'' of the ooecia on specimens in the Australian Museum collection, though on some examples there is a faint, irregular line in front. A belt of pores, however, may be observed at the junction of the ooecia and the frontal zooecial walls, a fact which was not referred to by Maplestone.

Localities.—The Australian Museum collection contains specimens from:—Murray Island, Torres Strait; collected by Messrs. C. Hedley and A. R. McCulloch, 1907: 16 to 18 miles north-east of Port Jackson, New South Wales, 75 to 80 fathoms, trawled by s.s. "Goonambee," May, 1924, and presented by Mr. C. W. Mulvey: about 80 fathoms off the southern coast of New South Wales, trawled by s.s. "Karaaga," August, 1924, and presented by Mr. Melbourne Ward.

The species has been recorded from:—"70-80 fathoms, off Cape Three Points, and Port Stephens," New South Wales, April, 1857 (Tenison-Woods): Murray Island, Torres Strait, 15-20 fathoms (Kirkpatrick).

NOTES ON THE LUNOECIA AND SPECIAL FILAMENT PORES AND THEIR RELATION TO METHODS OF ATTACHMENT.

Whitelegge (*loc. cit.*, 1887, p. 347) gave evidence that filaments served as means of attachment for *Bipora philippiensis*, and that each of these structures *appeared* to grow out of an avicularium, and attach itself to worm tubes and fragments of shell. Maplestone[4], on the other hand, considered that *all* the conical forms had small avicularia and pores on their apices, and filaments similar to those recorded on *C. philippiensis* grew from the pores and probably served to anchor the colony to the sea floor or some submerged object. Unfortunately, this author offered no evidence to support his contention.

Up to the present, anchoring filaments have been discovered on only two species of the genus—*C. philippiensis* and *C. crassa.* They *appear* to arise from avicularia in the former, but in the latter they arise from distinct and specialised pores almost as big as the peristomial apertures of the zooecia. Filament pores similar to those of *C. crassa,* are also present on *C. ampulla* (Maplestone) and *C. eburnea* (Maplestone), but not knowing their function Maplestone called them "large round perforations," though later he vaguely intimated their presence and function in his paper on "Growth and Habits of Biporae[5]". I have searched for traces of anchoring filaments on the type specimens of *C. eburnea* and *C. ampulla* in the Australian Museum Collection without success, but I believe they will be found on fresh specimens and in a similar position to those of *C. crassa.* In this event, the three species would be conveniently associated in a new genus which would provide for forms possessing a conical zoarium, without lunoecia, and with the type of anchoring filament pores indicated above.

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[4] Maplestone—Proc. Roy. Soc. Vict., (n.s.) xxiii, pt. i, 1910, p. 3.

[5] Maplestone—*loc. cit.*

We are still ignorant as to the significance of the lunoecia or special crescentic pores which are a characteristic feature of some species of the genus. Whitelegge (loc. cit., 1887, p. 338-9) thought they might be new zooecia forming between the older zooecia, but I share the opinion of Levinsen[6] that such a process is impossible.

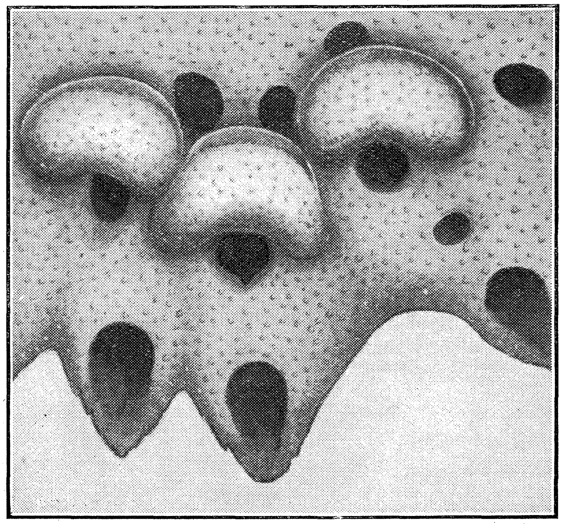

Fig. 1.

The ooecia of *C. crassa* seen near the edge of a juvenile colony. Drawn from a specimen obtained 16-18 miles N.E. of Port Jackson, N. S. Wales, 75-80 fathoms.

Knowing that *C. crassa* possesses anchoring filaments which arise from special cells, is it not logical to suppose that the lunoecia of the related species may serve the same purpose as suggested by Waters[7]? I have examined about sixty preserved specimens of *Conescharellina angulopora* but have failed to find any filaments. This may be due to imperfect preservation, however, and I think they will be discovered in fresh specimens.

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6 Levinsen—Morph. Sys. Stud. Cheil. Bryozoa, 1909, p. 310.

7 Waters—Journ. Linn. Soc. Zool., xxxiv, 1918-22, p. 406.

EXPLANATION OF PLATE XLVI.

Fig. 1. Zooecial detail of *C. crassa* looking down onto the colony from the apex. The top of the drawing runs up to the apex and is considered as distal; the bottom of the drawing represents the edges of the conical zoarium, and is considered proximal.

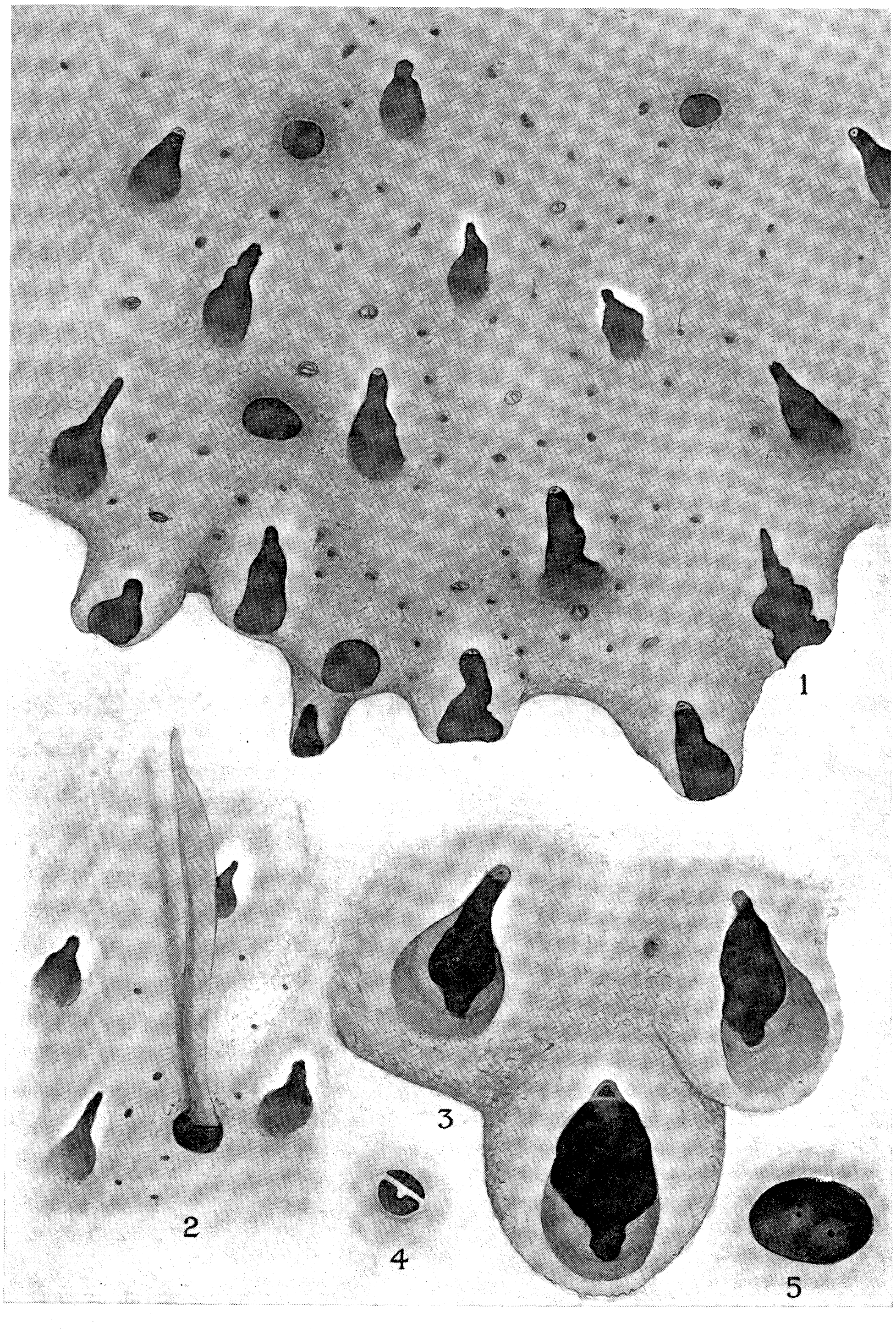
Fig. 2. Part of the zoarium of *C. crassa* showing the structure and detail of the anchoring filament.

Fig. 3. Portion of the zoarium of *C. crassa* tilted on edge until the true zooecial aperture can be seen below the peristomial aperture. Drawn from zooecia on the edge of the colony, the top of the drawing being distal (towards apex) and the bottom proximal (edge of colony).

Fig. 4. An avicularium of *C. crassa* showing the central cross-bar and the attached ligula.

Fig. 5. An enlarged view of a filament cell showing two communication pores in the basal wall.

Drawings made from a specimen from 16-18 miles N.E. of Port Jackson, New South Wales, 75-80 fathoms.



G. P. WHITLEY, del.