Art. VI.—*Some New Species of Bryozoa from the Marion Islands,* with Notes on Bicellaria Grandis.*

By J. R. Y. Goldstein.

[Read 9th June, 1881.]

On looking over a few specimens, part of a series kindly distributed by officers of the "Challenger" while in Melbourne, but only recently brought under my notice, I found six species of Bryozoa, marked as from the above locality. One was the well-known *Idmonea marionensis*. The other five appear to be new; and as they happen to be specially interesting just now, I have considered it advisable to describe and figure them at once, rather than wait for the appearance of Mr. Busk's work on the "Challenger" collection, which will probably not be available for some time, and which may not contain the present species.

I am encouraged in this haste to announce new forms by similar contributions that have appeared recently in several numbers of the *Annals and Magazine of Natural History*, from the pen of Dr. Hincks, and an article by Mr. Busk on *Kinetoskia*,† in *Quarterly Journal of Microscopical Science* for January of the present year.

The five species described below comprise an interesting addition to the genus *Alysidium;* a pretty *Bicellaria* of small dimensions; a very interesting form, that must be placed in Busk's family of Farciminariadæ, but requiring a new genus to be erected for it; the fourth is a *Vincularia* that deserves special notice, owing to recent remarks by Dr. Hincks on his genus *Steganoporella*‡ and on the genus *Vincularia*;§ and the fifth is a curious form placed in the genus *Hornera*, not without some hesitation.

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* South Indian Ocean.

† The *Kinetoskia cyathus* there described seems to be very closely allied to *Bugula robusta*, Macgillivray, common in these seas; the cells are almost identical in the two species, but the stems are different.

‡ *Brit. Mar. Polyzoa*, p. 177. *Ann. and Mag. Nat. Hist.*, Vol. VI., No. 36, Nov., 1880.

§ *Ibid*, Vol. VII., No. 38, Feb., 1881.

It is to be regretted that the system of classification proposed by Dr. Hincks in the introduction to his valuable *History of British Marine Polyzoa* presents a primary difficulty, and a serious one for Australian observers, in that it allows of no expansion, while failing to provide places for many well-known forms. True, the work is confined to British species; but in the remarks on classification* the talented writer evidently refers to the whole class, and then proceeds to base his proposed system† on British species only. The result, unfortunately, is not comprehensive enough to embrace foreign species, and is so arranged as actually to prevent the intervention of fresh families‡ without straining and distorting the system. Thus, at the outset of the present paper, I am forced, not unwillingly, to revert to the older system of Busk, which permits the insertion of almost every known form, although arranged many years ago when comparatively little was known of the Bryozoa; while in the system that Dr. Hincks now proposes to substitute for it no place can be found for three of the five forms described below. Fam. VI., CELLARIIDÆ, seems to offer a home for the *Vincularia*, but the author has himself since relegated this genus to his Fam. IX., MICROPORIDÆ§ at the same time observing that *V. ornata*, Busk, and *V. neozelanica*, Busk, should be in Fam. VIII., MEMBRANIPORIDÆ. Accepting the statement of Dr. Hincks, that "our knowledge of the polyzoa is not yet sufficient to admit of a strictly natural classification, and our arrangement of them must still be to a large extent more or less artificial,"‖ it must be apparent that the many reiterated attempts that have been made to make the system only a little less artificial are more likely to cause confusion than to prove beneficial. The time being not yet ripe for a natural system, it would have been better to have adhered to the classical work of Busk as a standard; improvement without confusion could then be obtained by subdivision and re-arrangement of the more cumbrous families and genera.

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* *Brit. Mar. Polyzoa*, Introduction, pp. cxviii—cxxxiv.

† *Ibid*, pp. cxxxvi—cxli.

‡ This difficulty might have been partly obviated by omitting to number the families.

§ *Ann. and Mag. Nat. Hist.*, Feb., 1881, p.

‖ *Brit. Mar. Polyzoa*, p. 183. (It is sad to think that this is written thirty years after Mr. Busk said the same thing, using almost similar words, in his *British Museum Catalogue*, Part II., p. 63.)

It is in this direction that Dr. Hincks' work is of real service; his subdivisions of the old genus *Lepralia* are very useful, and will readily commend themselves to all students. But, with regard to the general system, observers must feel that no classification of the Bryozoa can be useful that does not take into consideration the many varieties of form found living in Australian seas and fossil in Australian tertiaries.

It may be surmised that Prof. Smitt's efforts to construct a genealogical classification, and the stress he puts upon the assumed necessity of assigning first place to the form of the cell alone in the construction of families and genera, without regard to mode of growth, have greatly influenced the labours of Dr. Hincks; and, although the latter declines to accept in its entirety a proposition so revolutionary,* he has so far followed it that he assigns a strictly secondary place to mere zoarial habit;† and yet it must be maintained that in most genera zoarial habit *is* of equal importance with the character of the cell.

I am constrained to offer these views, doing so with great diffidence, because anxious to have the assistance of a really good system in working out the classification of a very large number of strange forms, obtained during several years of constant observation confined to this particular class. And after years of hopeful anticipation with regard to the long expected work of Dr. Hincks, I must confess great disappointment on finding it so little suited for the arrangement of Australian species. It is to be hoped, however, that that talented writer may soon be induced to publish a second edition of his otherwise admirable work; and that it will contain a system of classification more in accordance with the requirements of students in all parts of the world. Mr. Busk's advanced years and fully occupied time will probably preclude all hopes of extended labours in this direction; otherwise it might be anticipated from his long and intimate acquaintance with the subject, and the broad views evinced in his dealings with its difficulties in former years, that any alterations or elaboration of his old system, from his own pen, would be cordially welcomed by all observers.

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* *Brit. Mar. Polyzoa*, p. 180.
† *Ibid*, Introduction, p. cxxix.

Sub-order CHEILOSTOMATA, Busk.

Family CATENICELLIDÆ, *Busk.*

Genus Alysidium, *Busk.*

Alysidium inornata, n. sp. Plate I.; Fig. 1.

Cells translucent, without ornament or appendage of any kind; much elongated and tubular below; aperture oblique, occupying the whole width of cell at distal end, contracted internally; operculum small, oval, central; ovicells —.

Locality.—Marion Islands. "Challenger" Expedition.

The cell walls are so transparent that in the living state this species would afford every facility for anatomical observation. My specimen has ten cells; in several the form of the zooid is plainly seen, showing, however, only the closed tentacles disappearing at the lower end in a small confused mass of clear granular matter; seeming to indicate an extremely small body of the simplest form.

Family BICELLARIADÆ, *Busk.*

Genus Bicellaria, *Blainville.*

Bicellaria pectogemma, n. sp. Plate I.; Figs. 2 and 2A.

Cells small, much expanded above, tubular long and attenuated below; each cell arising from a short tubular process on the breast of the cell below on the same side, and attached to the next cell on the other side by a slight expansion of the tube a little below where the next cell above is given off; aperture large, wide, and square at outer end, narrowing inwards; operculum wide, and nearly square above at upper and outer end; cells armed with 2-6 long curved spines, springing from a slightly raised process, set transversely across upper end of cell and about level with cell mouth; a single (?) spine slightly curved springing vertically from the centre of each cell on the dorsal surface; avicularium —; ovicell —.

Locality.—Marion Islands. "Challenger" Expedition.

This species is closely allied to *B. grandis*, Busk, but differs in several important characteristics. The form of the aperture is exactly the reverse of that of *B. grandis*, which is widest at the inner end; the latter has never more than four submarginal spines, more frequently only two, while six seems to be the prevailing number in the present species. The mode of attachment of the cells to each other is also very

Plate I

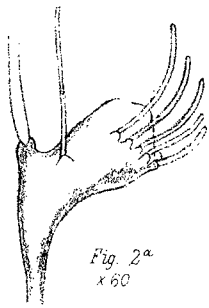

Fig. 2a
×60

Back view

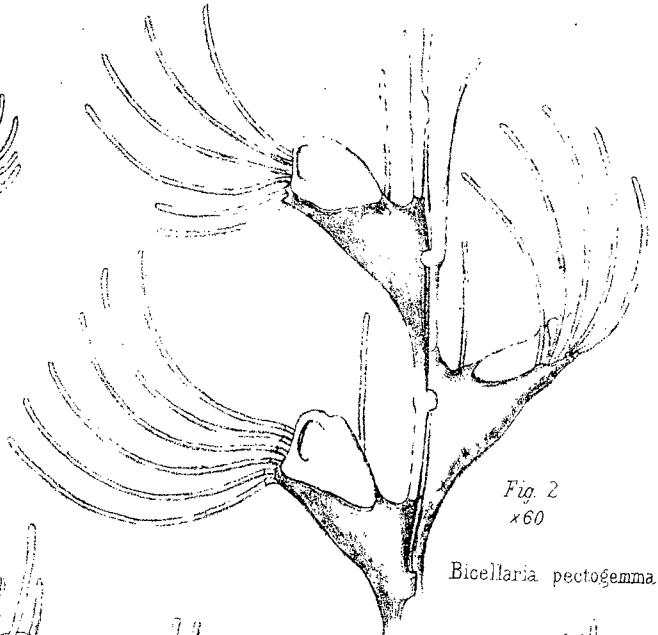

Fig. 2
×60

Bicellaria pectogemma

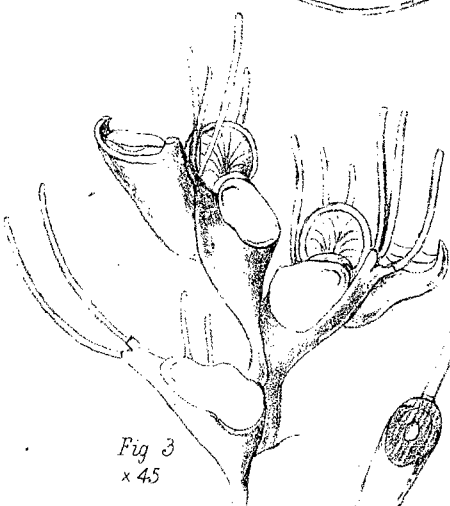

Fig 3
×45

Bicellaria grandis

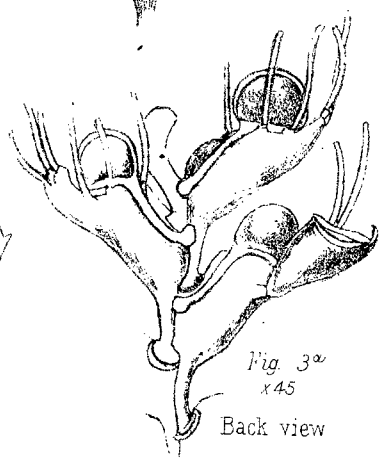

Fig. 3a
×45

Back view

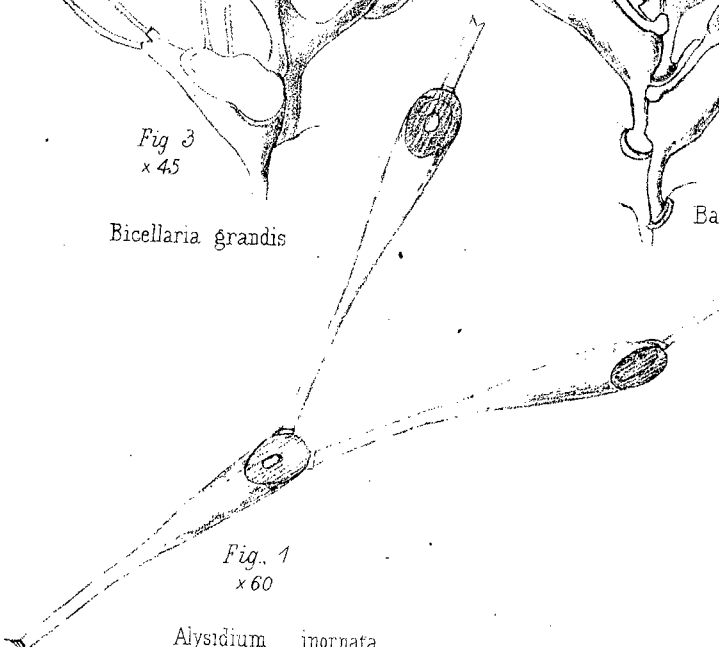

Fig. 1
×60

Alysidium inornata

Plate II

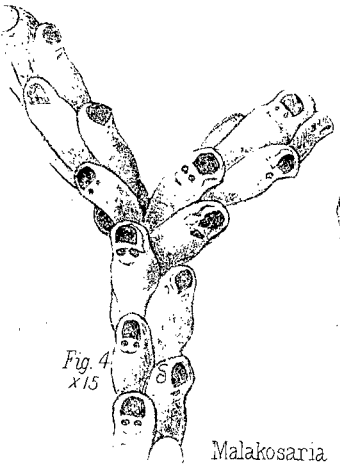

Fig. 4
x 15

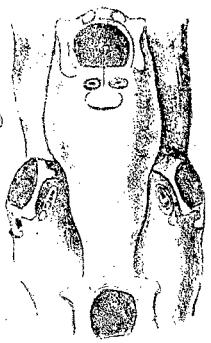

Fig. 4a
x 40

Malakosaria pholaramphos

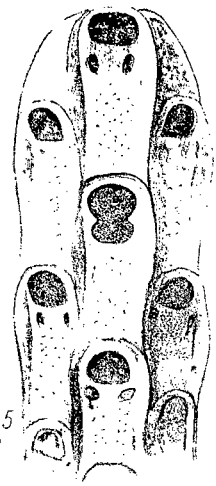

Fig. 5
x 20

Vincularia steganoporoides

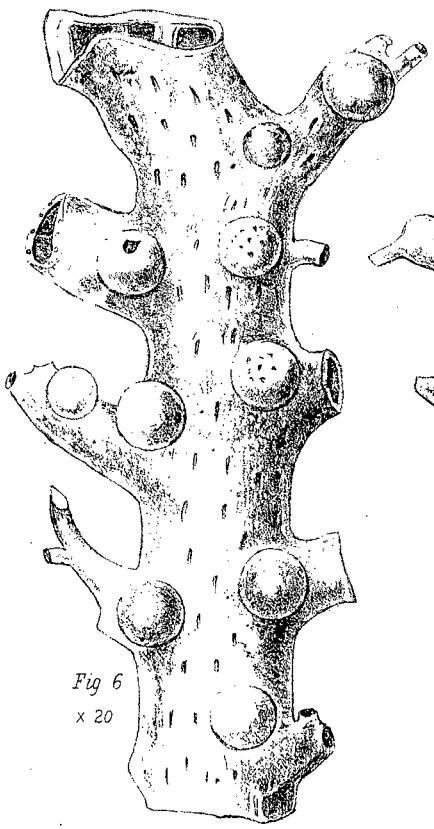

Fig 6
x 20

Hornera subdubia

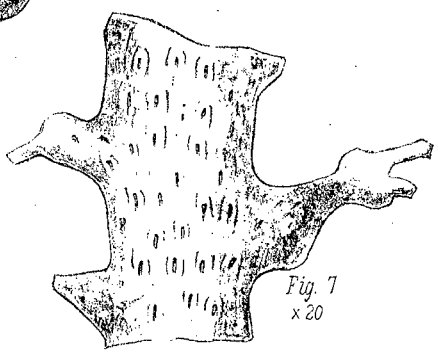

Fig. 7
x 20

Back view

Fig. 8

Natural size

different in the two species. In the one each cell springs from a tubular process on the breast of another cell, and the cells are only attached to each other at two points, while in *B. grandis* each cell springs directly from a ringed process on the *back* of another, and the cells are more closely adnate to each other throughout their whole length. In size also there is a great disparity between the two species, *B. pectogemma* being rather less than one-third that of *B. grandis*. The submarginal spine-bearing process is much more produced in the latter species, which is very common on this coast, and exhibits only very slight variations. I append a figure of *B. grandis* (plate I., figs. 3 and 3A) showing front and back views, not only for comparison but also to show its ovicell and fine avicularium, neither of which have been figured before.

Family FARCIMINARIADÆ, *Busk.*

Malakosaria, *nov. gen.*

Zoarium chitinous, flexible, cells raised, flat, rounded, or tubular, not bounded by raised lines.

Malakosaria pholaramphos, n. sp. Plate II.; Figs. 4 and 4A.

Cells ventricose, rounded; mouth near distal end, large, arched above, narrowed below, lower lip straight, surrounded by a wide raised border, the upper angles of which are produced so as to form a short blunt process on each side, below which is an immersed oval avicularium on each side facing laterally, lying hidden from view in front; space below mouth ornamented with two circular depressions, having a fissal line between, and a sharp, raised, transverse line below, curved upwards at each end; two oval marks on the space above mouth; colour of zoarium, light brown.

Locality.—Marion Islands. "Challenger" Expedition.

There is a peculiarity about the sharp raised line on the front of each cell below the mouth, in that it looks like a lid; it may possibly prove to be a form of avicularium. The genus *Tetraplaria,** erected by the Rev. J. E. Tenison-Woods for a fossil from the Muddy Creek beds, Victoria, may seem to cover this species; but the cells are not in pairs as in that genus, which the author has placed in Busk's family of GEMELLARIADÆ on that account. At

**Proc. Roy. Soc. New South Wales*, 1878, Vol. XII., p. 60.

first I was inclined to place the present species in the genus *Elzerina** of Lamouroux; but the description of that genus so closely resembles that of Busk's *Farciminaria*† that it could not be used for forms without an aperture surrounded by a raised border, and as Lamouroux and Busk make this character important as generic, the erection of a new genus under the name of *Malakosaria* would appear to be warranted.

Family VINCULARIADÆ, *Busk.*

Genus Vincularia, *Defrance.*

Vincularia steganoporoides, n. sp. Plate II.; Fig. 5.

Zoarium octagonal, branching dichotomously; cells in linear series, alternate, quadrate, depressed, bounded by thin, smooth, raised lines; mouth at distal end, sloping forward above, much depressed below, round above, nearly straight below; surface of cell finely granular; an oval opening on each side below the mouth; the whole surface closely invested by a thin chitinous membrane.

Locality.—Marion Islands. "Challenger" Expedition.

This species is specially interesting just now as serving to show some of the difficulties in the way of accepting the proposal of Dr. Hincks, previously alluded to, to place Bryozoa of this description in separate families, according to the character of the cell. This species in general appearance closely resembles *V. elegans*, D'Orb; *V. ornata*, Busk; and *V. neozelanica*, Busk. The last two Dr. Hincks would place with the true *Membraniporidæ*. There is certainly a membranous covering on the cells of the present species; but, unlike the *Membraniporæ*, the operculum is distinct, and is *not* formed by a lap of the investing membrane. At first glance the cell looks as if it ought to be placed in the genus *Steganoporella* of Hincks, having the two orifices just below the mouth characteristic of that genus; but these are not openings into internal divisions as in *Steganoporella*. After removal of the membranous covering by incineration,

* *Hist. des Polyp. Cor. flex.*, 1816, p. 122.

† It is strange that Mr. Busk should have overlooked the genus *Elzerina*, provided by Lamouroux for Bryozoa having soft cylindrical unarticulated branches, with a type of cell similar to that of *Salicornaria*, Cuvier. It would almost seem necessary to abandon the name *Farciminaria* in favour of that of *Elzerina*.

the lamina between the mouth and the two suboral orifices, though calcareous, is easily destroyed by excess of heat, showing the interior of the cell as a single chamber. I have endeavoured to show this in the figure accompanying this paper.*

Sub-order CYLOSTOMATA, Busk.

Family HORNERIDÆ, *Hincks.*

Genus Hornera, *Lamouroux.*

Hornera subdubia, n. sp. Plate II.; Figs. 6, 7, 8.

Zoarium irregularly branched, seldom inosculating; cells few, terminal on minor branches or pinnæ bestowed laterally, produced and tubular; orifice simple or slightly produced on one side; zoarium punctured on front and back; both surfaces faintly fibrillate; ovicells raised, globular, or conical, scattered freely over anterior surface.

Locality.—Marion Islands. "Challenger" Expedition.

This is a very strange form, owing to the small number of cells. The specimen I have is one inch long, and the same in width; it does not look like the old base of a colony, but has all the fresh appearance of a terminal portion. The scarcity of cells is remarkable, particularly when we regard the large number of ovicells, which literally cover the whole specimen. Occasionally a single tubular cell is to be seen on the side of the main stem, but the majority are only found on the ends of short lateral pinnæ, in companies of two, sometimes only one; and in most cases the orifice is closed as if by a calcareous deposit, or an operculum (!). A

* I was induced to make this comparison because *Steganoporella smittii*, Hincks, assumes the habit of a *Vincularia* on the north coast of Australia. I have specimens from Port Darwin showing every stage from the ordinary encrusting form, through the free, erect, hemescharal, and escharal forms. This change of habit I consider to be a sort of mimetism, which will be enlarged upon on another occasion, when I propose to show the importance of true zoarial habit as distinct from mimetic changes of form.

I may here indicate West Australia as another locality for *Steganoporella smittii*. Two valves of *Tridacna* from that coast in my possession are encrusted by large colonies of this species, agreeing exactly with the description by Hincks of the Cornish form, except that the foramina in the West Australian form are very much larger, showing the full extent of the inner chambers; each orifice being more than half as large as the cell mouth, sometimes quite as large. The front wall of the cell is much depressed across the centre. The very curious avicularia are pretty freely dispersed over the colonies, and the ovicells numerous in patches.

transverse section of the zoarium shows two or three internal longitudinal chambers. Branches disposed in the same plane.

I would not be surprised to find that I have failed to diagnose this form correctly, but I give it just as it appears, so as to direct the attention of other observers to it.

Note on Bicellaria grandis (Busk).

In describing this species from Bass's Straits, Mr. Busk mentions 2-5 submarginal spines and a single dorsal spine; my specimens frequently show three dorsal spines, as now figured. The fine pedunculate avicularium is often abundant on some specimens. It is attached to the back of a cell by a very short peduncle, and widens rapidly upwards, the top oval and flat, occupied by a large mandible, which closes into a strong hooked beak on the outer side; the large retractor muscles, springing from near the centre of the mandible, diverge below and fill the whole lower portion of the avicularian chamber.

The ovicell is globular, covering the upper portion of the cell on which it is placed, and is open and arched below just over the cell mouth, where it is strengthened by a transverse band. The front is prettily marked by lines radiating upwards from a slight fissure near the centre of the arched band. There is a slight space between the outer and inner walls, and it is the inner wall that is ornamented. A long tubular process extends from the lower and inner side of the ovicell, obliquely down the back of the cell on which it is placed, and is then attached by a ringed process to the tubular stem of the next cell above.

This mode of attachment, or anchoring, of the ovicell suggests a curious problem—By what means does the ovicell send down this tubular process, and how does it attach itself to the neighbouring cell? Would it not appear that the anchoring stem, or peduncle, must have within its walls some active vital principle, having a discriminative power, or instinct—some prolongation from the body of the parent zooid somewhat similar to the cænosarc of the *Hydroida*? Another curious fact to be noted is that the ovicelligerous cells are generally twisted out of the normal shape. This species is common on the southern coast of Australia.