PLATE 27.

Fig. 7. Small portion of a very thin vertical section through one of the deeper layers, mounted in chlor-zinc-iodide after soaking in a solution of iodine in potassium iodide. Drawn under Zeiss D. Oc. 3. *sh*, the empty sheaths of the bacterial rods (stained blue); *pr*, protoplasm? (stained yellow); *o*, fragments of Algæ (stained blue).

Fig. 8. Small portion of a very thin vertical section through one of the deeper layers, mounted in a solution of iodine in potassium iodide. Drawn under Zeiss F. Oc. 1. *ch*, chains of bacterial rods (stained yellow); *sh*, empty sheaths (unstained); *pr*, protoplasm? (stained yellow).

Fig. 8 *a*. Fragment of an Oscillarian found in the same section and drawn to the same scale.

Fig. 9. Small portion of a vertical section, including the outermost layer, cut by the paraffin method and stained with carbol-fuchsin after drying on the slide, followed by iodine and mounted, after again drying, in Canada balsam. Drawn under Zeiss F. Oc. 1. *ch*, chains of rods; *pr*, outermost layer of protoplasm?

On *Haddonia*, a new Genus of the Foraminifera, from Torres Straits.

By FREDERICK CHAPMAN, A.L.S., F.R.M.S.

[Read 18th November, 1897.]

(PLATE 28.)

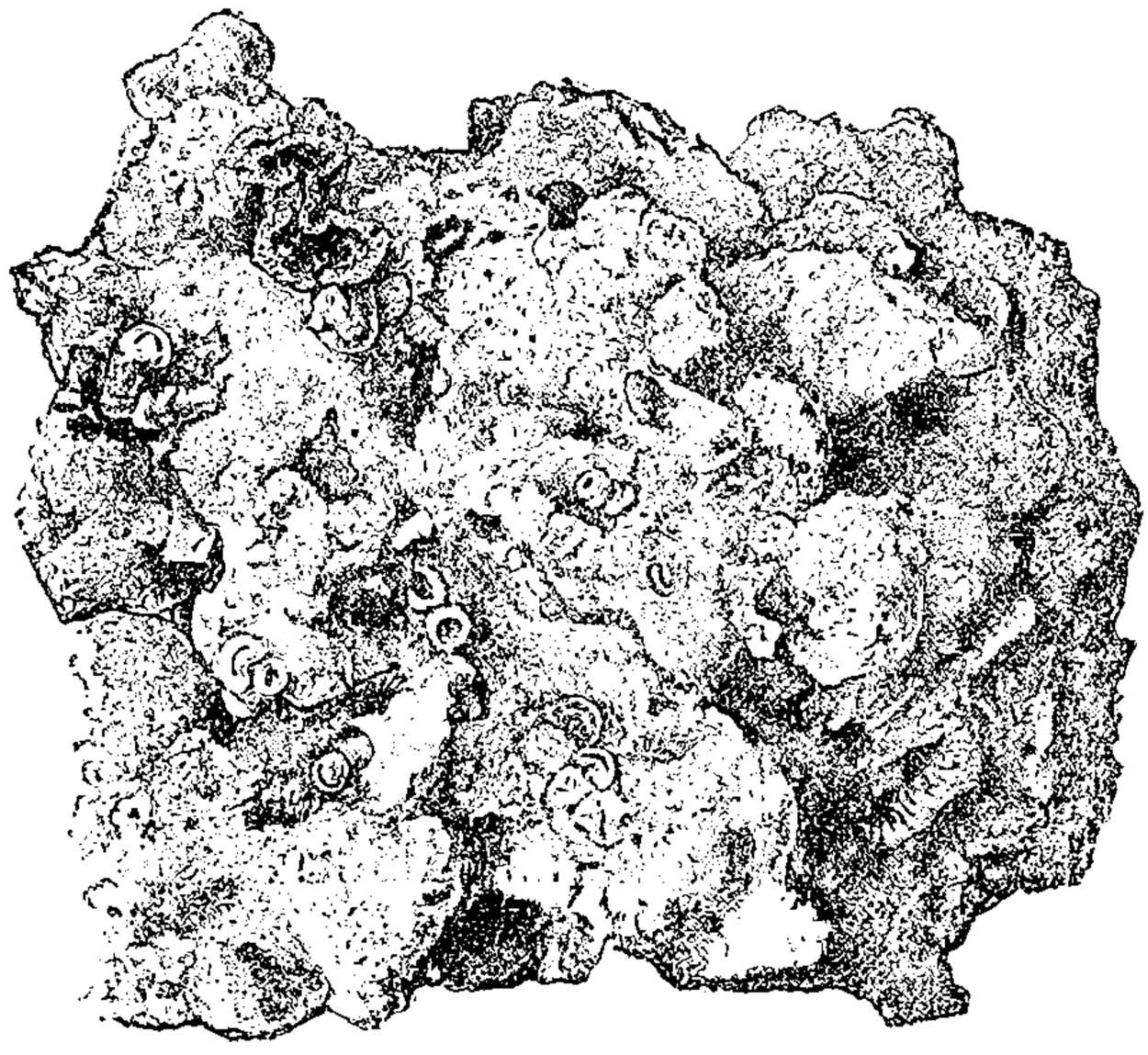
AMONG the many varied types of the Foraminifera, those which are adherent upon foreign bodies are often of peculiar interest, chiefly by reason of the ability of the protoplasmic body of the animal to wander freely over the surface of the object of its support. Such genera, for example, as *Nubecularia*, *Sagenella*, *Placopsilina*, *Bdelloidina*, *Webbina*, *Stacheia*, *Ramulina*, *Vitriwebbina*, *Carpenteria*, *Rupertia*, *Gypsina*, and *Polytrema*, on first acquaintance, were each with more or less difficulty assigned a well-defined position in the Order to which they belong; but as they became more fully understood they were found to exhibit many points of interest in their plans of growth and the structure of their tests, while in their errant condition they sometimes furnished important data for estimating the inter-relationships of other and more exclusive groups.

Many of these adherent Foraminifera find their habitat on coral-reefs and the coral débris derived from them; and the

specimens now to be described were in like manner found on coral-rock.

The original block of rock, on which the new foraminiferal type herein described was found, was collected in 1889 by Prof. A. C. Haddon in the Torres Straits, and on this account I propose for it the generic name *Haddonia*.

For the opportunity of, and facilities for, describing the specimens I am indebted in the first place to Prof. J. W. Judd, C.B., LL.D., F.R.S., who had previously received the coral-rock for the Geological Collection of the Royal College of Science, through Mr. M. F. Woodward of the Biological Laboratory, who had noted it among a collection of corals therein deposited by Prof. Haddon; and subsequently, by the kindness of Messrs. R. Kirkpatrick and H. M. Bernard, I have been furnished with another specimen from the Haddon Collection, now in the British Museum (Natural History), which has helped to complete our knowledge of the chief characters pertaining to the test of the genus.



Specimen of Coral-rock, showing the new Arenaceous Foraminiferon *Haddonia torresiensis*, occurring in association with a *Polytrema*. $\frac{2}{3}$ nat. size.

Haddonia, gen. nov.

Salient Characters of the Genus.—Test calcareo-arenaceous, adherent, and sinuous; the commencement sometimes straight, sometimes spiral. Chambers imperfectly septate, or openly labyrinthic. Shell-wall coarsely porous.

HADDONIA TORRESIENSIS, sp. nov. (Plate 28.)

Test calcareo-arenaceous, surface rough, of a whitish to yellow or brown colour; consisting of imperfectly septate chambers, their breadth being about twice their height, which are here and there subdivided obliquely, somewhat in the manner of *Textularia*, but very irregularly, the general plan being a moniliform series of segments. The test commences either with a straight or a sinuous series of chambers, or more rarely with a flat coil of a single whorl, after which the chambers are arranged in a more or less rectilinear manner. The test is adherent to coral-rock, fragments of which, with quartz-grains and organisms such as *Discorbina*, fragments of *Polytremata*, and pieces of molluscan shells, are used to construct the shell-wall. The sinuous manner of growth in *Haddonia* is suggestive of a Serpula-tube, and the shell is often bent upon itself. The interior of the test is smooth or even polished, and partially subdivided by imperfect and curved septa (irregularly labyrinthic). The outer wall of the test is perforated by coarse pores such as are seen in *Rupertia* in the hyaline group; and the salient angles of the imperfect septa, which form flying buttresses on the interior of the proper wall, usually show in section a layer of transparent (hyaline) prismatic shell-structure which is non-perforate.

Aperture usually crescent-shaped, sometimes gaping, but more often having a valvular flap, formed by a prolongation of the superior surface of the test, which nearly closes up the orifice as in *Valvulina* and some of the *Miliolinæ*. This apertural flap or valve is in some specimens directed towards the distal end of the test (Pl. 28. fig. 1), but in others towards the proximal end (*cf.* fig. 3); in other words, the organism is sometimes adherent by one side of the flattened and asymmetrical test, and at other times by the relatively opposite side. In the one case the extruding sarcode will be directed towards the surface of attachment, in the other away from it.

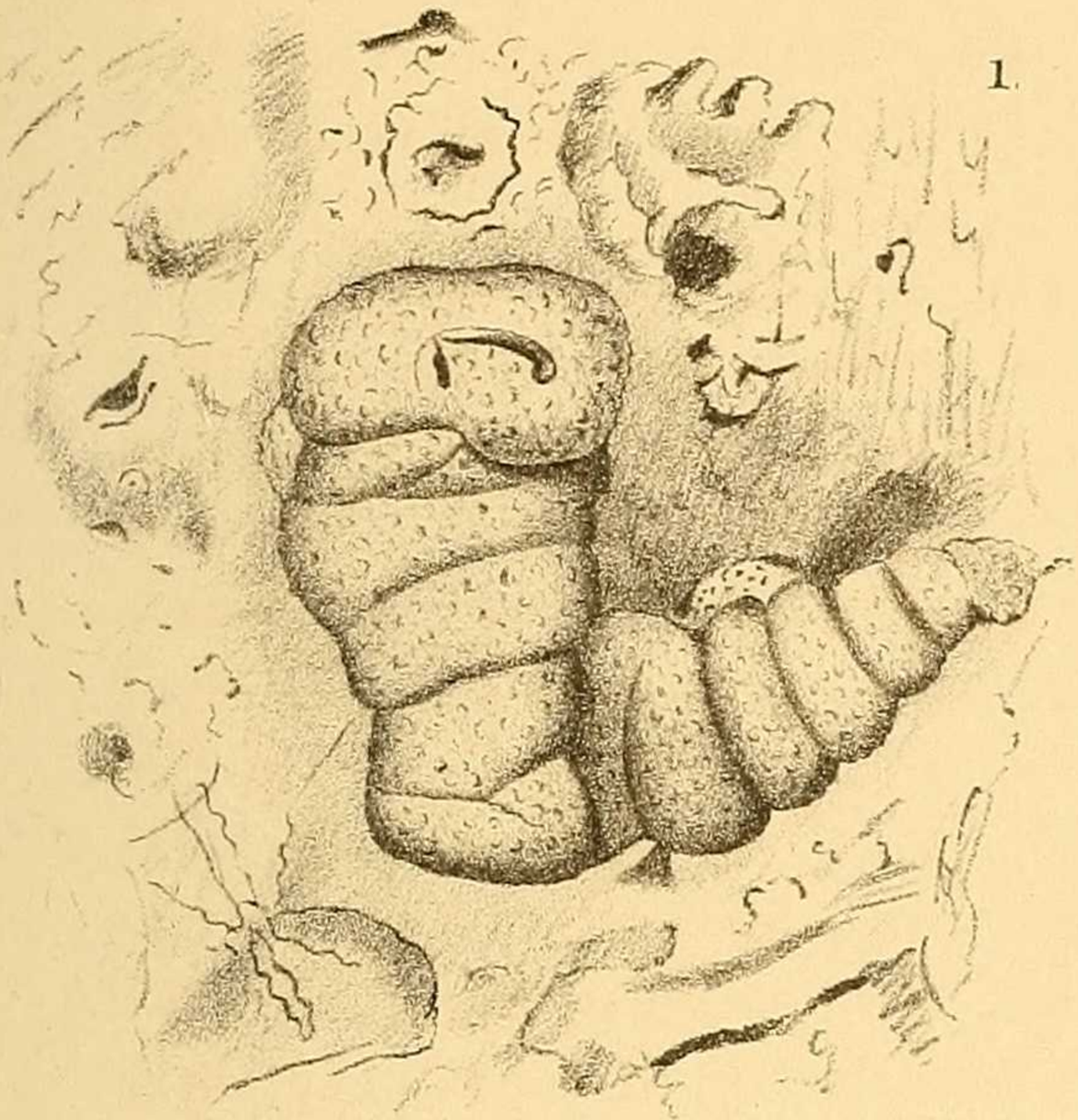
The last few chambers also communicate with one another by a curved slit in the middle of the transverse septal wall, when the septation is more than usually complete.

The sarcode when dry is of a rich brown colour (as seen in the recesses of the test of *Haddonia* in a section), with cavernous or honeycomb structure, and bearing here and there fragmentary sponge-spicules, which are adventitious.

Length $\frac{1}{2}$ to nearly $\frac{2}{3}$ of an inch.

On coral-rock, Torres Straits.

1.



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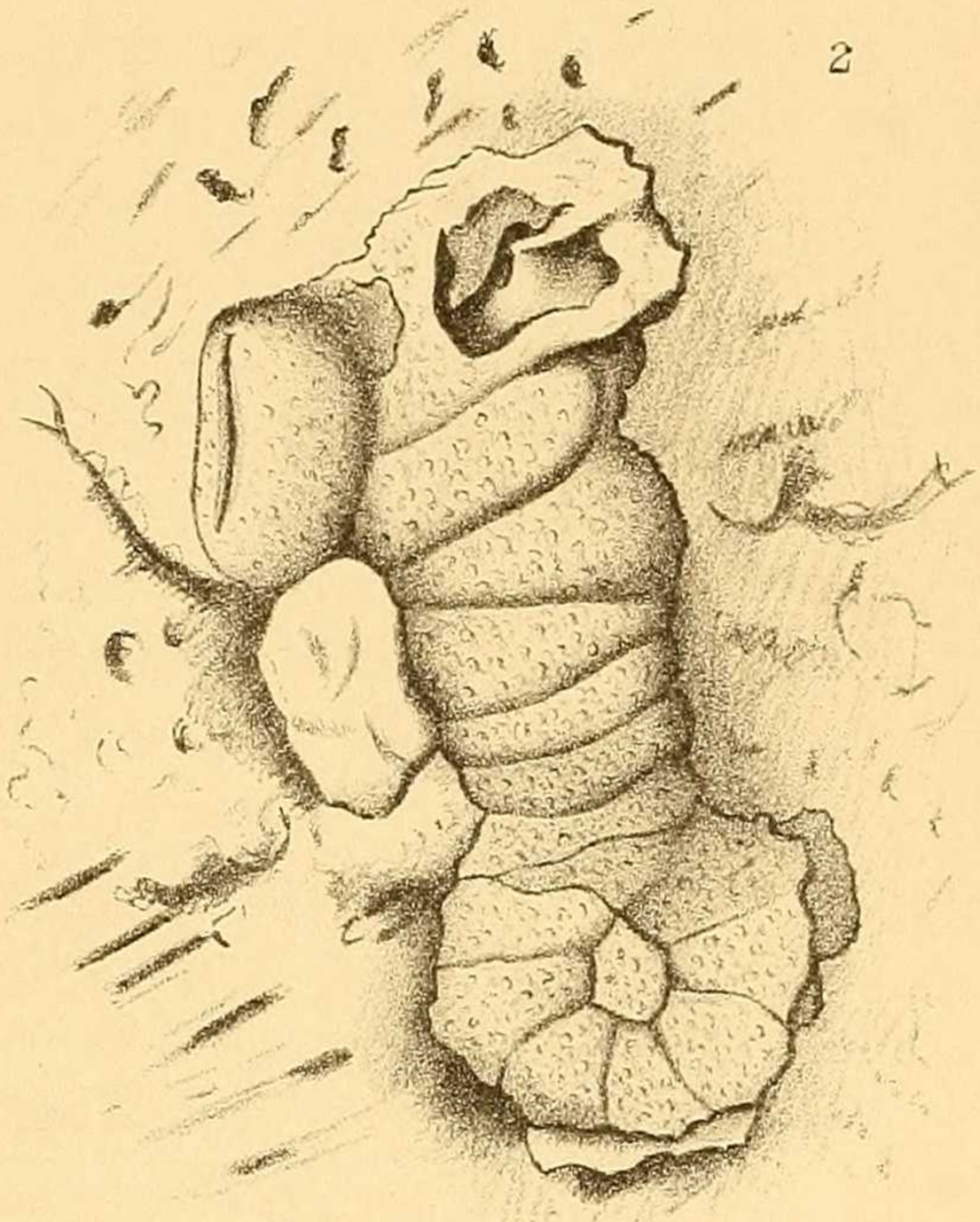

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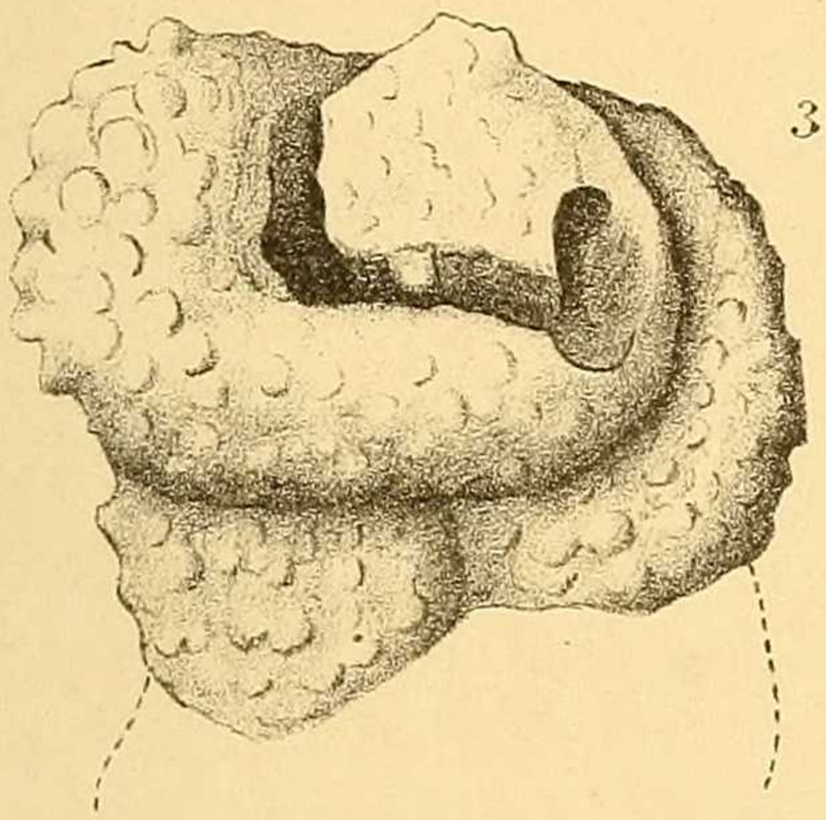

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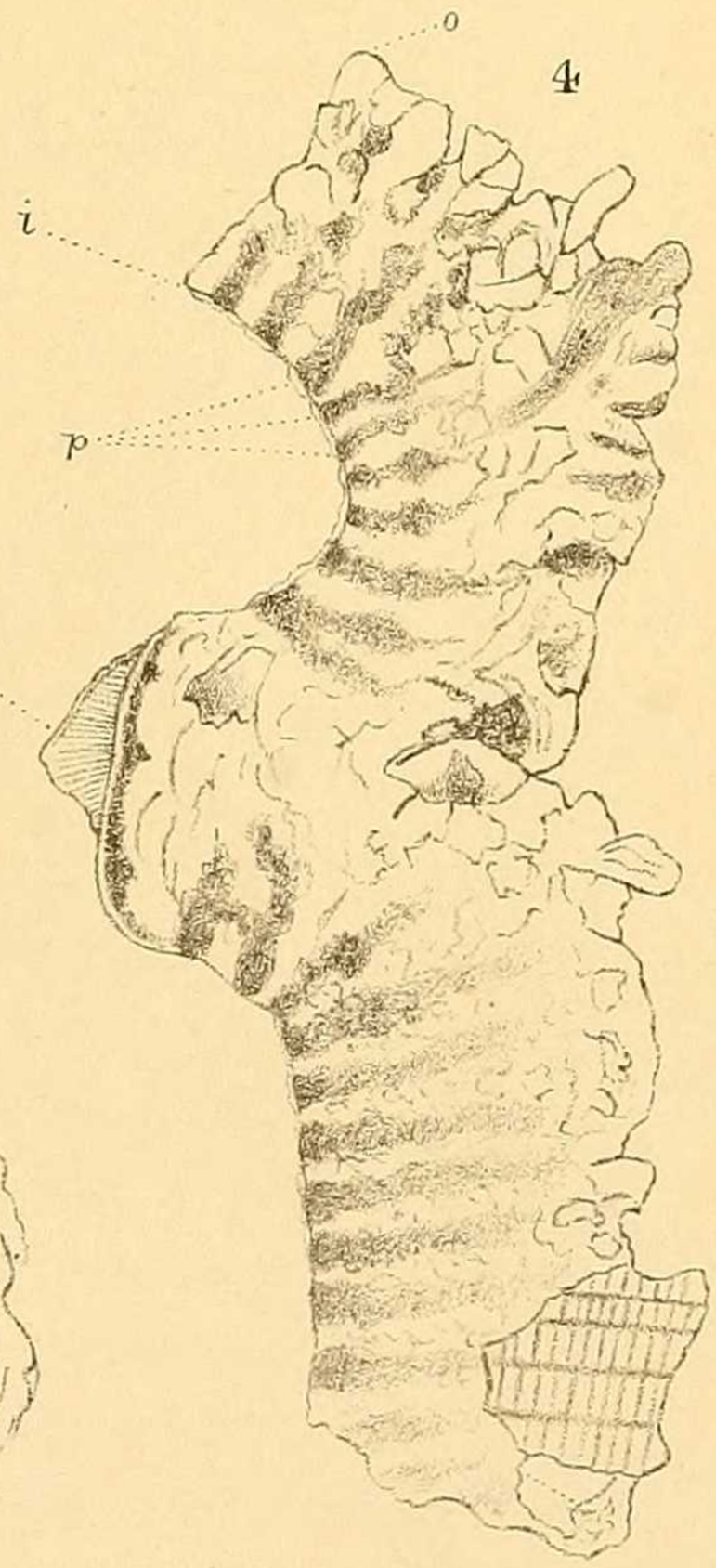

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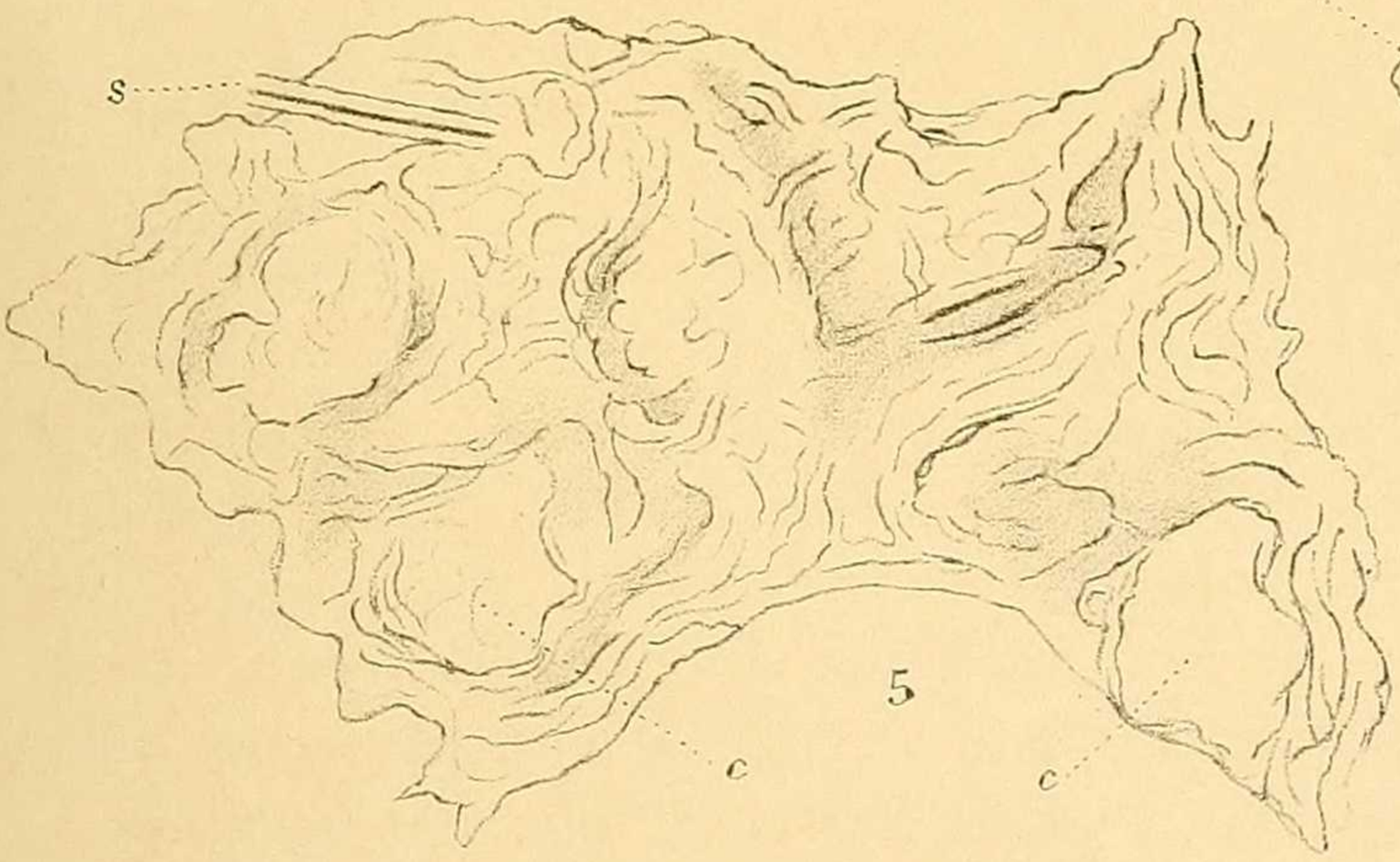

F. Chapman del. ad nat.
Parker & Percy lith.

Geo. West & Sons imp.

HADDONIA TORRESIENSIS.

Affinities of the Genus.—The specimens above described were discovered on two separate blocks of coral-rock. The organisms appear to have lived on the upper surface of the mass, where they would be exposed to the greater circulation and excitation of the water. The great abundance of specimens of *Haddonia* may be gathered from the fact of there being 31 distinct specimens attached to one of the pieces of rock measuring about 5 × 4 inches *.

The genus, more than perhaps any other I have studied, exhibits points of form and structure in common with several other, and presumably distinct, genera. It falls naturally into the arenaceous group of Foraminifera, by reason of the nature of its test-structure, and appears referable to the labyrinthic group of the subfamily *Lituolinæ*.

The valve-like aperture shows a certain resemblance, if not relation, to the Clavuline and Valvuline groups of the Textulariidæ; but although this detail of structure is often of great use in determining the position of the organism, it must be borne in mind that the characters are not always a safe criterion of affinity.

The freedom of growth and the undulating contour of *Haddonia* also call to mind the little-known genus *Bdelloidina* of Carter †, but that has nothing like so complicated a shell-structure as *Haddonia*.

With regard to the coarse porous nature of the shell-wall, it has been already remarked that in this respect this genus shows a similarity to *Rupertia*. And, indeed, on examining the dried sarcode of *Haddonia* under a high power, sponge-spicules were detected in the substance of the protoplasm, which pointed to still further relationship with the group to which *Rupertia* belongs.

The presence of sponge-spicules in the sarcode of *Polytrema* and *Carpenteria* is well-known; and on this account the latter genus was at first believed by its discoverer Dr. J. E. Gray, and also by Dr. Carpenter, to typify an annectant animal form between the Rhizopods and the Sponges.

Although these broken sponge-spicules are normally present in the sarcode, they are sometimes found embedded in the

* Associated with *Haddonia* upon the same block were other Foraminifera, as *Polytrema*, *Carpenteria*, and *Gypsina*.

† Ann. & Mag. Nat. Hist. ser. 4, vol. xix. (1877) p. 201, pl. xiii. figs. 1–8.

structure of the test, being presumably caught up in its growth. The probable use of these spicules in *Haddonia*, as in the other genera mentioned, would seem to be for the stiffening and support of the sarcode, whether within the chamber-cavities or at the points of extrusion, as in *Polytrema*.

EXPLANATION OF PLATE 28.

Fig. 1. *Haddonia torresiensis*, gen. et sp. nov. A typical specimen. Apertural valve situated on the upper surface of the test. ×6.

Fig. 2. *Haddonia torresiensis*. A specimen with a spiral commencement. The end of the test is broken away, and shows the open labyrinthic structure. ×6.

Fig. 3. *Haddonia torresiensis*. Apertural end of test, showing valve-like opening; the valve in this instance is situated nearer the attached surface of the test. ×9.

Fig. 4. Section through the shell-wall of *Haddonia torresiensis*. *o*, the external surface of the test; *i*, the inner surface; *b*, the hyaline shell-layer; *p*, the coarse pores in the shell-wall. ×60.

Fig. 5. A fragment of the dried sarcode of *Haddonia torresiensis*, highly magnified. *c*, irregular cavities in the sarcode, probably due to drying; *s*, a sponge-spicule embedded in the sarcode. ×332.

On some Points in the Anatomy of *Caudina coriacea*, Hutton.

By Arthur Dendy, D.Sc., F.L.S., Professor of Biology in the Canterbury College, University of New Zealand.

[Read 2nd December, 1897.]

(Plate 29.)

The occurrence of small projections arranged, usually in groups, around the anus * has been known for a long time, but comparatively little light has yet been thrown upon their exact nature. It has, indeed, been recognized that these projections are of two kinds, *anal teeth* and *anal papillæ*. The former occur as calcareous plates or scales, radial or interradial in position †; the

* I use the term *anus* in accordance with the usual custom, though *cloacal aperture* would doubtless be more appropriate.

† *Vide* Ludwig's "Echinodermen" in Bronn's 'Klassen und Ordnungen des Tr-hiereichs,' p. 141.

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