

ART. XIV.—*Descriptions of New, or Little Known,
Polyzoa.*

PART V.

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[Read 9th August, 1883.]

IN the present communication I propose describing some forms of Retepora, and giving a list of all the Victorian species known to me.

In this genus the appearance of the cells varies so much, according to age and other circumstances, that the specific determination of fragmentary or imperfect specimens is frequently very difficult and sometimes impossible. Those enumerated here are well-marked, and have definite characters by which I think they can almost always be certainly recognised.

The habit of growth is not usually of very great value. Of our Australian species, however, several can be recognised at a glance, as *R. monilifera* (normal form), *R. granulata*, and *R. porcellana*. *R. munita*, *formosa*, and *aurantiaca* are very similar in form, but the latter is known by its colour. *R. tessellata*, *fissa*, and *avicularis* are not easily distinguished from each other without a lens. *R. phœnicea* is at once known by its permanent red colour. Important characters are derived from the form of the mouth, the structure and situation of the avicularia, the appearance of the ovicell, and in a less degree from the more or less massiveness of the zoarium, and the proportion in size of the fenestræ to the interspaces. The ovicell in many species is very characteristic. In *R. serrata* and *avicularis* it is filled in, smooth, and without any special markings; in *R. phœnicea* the lower part is occupied by a peculiarly-shaped plate, curving downwards and backwards; in *R. fissa* and *aurantiaca* there remains a permanent vertical slit, sometimes closed, but

always marked; in *R. carinata* this slit is filled in to form a keel; in *R. formosa* it is occupied by a granulated vertical band, dividing below to form a similar band on each side above the aperture; in the various forms of *R. monilifera* the ovicell is similarly marked, the band in *umbonata* ending above in a sharp umbo; in *R. tessellata* it is not perfectly known, those I have examined, which agree with Hincks' figure, being evidently immature, but it is probably entire, and without special marks.

In the "Proceedings of the Literary and Philosophical Society of Manchester for 1878," Mr. Waters published a short but very suggestive paper on the use of the opercula in the determination of the Bryozoa. I regret not having been able to procure this paper until quite recently, when the author kindly sent me a copy. Busk, who also had not seen it until long after its publication, has lately figured the opercula and other chitinous organs in a paper on the "Challenger" Celleporæ, and shown that they are of great specific value.* I have examined these parts in all our Reteporæ, and find that in many they are very characteristic—in fact, it would be possible to identify most of the species by an examination of the opercula alone. A reference to the figures will show their variations. There can be no doubt that in other genera, especially those in which the real structure of the mouth is so apt to be obscured by the growth of the peristome or the deposition of calcareous matter, the examination of the opercula will give most valuable aid in the discrimination of the species. Whether they will afford characters of higher value must be doubtful until a much larger series has been examined. They have been prepared in the manner adopted by Busk. A fragment is treated with dilute nitric acid for the removal of the calcareous matter, carefully washed in water, soaked in picro-carmin, which stains the chitinous parts yellow, and then teased out with needles in a drop of glycerine. Figures of all the forms are appended.

I am indebted to Mr. Hincks and Mr. Waters for specimens of the European species for comparison.

Full details of all our species, for which the drawings are being lithographed, will shortly be published in Professor M'Coy's "Decades."

* *Journal of Linnæan Society*, October, 1881.

R. monilifera, M'G.

(*R. monilifera*, P. H. MacGillivray, *Trans. Phil. Instit., Vict.*; 1860; Hincks, *Ann. and Mag., Nat. Hist.*, May, 1878.)

Polyzoary foliaceous, variously convoluted. Fenestræ oval, narrower than the interspaces. Cells separated by narrow raised lines, convex, smooth or granular. Primary orifice arched above, straight below or hollowed, or with a sinus. Secondary orifice with a sinus in the lower lip, permanently open or becoming closed in whole or in part, at one side of which is generally a small oval avicularium. Usually an elliptical avicularium on the front of the cell, and others of various forms on different parts of the polyzoary. Ovicells prominent, rounded or pyriform, with a beaded or granular band above the orifice, from which extends upwards a similar vertical band. Dorsal surface vibicate, granular.

This abundant species presents several forms so marked that it may be doubtful whether they ought not to be considered as species. In all, however, the mouth has essentially the same structure, a fissure in the lower lip of the peristome, with a small avicularium at one angle of the opening. This fissure is sometimes closed by the complete or partial coalescence of the opposite sides, leaving only a loop-shaped mark or the lower end remaining perforated by a round foramen. The angle supporting the oral avicularium is frequently much produced forwards. The other avicularia are extremely various. There is generally an elliptical one on the front of the cell, and forms with semicircular mandibles are common. On the inner edge of many of the fenestræ, one or more are found with long, narrow mandible closing in a rostrum which has a sharp tooth on each side towards the point. These open horizontally inwards. In all, the ovicell is prominent and marked by a beaded line immediately above the orifice, from the middle of which a branch extends vertically upwards. In *sinuata* the upper part of the vertical band frequently projects considerably forwards, in *munita* it occasionally ends in a sharp spine, while in *umbonata* it ends at the base of a large sharp umbo. All intermediate forms may be observed. The general form of the operculum is similar, although somewhat modified in the different forms. In the typical form it is thinner, more mitriform, and constantly

presents a peculiar dendroid marking, which also occasionally occurs in *sinuata*, but not in the others. The peculiar large, jointed spines seem to be confined to the typical form, *sinuata* and *umbonata*; at least I have not seen them in *munita*.

Form *monilifera*.

Polyzoary expanded, foliaceous, closely plicated, usually much broader than high. Fenestræ rounded or elliptical, much narrower than the interspaces. Mouth at first with the lower margin entire or with a slight notch; as growth advances, the peristome of the lower lip is much produced, retaining a deep narrow notch, at one angle of which a small avicularium is produced. Ovicells prominent, the beaded line broad, the extension upwards slightly clavate and reaching nearly to the upper edge.

This common form is confined to shallow water. On the framework of the wooden pier at Queenscliff it forms large masses, almost dry at low tide. The mode of growth is characteristic. The polyzoary is closely plicated, forming numerous narrow calyces and cavities, expanding widely from its attachment and sometimes, either from a single zoarium or the confluence of several, forming masses six to nine inches wide and two to four or five inches high. The fenestræ are generally much narrower than the interspaces. In the youngest marginal cells the shape of the mouth varies, the lower edge being straight, hollowed, with a small central sinus, or with a deep lateral one. As growth advances, a narrow central sinus is formed in the peristome. On one angle of this a small avicularium is usually developed. Occasionally this angle is much produced forwards, bearing the avicularium on its summit. Sometimes the angles of the sinus coalesce, leaving a rounded foramen, and occasionally this also is obliterated. There is usually an elliptical avicularium on the front of the cell, towards the upper part, either vertical or oblique, sometimes nearly central, but oftener to one side. In some specimens numerous other avicularia are present, often on calcareous elevations. The mandibles are of various forms, pointed, spatulate, or semicircular; one of the last frequently situated above a fenestra. The beaded line of the ovicell is thick, the vertical part extending to its summit, where its clavate extremity is occasionally slightly elevated. Small oval or elliptical

avicularia are scattered irregularly over the back, sometimes with triangular mandibles, and occasionally one of the latter of a large size is found at the base of a fenestra.

In young cells there are frequently two long, hollow, jointed spines articulated at the upper margin of the mouth. In older cells, and occasionally in younger ones, there is an enormous spine on one side articulated to an elevation of the peristome. These spines are of peculiar structure (as pointed out by Hincks), consisting of segments narrower at the base, expanding upwards, and each segment fitting into the one below somewhat like the joints of an Equisetum.

Variety *sinuata.*

Polyzoary much convoluted and contorted, thick. Fenestræ rounded, narrower than the interspaces. Mouth with a deep and wide sinus in the lower lip, on one angle of which is a large oval avicularium. Ovicell prominent, the vertical band thickened and frequently, especially in older cells, slightly elevated. Back vibicate, dense, granular.

This variety, which attains a size of about 2 inches by 1 to 1½, is usually found surrounding the narrow stems of black algæ. The polyzoary is much thicker and denser than in the normal form. The sinus in the lower lip is much wider and deeper, and the oral avicularium is larger. The jointed spines, which are commonly present, are of great size; the lower joint is very long, the succeeding much shorter. The ovicells are broader, and the vertical beaded line is frequently elevated towards its upper extremity. The avicularia are usually very numerous, and are often raised on calcareous eminences. They vary much in shape, and are frequently broadly spatulate. The back is densely granular, the vibices little prominent, and the avicularia very few.

R. monilifera, form *umbonata.*

Polyzoary foliaceous, expanded, or convoluted. Fenestræ elliptical, narrower than the interspaces. Cells quadrate or ovate, those towards the edges separated by much-raised margins, surface granular, glassy. Mouth sloping obliquely backwards; in young cells lower lip nearly straight or

hollowed, entire, thin; in older with a loop-shaped notch, at the angle of which is an avicularium. This notch is frequently bridged over, leaving a small foramen, which also is sometimes obliterated. In the latter case the lip is thickened, and at its junction with the lateral margins projects slightly, giving origin to slender, jointed spines; in many of the older cells the spines are very thick and telescopic in appearance, and are frequently confined to one side. The avicularia are very varied, semicircular, spatulate, and pointed; and there is frequently a semicircular one above a fenestra, and also often one with a long, narrow mandible closing in a bidentate rostrum, opening horizontally inwards on the edge of a fenestra. Ovicell prominent; the vertical band ending in the base of a sharp, smooth, umbonate process. Back strongly vibicate, with numerous small, round avicularia, especially about the edges of the fenestræ.

A small form distinguished by the much-raised margins of the younger cells and the peculiar umbonate process on the ovicell. These characters are usually so marked that they might seem sufficient to constitute a new species. In some cases, however, the umbonate process scarcely exists, and the vertical band is little more prominent than in *sinuata*. Young cells of *munita* also not uncommonly have the edges considerably raised.

R. monilifera, form *munita*.

Polyzoary expanded, foliaceous, convoluted to form large cavernous or calyculate masses. Cells separated by narrow raised lines, surface granular. Peristome expanded forwards with a loop-shaped mark in the centre of the lower lip, closed or perforated below, on one side of which is an avicularium. Small oval avicularia on the front of the cells, and various others scattered in different parts. A very large avicularium, with either a semicircular or very long triangular, pointed mandible, above the upper angle of most of the fenestræ. Ovicells with the beaded line narrow. Back granular, vibices well-marked, elliptical avicularia more abundant about the edges of the fenestræ.

Mr. Hincks, in his valuable paper on Retepora, has already proposed the varietal name of *munita* for this form. The largest specimen I have is $2\frac{1}{2}$ by 3 inches, but as all my other specimens are incomplete, I have no doubt it attains a

considerably greater size. The convolutions of the polyzoary form large calyculate or funnel-shaped cavities, and are not closely plicated, as in the form *monilifera*. The peristome is usually much elevated forwards, with a loop-sharped mark or occasionally a fissure, on one angle of which is a small avicularium. This avicularium is very frequently absent. It is also sometimes very much elevated on a production of the peristome. There is occasionally a thin spine at each side of the mouth above, but I have never seen the large jointed spines found in the other forms.

Two varieties are distinguishable. In the one, *lunata*, the supra-fenestral avicularium has the mandible semilunar or semicircular and very large, and the loop of the peristome is usually imperforate. In the other, *acutirostris*, which is also usually altogether stouter, the supra-fenestral avicularium has an enormous pointed mandible, and the peristome of the lower lip is usually perforated. Occasionally both forms of large avicularia occur on the same specimen.

R. formosa, n. sp.

Polyzoary expanded, twisted and convoluted so as to form large funnel-shaped compartments. Fenestræ rounded or oval, narrower than the interspaces. Cells elongated, raised and expanded above, separated by distinct raised lines, surface minutely granular. Mouth sloping backwards, narrowed below, the thickened lateral margin uniting at an acute angle with the raised cell-margin; the lower lip straight, with a minute notch. Usually an elliptical avicularium directed vertically or obliquely on the front of the cell towards the middle or to one side. Ovicell large, prominent, a small beaded band on each side above the aperture, meeting at an angle in the middle, and extending vertically upwards to end in a slightly clavate extremity. Posterior surface strongly vibicate, granular, and with numerous elliptical or rounded avicularia close to the edges of the fenestræ. Operculum expanded upwards, slightly contracted below, higher than broad.

Port Phillip Heads, 10 to 18 fathoms.

This beautiful species in the appearance and size of the polyzoary resembles the *munita* form of *R. monilifera*. It is, however, at once distinguished by the form of the mouth,

which slopes backwards, and is wide above and contracted below. The lower lip is straight, and has usually a minute rounded sinus, and is destitute of oral avicularium. The slightly thickened sides of the mouth unite at an acute angle with the elevated margins of the cells. The operculum is also of a very characteristic shape, in correspondence with the form of the mouth. Besides the avicularia on the front of the cells and those on the back of the polyzoary, there are frequently one or more with long pointed mandible opening horizontally inwards on the edge of the fenestræ. There is also occasionally an avicularium with a semicircular mandible above a fenestra in front.

R. carinata, n. sp.

Polyzoary expanded. Fenestræ elongated, narrower than the interspaces. Cells ovate, broad, separated by narrow raised margins. Mouth (primary) with the lower lip entire, or (secondary) with a deep sinus at one side and a large avicularium towards the base of the prominent peristome; operculum rounded above, hollowed below, broader than high. On the inner margin of the fenestræ, slightly in front, several avicularia with long pointed mandibles directed vertically from before backwards. Ovicell sub-immersed, pyriform, with a vertical sharp ridge slightly bulbous at its upper extremity. Dorsal surface granular, traversed by slightly raised vibices, and with a few rounded avicularia about the edges of the fenestræ.

Port Phillip Heads.

The only specimen I have seen is quite perfect, and forms a waved, somewhat fan-shaped expansion seven-eighths of an inch wide by about three-fourths deep. It is of a beautiful orange colour. The cells are mostly broad, prominent, tubercular, and glistening. The mouth is broad, arched above, and in the youngest seems to be entire and straight below or slightly convex. The peristome is rapidly developed on the lower lip, projecting as a plate with a deep notch at the angle of the mouth on one side, and receding gradually from this to nearly the level of the opposite angle, but without any notch at that side; the margin is frequently finely serrated. There is a considerable, prominent avicularium below the lower lip, with the broad mandible directed upwards and usually inclined to the angle formed by the

sinus. There are also other round or elliptical avicularia scattered in various parts, and numerous avicularia, with long narrow mandibles closing in bidentate rostra, close to the edge of the fenestræ. Similar avicularia occur in some other species, but in these, so far as I have seen, they always open horizontally inwards, while in the present they are directed across the edges of the fenestræ. The vertical slit, the closure of which gives rise to the ridge on the ovicell, is still in some instances slightly open towards the upper extremity.

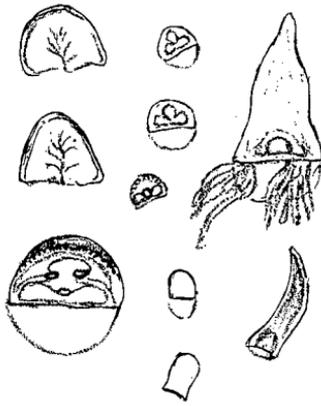
R. fissa, M'G.

The description and figures of this species given in my last paper were taken from the original specimen, which is of considerable size and well calcified. I have a number of other specimens with the fenestræ more elongated, the interspaces narrower, the cells longer, and the peristome very much produced, of the true position of which I was doubtful. I am now satisfied that they belong to the same species, and I believe that they are identical with Smitt's Floridan, *R. marsupiata*, although they do not altogether correspond with his description, and that they are probably the Australian form referred to *R. cellulosa* by Busk and Hincks.

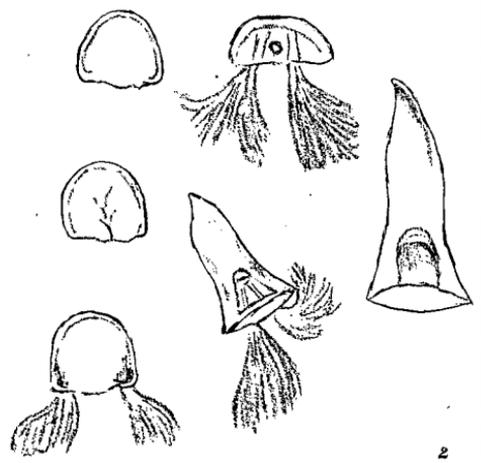
In this form the fenestræ are large, elongated, and wide, the interspaces narrow, with one to four rows of cells. The cells are long, narrow, separated by well-raised margins. The peristome is much produced, curved forwards, with a nearly circular aperture opening upwards. From the centre of the lower lip a shallow groove, with slightly raised edges, extends vertically downwards; immediately below this, or slightly to one side, is usually an avicularium with a bluntly-triangular mandible directed downwards and tilted somewhat forward. The lower lip on either side of the groove is smooth or sometimes serrated. The edges of the groove occasionally meet to form a tube either extending the whole length or confined to the lower end. Occasionally the small avicularium is enormously developed with a large triangular mandible. There are also sometimes other avicularia. In some cells the avicularia are entirely absent. The ovicells are rounded with a vertical slit. In different specimens a complete gradation may be seen to the structure of the typical *R. fissa*.

The Victorian species of *Retepora* with which I am acquainted and to which all my specimens may be referred are:—

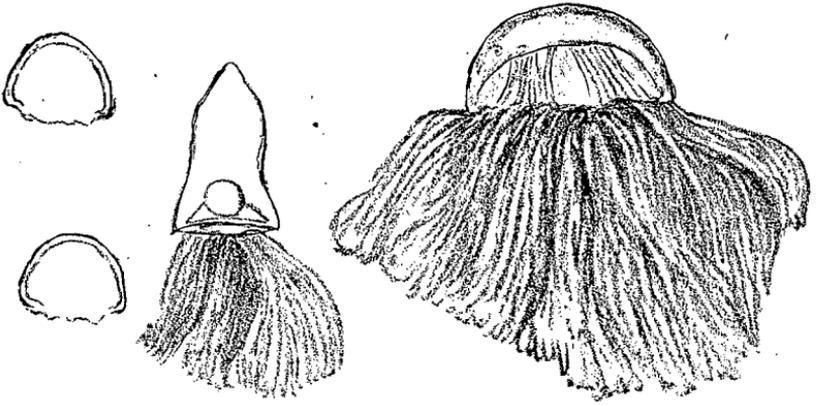
- R. monilifera*, M'G.
 - Form *monilifera*, M'G.
 - var. *sinuata*, M'G.
 - Form *umbonata*, M'G.
 - Form *munita*, Hincks.
 - var. *lunata*.
 - var. *acutirostris*.
 - R. formosa*, M'G.
 - R. aurantiaca*, M'G.
 - R. carinata*, M'G.
 - R. granulata*, M'G.
 - R. fissa*, M'G.
 - (? = *marsupiata*, Smitt.)
 - R. porcellana*, M'G.
 - (= *robusta*, Hincks.)
 - var. *laxa*.
 - R. avicularis*, M'G.
 - R. tessellata*, Hincks.
 - R. phœnicea*, Busk.
 - R. serrata*, M'G.
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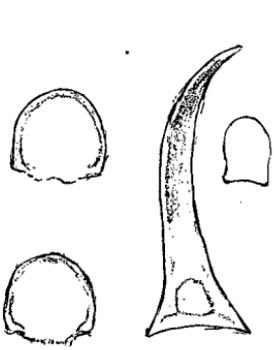
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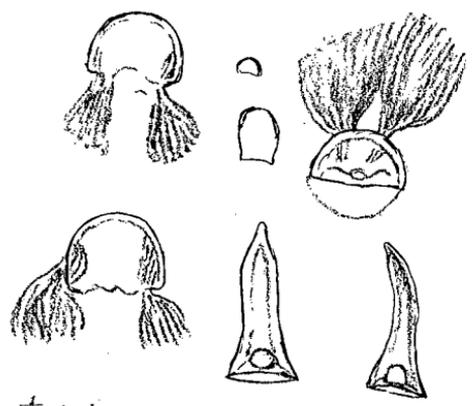
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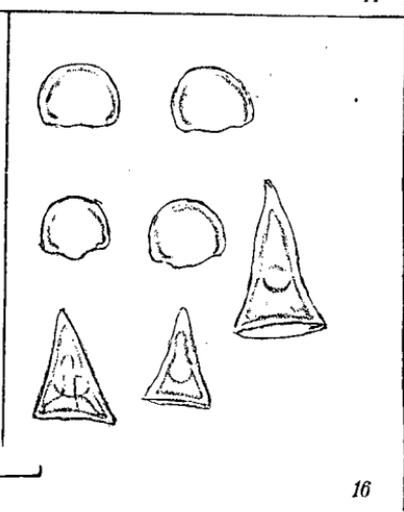
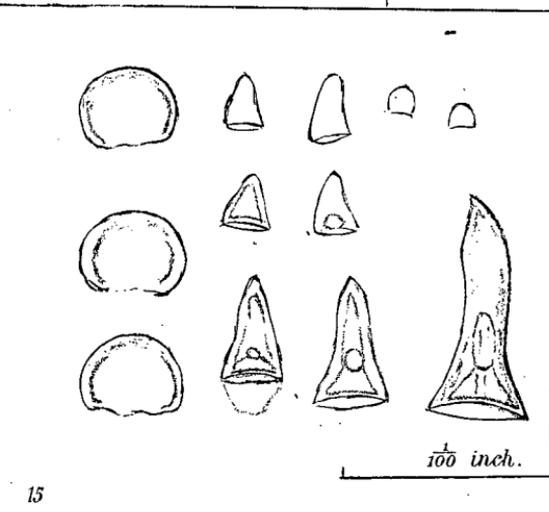
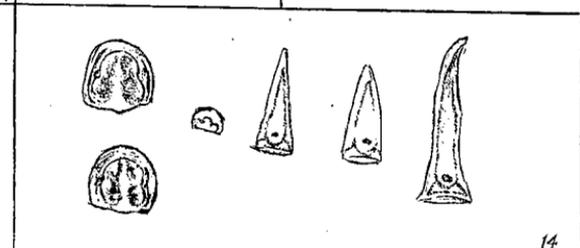
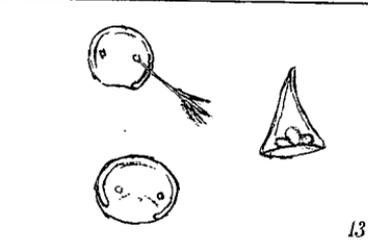
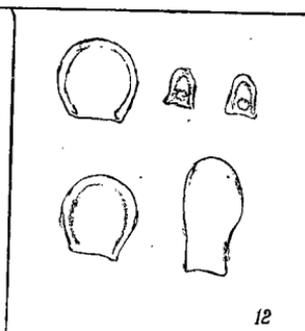
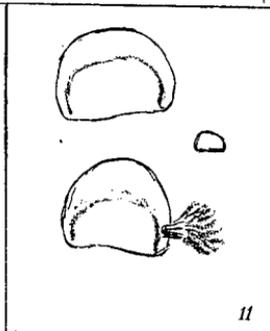
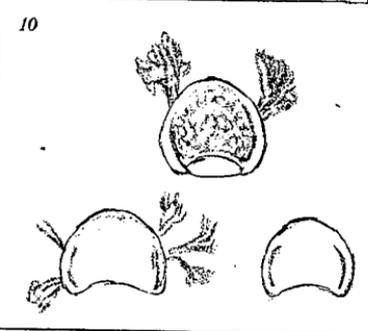
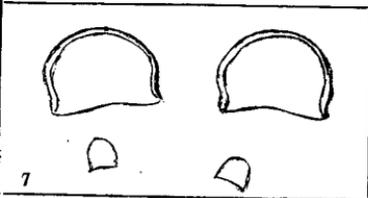
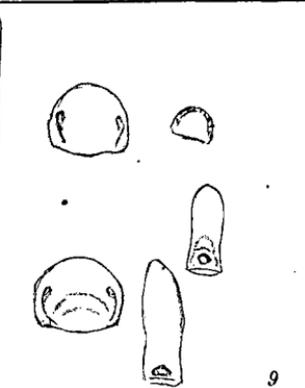
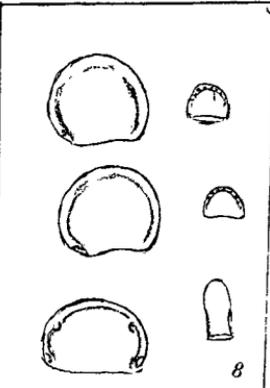
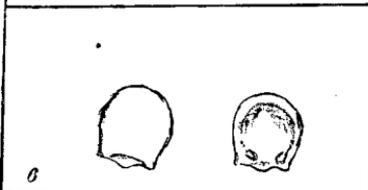


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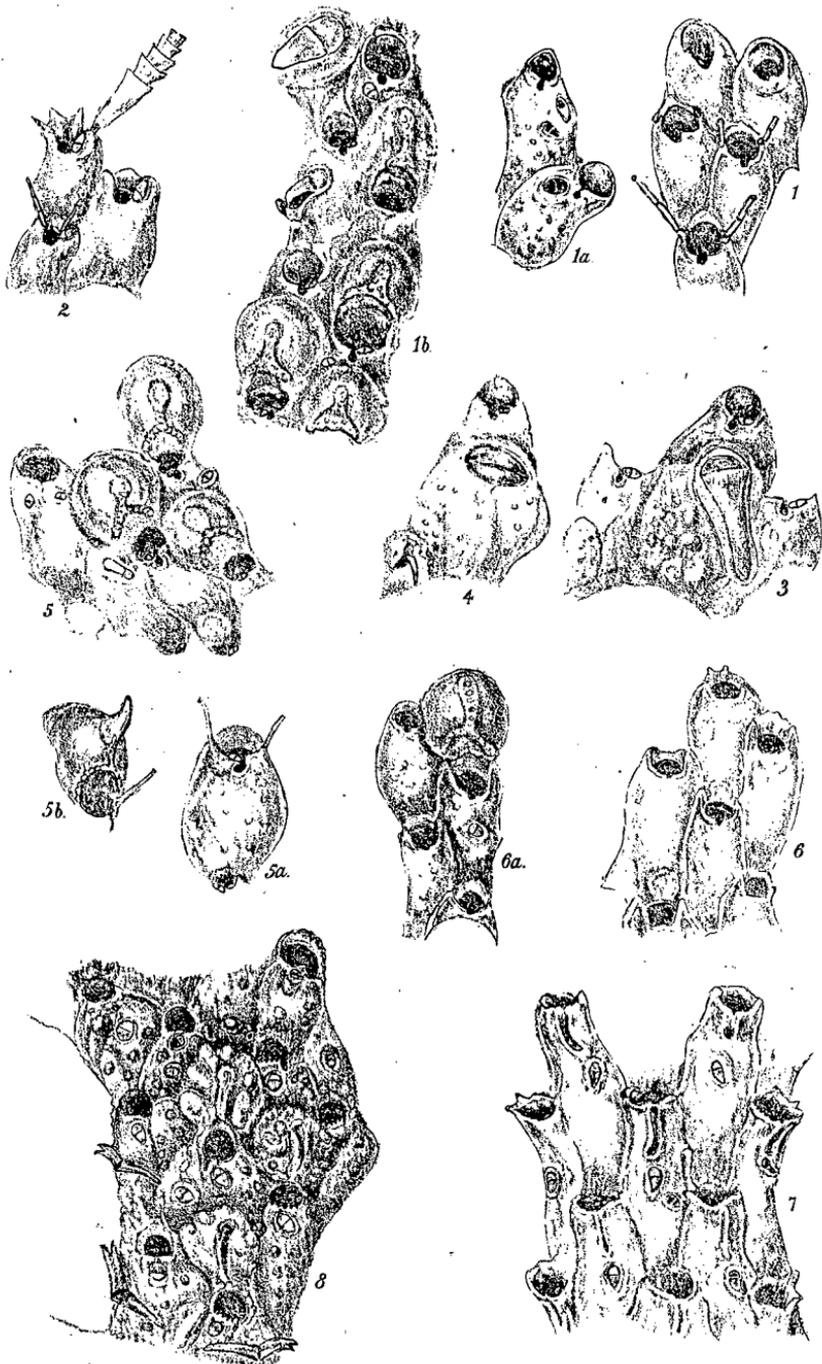


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$\frac{1}{100}$ inch



$\frac{1}{100}$ inch.



EXPLANATION OF FIGURES.

Plates I. and II.

Opercula and Chitinous Appendages.

- Fig. 1. *Retepora monilifera*.
 Fig. 2. *R. monilifera*, var. *sinuata*.
 Fig. 3. *R. monilifera*, form *munita*, var. *lunata*.
 Fig. 4. *R. monilifera*, form *munita*, var. *acutirostris*.
 Fig. 5. *R. monilifera*, form *umbonata*.
 Fig. 6. *R. formosa*.
 Fig. 7. *R. aurantiaca*.
 Fig. 8. *R. porcellana*.
 Fig. 9. *R. porcellana*, var. *laxa*.
 Fig. 10. *R. carinata*.
 Fig. 11. *R. granulata*.
 Fig. 12. *R. serrata*.
 Fig. 13. *R. phœnicea*.
 Fig. 14. *R. tessellata*.
 Fig. 15. *R. fissa*.
 Fig. 16. *R. avicularis*.

Plate III.

- Fig. 1. *Retepora monilifera*, young cells. Fig. 1a. Adult cells. Fig. 1b. Portion showing ovicells.
 Fig. 2. *R. monilifera*, var. *sinuata*.
 Fig. 3. *R. monilifera*, form *munita*, var. *acutirostris*.
 Fig. 4. *R. monilifera*, form *munita*, var. *lunata*.
 Fig. 5. *R. monilifera*, form *umbonata*. Fig. 5a. Young cells. Fig. 5b. Ovicell in profile, to show the umbo.
 Fig. 6. *R. formosa*, young cells. Fig. 6a. Older cells and ovicell.
 Fig. 7. *R. fissa*, var. *marsupiata* (?).
 Fig. 8. *R. carinata*.