

Quite distinct from this species is the *Viverra megaspila* (Blyth, Journ. As. Soc. Bengal, xxxi. 1863, p. 331) from Pegu and the Malayan peninsula. It grows to nearly twice the size of *V. tangalunga*, with which it agrees only in having the black median dorsal streak continued along the tail, and not interrupted by the light rings, which are incomplete and few in number. In an adult female from Pinang (Cantor's *V. tangalunga*) the body measures three feet from the tip of the nose to the root of the tail, the tail 17 inches. The black spots on the body are large, very distinct, not ocellated, and arranged in five longitudinal series. This peculiar coloration is already sufficiently distinct in a very young individual, whose total length is only $19\frac{1}{2}$ inches.

As this species has never been figured, or acknowledged by naturalists, I have thought it better to draw their attention to it by the accompanying figure (Plate XXXVII.) drawn from our specimens from Pinang.

2. Notices of some Deep-sea and Littoral Corals from the Atlantic Ocean, Caribbean, Indian, New-Zealand, Persian Gulf, and Japanese &c. Seas. By Prof. P. MARTIN DUNCAN, F.R.S., Pres. Geol. Soc.

[Received May 16, 1876.]

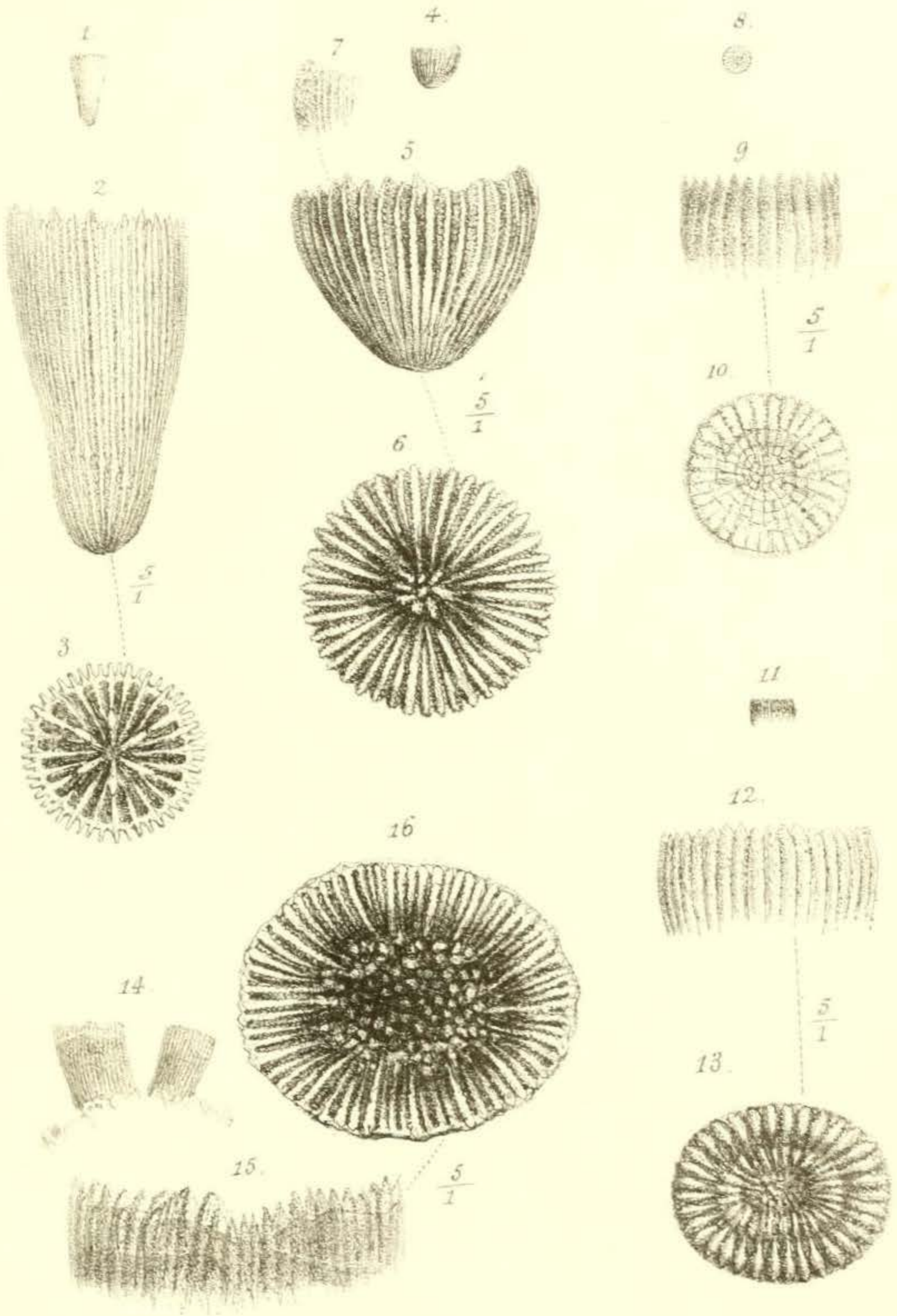
(Plates XXXVIII.-XLI.).

The corals which are described in this communication are nearly all remarkable forms. They are not the usual reef-building species, nor are they found in very deep seas; but, coming from remote districts, they present a most varied generic assemblage.

It has been necessary to establish several new genera in order to classify the species, and also to introduce into the recent coral fauna two genera, one hitherto considered to be represented only in the Cretaceous, and the other in the Miocene formation; but lately the last has been found in the Caribbean by Agassiz and Pourtalès.

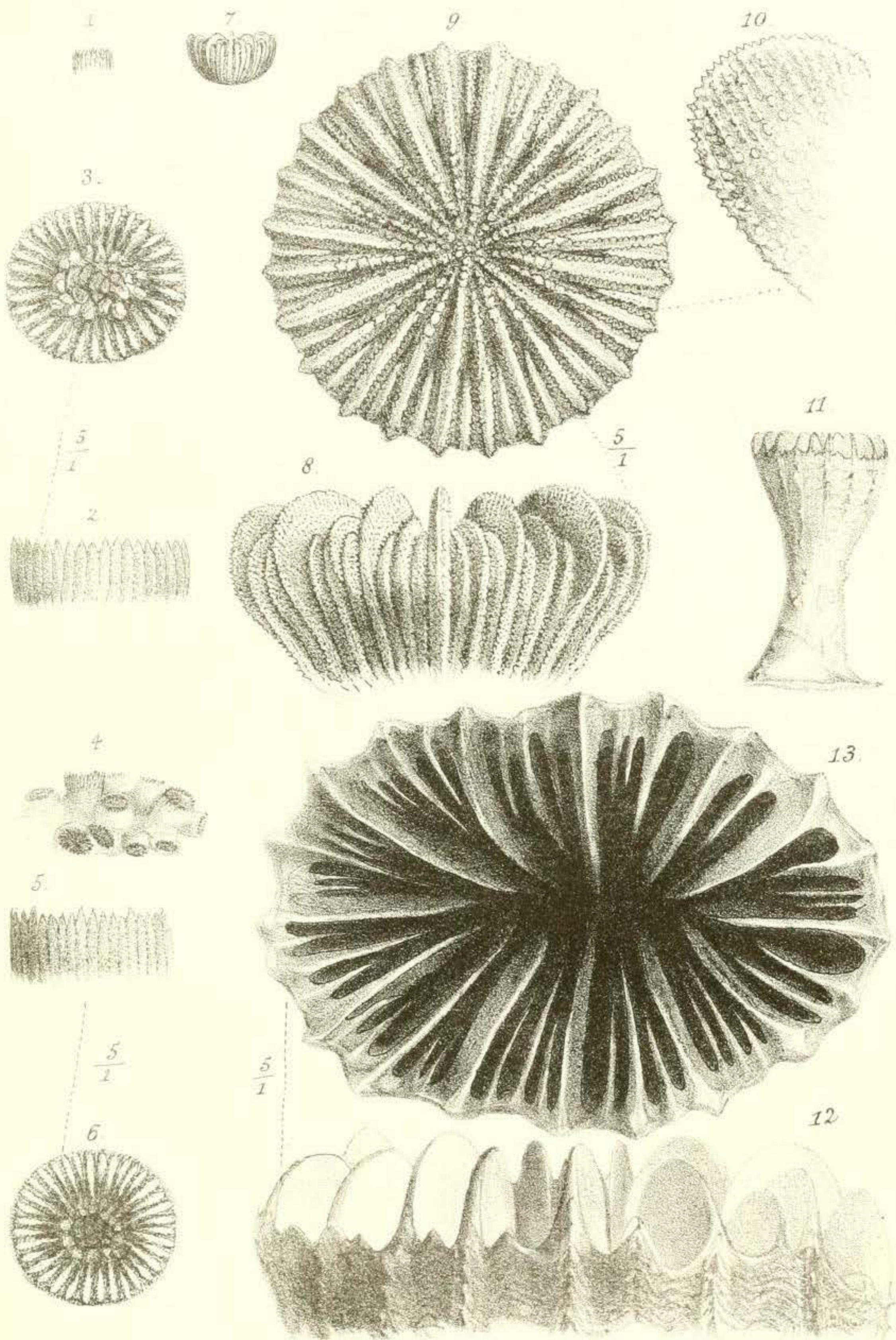
Three of the species closely resemble fossil forms; and they are *Conocyathus zealandiæ*, *Deltocyathus orientalis*, and *Antillia lonsdaleia*, variety.

The first of these belongs to a genus which is a most marked one, and very well differentiated. It is allied to *Conocyathus sulcatus*, D'Orb., from the Miocene or Oligocene of Mayence. *Deltocyathus orientalis* is closely allied to *Deltocyathus italicus* (of the Italian Miocene); and *Antillia lonsdaleia*, var., differs very slightly from the form from the San-Domingan Miocene, described by me in the 'Quarterly Journal of the Geological Society,' vol. xx., in an essay on the fossil corals of the West Indies. This is of course a most important species; for its being found large and well developed in the Japanese seas implies that the Caribbean was once open to the west. The other evidence of this former connexion between the



From nat. on stone by J. Eschsché.

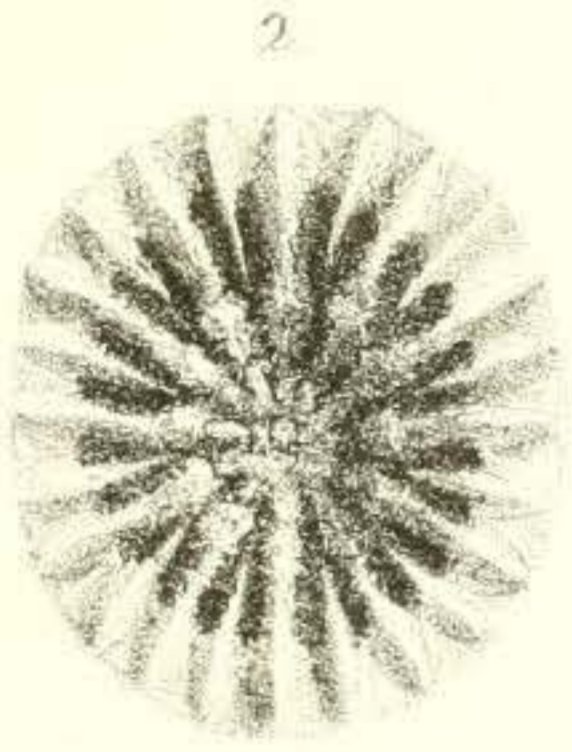
M. & N. Hammett. sculp.



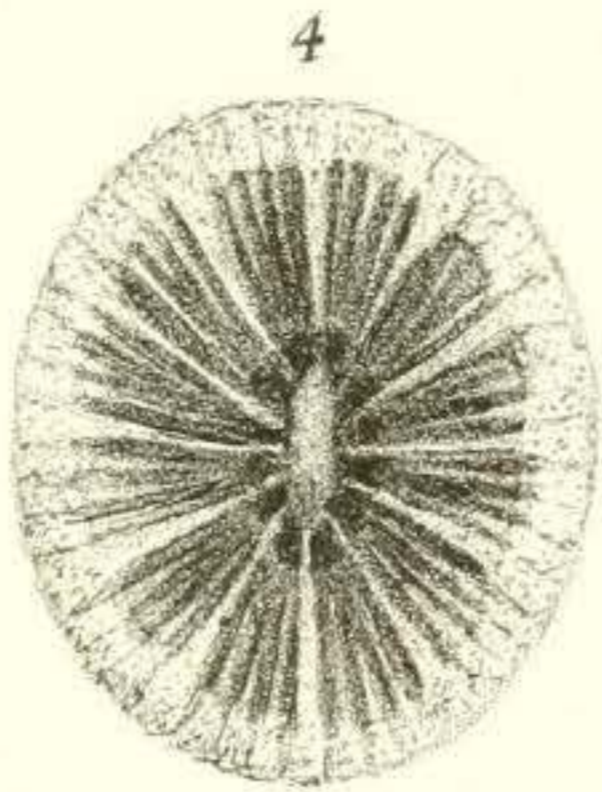
From nat. on stone by J. Erylehen

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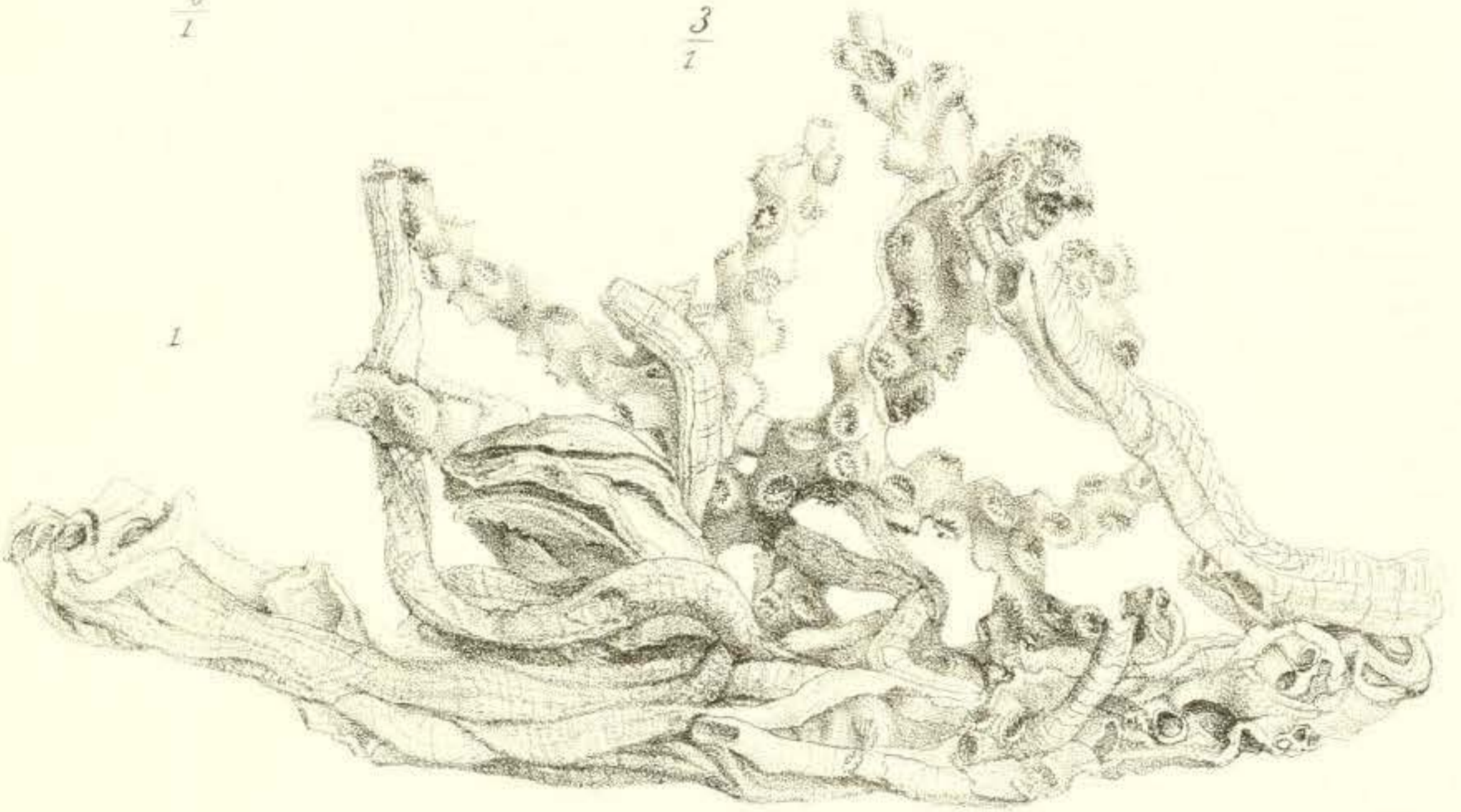
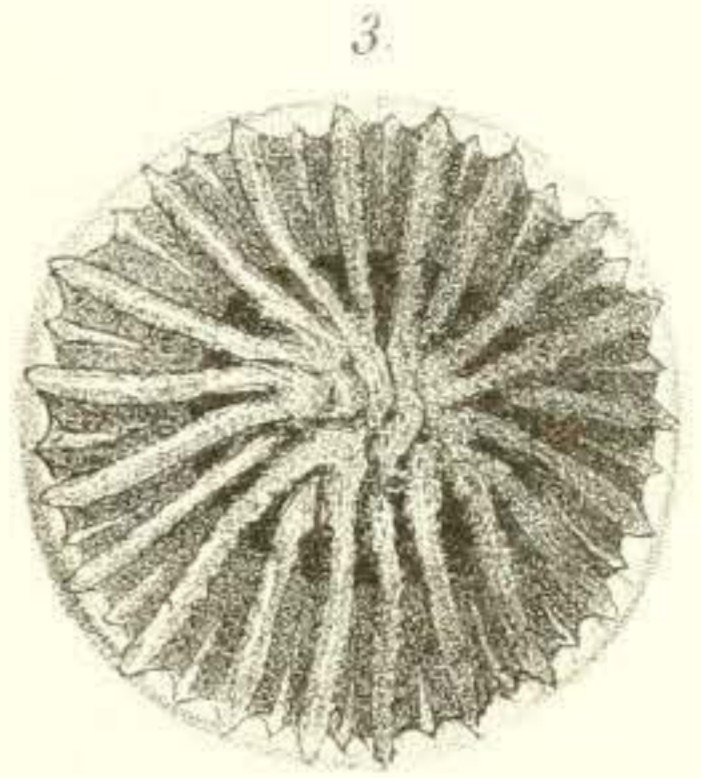
NEW CORALS



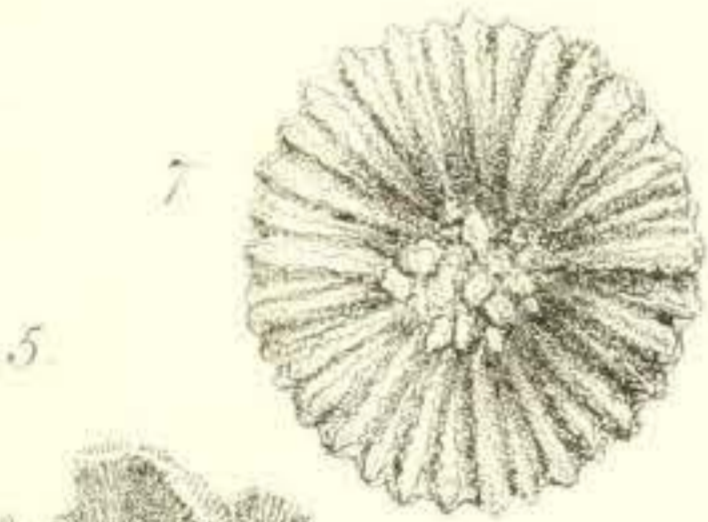
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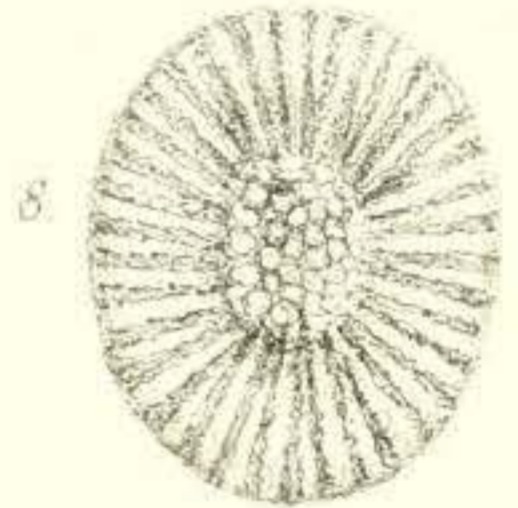


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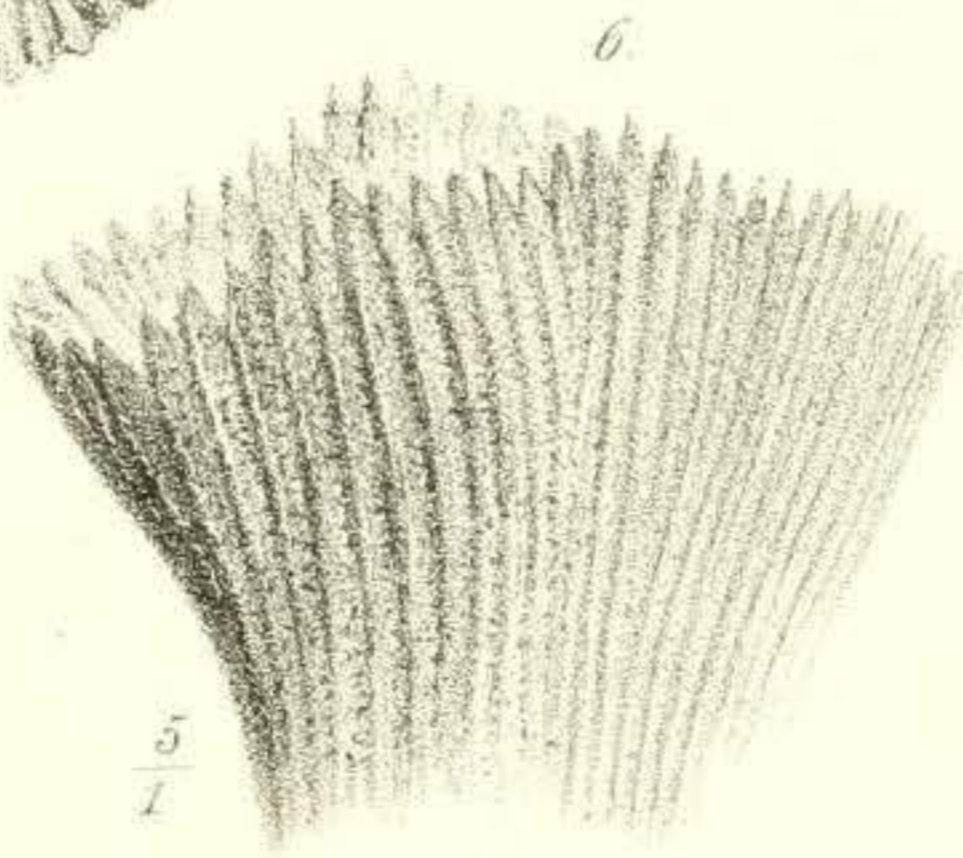


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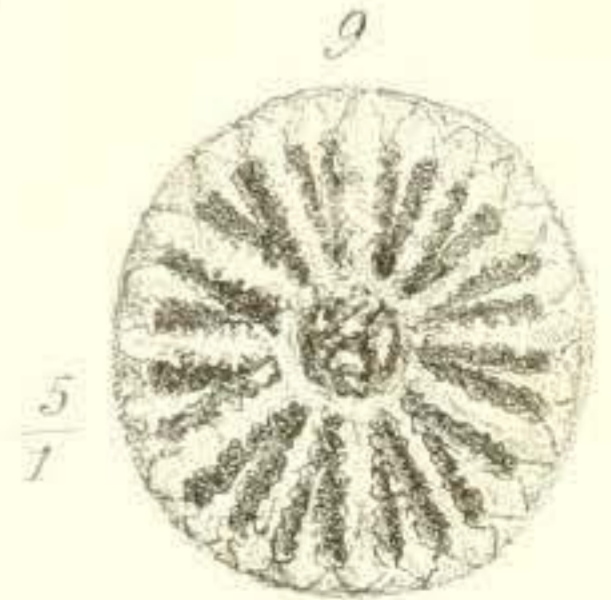


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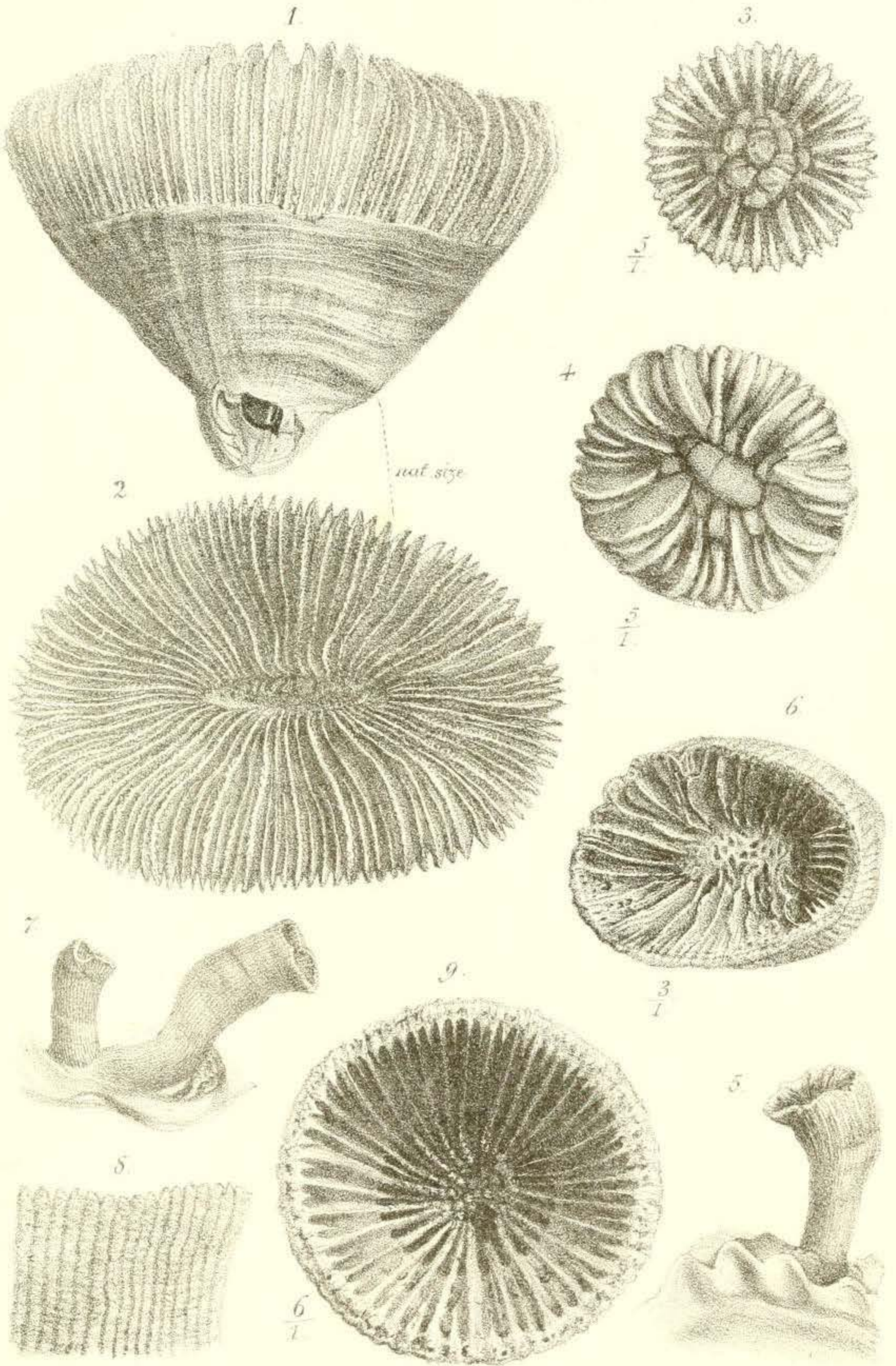
9

$\frac{5}{1}$

From nat. on stone by J. Exleben.

M&N Hanhart imp

NEW CORALS



nat size

From nat. on stone by J. Erxleben.

M & N Hanhart imp.

Pacific and West-Indian coral-faunas is explained in the essay mentioned above.

Of the new genera, *Polycyathus* and *Agelecyathus* may be said to be like the Astrangiaceæ; but they have not incised septa, and there is no endotheca.

Brachytrochus is a very simple form, whose flat shape is relieved by the presence of teeth to the septa, simulating pali.

Javana is a *Desmophyllum* with a remarkable epitheca; and *Dendrocora* represents in the littoral zone the deep-sea genus *Solenosmilia*, nobis (Trans. Zool. Soc. vol. viii. p. 327).

It has been found necessary to reexamine the species *Sclerohelia hirtella* (a St. Helena coral, with a wonderful amount of calicular variation and recalling the Cretaceous *Synheliæ*), and also *Cyathohelia axillaris* of Japan.

List of new Species.

- Conocyathus zelandiæ*. Cook's Straits, New Zealand.
Deltocyathus orientalis. Japanese seas, 52 fathoms.
Paracyathus persicus. Persian Gulf.
 — *coronatus*. Nullipore zone in Persian Gulf.
Polycyathus atlanticus. St. Helena.
Agelecyathus helenæ. St. Helena.
 — —, variety *minor*. St. Helena.
 — *persicus*. Persian Gulf.
Brachytrochus simplex. Gaspar Straits, 12 fathoms.
Javana insignis. Japanese seas, 48 fathoms.
Oculina cubaënsis. Caribbean sea.
Antillia lonsdaleia, Duncan, a variety. Japanese seas.
Dendrocora fissipara. West coast of Africa.
Astrangia minuta. Caribbean seas, littoral.
 — *epithecata*. Caribbean seas, littoral.
Cylicia tenella, variety. Port Natal.
Placopsammia darwini. Galapagos Islands.
Balanophyllia helenæ. St. Helena.
 — *striata*. St. Helena.

List of Species reconsidered.

- Sclerohelia hirtella*, Pallas, sp.
Cyathohelia axillaris, Ellis & Solander.

List of new Genera.

- | | |
|----------------------|-----------------------|
| <i>Polycyathus.</i> | <i>Javana.</i> |
| <i>Agelecyathus.</i> | <i>Brachytrochus.</i> |
| <i>Dendrocora.</i> | |

List of Species, and their Classification.

Suborder SCLERODERMATA.

Section MADREPORARIA APOROSA.

Family TURBINOLIDÆ.

Subfam. CARYOPHYLLIACEÆ.

Conocyathus zelandiæ, sp. n.

Subfam. TROCHOCYATHACEÆ.

Deltocyathus orientalis, sp. n. *Paracyathus coronatus*, sp. n.*Paracyathus persicus*, sp. n.

Subfam. TURBINOLIDÆ REPTANTES, NOV.

Polycyathus atlanticus, sp. n. *Agelecyathus helenæ*, var. n.*Agelecyathus helenæ*, sp. n. — *persicus*, sp. n.

Subfam. TURBINOLIACEÆ.

Javania insignis, sp. n. *Brachytrochus simplex*, sp. n.

Family OCULINIDÆ.

Oculina cubaënsis, sp. n.

Family ASTRÆIDÆ.

Subfam. ASTRÆINÆ.

Antillia lonsdaleia, var. n.

Division CLADOCORACEÆ.

Dendrocora fissipara, sp. n.

Division ASTRANGIACEÆ.

Astrangia minuta, sp. n. *Cylicia tenella*, var. n.— *epithecata*, sp. n.

MADREPORARIA PERFORATA.

Family EUPSAMMINÆ.

Balanophyllia helenæ, sp. n. *Placopsammia darwini*, sp. n.— *striata*, sp. n.*Species reconsidered.*

Family OCULINIDÆ.

Sclerohelia hirtella, Pallas.*Cyathohelia axillaris*, Ellis & Solander.*Description of the Species.*

Suborder SCLERODERMATA.

MADREPORARIA APOROSA.

Family TURBINOLIDÆ.

Subfam. CARYOPHYLLIACEÆ.

Genus CONOCYATHUS, D'Orbigny.

This genus is thus described by Milne-Edwards and Jules Haime in their 'Hist. Nat. des Corall.' vol. ii. p. 25 :—

The corallum is simple, trochoid, straight, free, and without a trace of adherence. The costæ are not lamellar; the septa are exsert, being strongly spined laterally; the columella is wanting or is rudimentary; and there are well developed pali before the septa of the penultimate cycle.

The genus resembles *Turbinolia* without a columella and with pali. Its solitary species, a well-marked form, with three cycles of septa, and six large pali, was found in the Mayence Tertiary deposits, and was called by D'Orbigny *Conocyathus sulcatus*, from the grooved appearance of its outside.

Two specimens of simple corals were dredged up in Cook's Straits, New Zealand, from no very great depth, and they were evidently within this remarkable genus, differing very slightly from the fossil form.

CONOCYATHUS ZELANDIÆ, sp. n. (Plate XXXVIII. figs. 1-3.)

The corallum is conical, the calice being circular in outline; but the lower third of the corallum diminishes suddenly, there being fewer costæ there than above. The base is rounded, and is costulate, the costæ are in ridges, and have distinct intercostal spaces. There is no columella; but six large upward-projecting pali start around the axis, and are placed before each secondary septum. There are three cycles of fully developed septa, and there are three corresponding cycles of costæ; and in addition there are costæ of the fourth cycle in each of the six systems; but they correspond to rudimentary septa.

Height $\frac{3}{10}$ inch. Diameter of calice about $\frac{1}{10}$ inch.

The resemblance of this coral, at first sight, to a Turbinolian without a columella is very striking. The pali are unusually large; and the existence of the costæ, and in relation with rudimentary septa of the fourth cycle, is very remarkable.

Subfamily TROCHOCYATHACEÆ.

DELTOCYATHUS ORIENTALIS, sp. n. (Plate XXXVIII. figs. 4-7.)

The corallum is short, turbinate, widely open at the calice, and it has a circular spot to its base, which is without costæ. The columella is exceedingly small; the primary septa are very exsert; and the costæ are subequal, crowded, granular, and project from the wall. The septa are in four cycles; but the higher orders are incomplete in some systems. The pali are small and lower before the tertiaries, and prominent and tall but not broad before the secondaries. All the septa and the pali are closely granular.

Height of coral $\frac{1}{5}$ inch. Breadth of calice $\frac{1}{5}$ inch.

Locality. Japanese seas. N. lat. $34^{\circ} 12'$, E. long. $136^{\circ} 20'$, in 52 fathoms. Collected by Capt. St. John.

PARACYATHUS PERSICUS, sp. n. (Plate XXXVIII. figs. 8-10.)

The corallum is short, and the base is broader than the calice, which is shallow and open. The costæ are well developed, rounded and subequal. The septa are close and crowded, broad, not exsert,

long and granular at the sides; and there are not quite three cycles. The pali are broad and short, and look like continuations of the primary and secondary septa. The columella is small and concave.

Breadth of calice $\frac{1}{12}$ inch. Height of corallum $\frac{1}{12}$ inch.

Locality. Dredged up from Persian Gulf on Nullipore.

PARACYATHUS CORONATUS, sp. n. (Plate XXXVIII. figs. 11-13.)

The base is broad, but not so wide as the calice; and the whole is short, the costæ being very distinct, prominent, unequal, and extending to the base. The calice is elliptical in outline, and the larger septa are exsert and rounded. The calice is shallow; and a circular ring of septa-like pali arises around the rather small columella. The septa are in incomplete four cycles; and there are about 20 prolongations into the inner circle. These pali are long and arched, the whole presenting the appearance of an intercalicular gemmation.

Height of corallum $\frac{2}{10}$ inch. Breadth of calice $\frac{1}{10}$ inch.

Locality. On a shell in the Persian Gulf.

There is often much difficulty in deciding whether one of the crowns of pali are really such, or only long spines attached to the septa on their inner margin near the central space.

The importance of deciding the true character of the structures is great; for whilst the septal spine may be of specific importance, the presence of the pali as independent structures is generic; for it involves the presence of other tissues—such, for instance, as an extra crown of soft tentacles. Every one who has seen many of the small sessile corals usually called *Astrangia*, *Phyllangia*, and *Ulangia* amongst the Astrangiaceæ must have felt this difficulty. In some the spinose nature of the false palus is evident; but in other species an arbitrary custom appears to have decided that such and such are not septal structures but pali.

In the Astrangiaceæ there must be evidences of endothecal structure in the form of dissepiments, although Milne-Edwards says it is "peu abondante." Moreover the septa must have their free margins more or less incised, and not plain. The origin of the corallites from a basal expansion is part of the diagnosis; but of course this fails with regard to the parent before basal expansions, or stolons have been cast forth.

If a corallite simply increases by basal expansions, or stolons, it is not necessarily one of the Astrangiaceæ; for budding can take place in species of other groups so low down and close to the base that it appears to be, and may be, essentially basal. This is seen in a specimen of *Ovulina cubaënsis* from the Caribbean, when *Serpulæ* have kept the branches from rising as usual. Moreover in the *Sclerohelia* from St. Helena there are some corallites close to the base, and continuous with it, which are not distinguishable from it.

Corallites springing thus from a base more or less closely, and not having endotheca or serrate-edged septa, are not Astrangiaceæ; so that without the necessity of determining what are and what are not pali, the difficulty in classification is somewhat removed.

These observations are necessary, in order that the nature and classification of several corals which closely resemble each other may be understood, and that their separation or not from the Astrangiaceæ be comprehended.

TURBINOLIDÆ REPTANTES.

Corals rising from a prolongation of the basal structures, sometimes distant, sometimes very close. The septa are plain; and there is no endotheca.

This diagnosis forms a group amongst the Turbinolidæ like that of the Astrangiaceæ of the Astreaceæ; and this group is as it were linked on to the endothecate corals by the Oculinaceæ, which occasionally assume this basal method of growth. I believe "occasional" is a correct term, and that the force of circumstances which prevent the upward growth, and necessitate a basal one, is accompanied by trifling changes in the septal arrangement, and in that of the columella also; so that a species may present itself under two aspects. But until more is known of the soft parts, it is best to make them basal growers when they are only found in that manner.

Genus POLYCYATHUS.

There is an epitheca covering the costæ; pali are present; and the columella is usually deeply seated.

POLYCYATHUS ATLANTICUS, sp. n. (Plate XXXVIII. figs. 14-16.)

The corallites arise close to the bases of their neighbours, and grow more distinct and distant with age. Their shape is cylindrical, with a broad base and an elliptical calice, which is circular in outline in young species. The epitheca is very decided in young, and well seen in the old specimens. The septa are irregularly arranged; and in the largest calices there are four complete cycles and part of a fifth. The primary and secondary septa are the most distinct and exsert, being granular at the sides, but not incised on the margin. The smaller septa do not reach far from the wall. The margin of the calice, round and stout in the young corallite, is rather wavy and even angular in the largest. The costæ are subequal, granular, and covered by the epitheca. The columella is deeply seated, small, and ends in a few papillose spines. The pali resemble the spines of the columella, but are usually larger and, indeed, longer than the smaller septa before which they are placed. The pali are placed before the tertiaries and secondaries, those of the tertiaries being nearer the margin of the calice. Sometimes the pali are double or bilobed before these septa, but not before the secondaries. There is no endotheca.

Height $\frac{4}{10}$ inch. Breadth of calice $\frac{3}{10}$ inch.

On an *Ostrea* from St. Helena.

Genus AGELECYATHUS.

There is no epitheca; the costæ are well developed, especially near the calices; the septa are more or less exsert. There are pali, a columella, and no endotheca.

AGELECYATHUS HELENÆ, sp. n. (Plate XXXIX. figs. 4-6.)

The corallum incrusts; and the corallites, united by a common base, are wide apart and short. The calices are elliptical or round, open and moderately deep. The columella is small, papillose, and deeply seated; the septa are not crowded, but are stout, granular, and unequal. The primaries and some secondaries are exsert. The pali are long, thin, papillose, and are placed before the secondaries and the tertiaries. The costæ are flat, unequal, extend to the base, and are granular.

Diameter of calice $\frac{2}{10}$ inch.

Locality. On an *Ostrea* from St. Helena.

The variation of the size and shape of the pali and septa on the same corallum is interesting. In some they are both broad and sharply granular laterally.

Var. MINOR.

A smaller series of corallites, and with all the specific attributes, is on the under valve of the same *Ostrea*.

AGELECYATHUS PERSICUS, sp. n. (Plate XXXIX. figs. 1-3.)

The corallites are united by stoloniferous expansions; and some are distant, whilst others are close. The corallites are cylindrical, slightly narrower at the base, and tumid below the calice. The costæ are distinct, wide, granular, unequal, and flat. The septa are unequal, the primaries being the shortest, and those of the higher cycle much smaller: but in some calices the septa are alternately large and small. Some calices have very wide septa, largely granular at the sides; others have them thinner; and all are short. There are three cycles, or some septa of the fourth may be present. The columella is small and papillose, and deep in the rather deep fossa. The pali are small, and either thick or papillose. They are placed before the tertiaries, and sometimes before the secondaries.

The variability of the pali, and size of the septa, and the septal number is very remarkable in the same corallum.

Expanse of corallum 1 to 2 square inches. Height of corallites $\frac{1}{20}$ to $\frac{4}{10}$ inch. Breadth of calice $\frac{1}{12}$ to $\frac{1}{10}$ inch.

Locality. Dredged up out of Persian Gulf.

Subfam. TURBINOLIACEÆ.

JAVANIA, gen. nov.

The corallum is simple, tall, compressed at the calice, and adheres by a broad base. There is a complete epitheca, dense inferiorly, and pellicular superiorly. The larger septa are very exsert; and the tertiaries have costæ much broader than they are. The costæ of the

primary and secondary orders project. There is no columella; and the calicular fossa is very deep.

The genus is allied to *Desmophyllum*, Ehrenberg; but the absence of exsert higher orders of septa and the dense epitheca separate it from this form.

JAVANIA INSIGNIS, sp. n. (Plate XXXIX. figs. 11-13.)

The corallum has a broad incrusting base, above which it is smaller and cylindrical, and it expands gradually, being compressed from side to side. The calice is elliptical, and the axes are on the same plane; the septa are very unequal; and there are four cycles and part of the fifth. There are twelve nearly equal exsert septa, and twelve tertiaries which are less exsert and smaller. Between these septa there are in some parts three small and well-developed septa, and sometimes two or none. The larger septa are nearly without ornamentation and are thick; and they approach the long-axis space, deficient in columella. The epitheca is stout and plain inferiorly, but towards the calice it becomes pellicular and arranged in series of transverse festoons. These curve up to the prominent and bluntly serrate costæ, which correspond to the septa of the three front cycles. The other septa have no costæ. The calicular margin has the epitheca continued to it; and the costæ of the primaries and secondaries are exsert and wide, as are those of the tertiaries which form the costal prolongations down the wall.

Height $1\frac{1}{5}$ inch.

Locality. Japanese sea, N. lat. $34^{\circ} 13'$, E. long. $136^{\circ} 13'$, 48 fathoms. Collected by Capt. St. John.

There is some difficulty in classifying the next species, on account of the very arbitrary manner in which certain modifications of the internal parts of the septa are decided to be pali. Pali, in the strict and proper sense should arise from the internal base of the corallite, and should be placed between certain septa and the columella, or the axial space, when this last is deficient. They may adhere to the septa; but in either case the ornamentation and general arrangement of the sclerenchyma of the pali differ from those of the septa. A row of pali infers an extra row of tentacles. But the term pali is given to prominent dentations of the inner margin of septa, or to the inner margins when their dentition differs from that of the rest of the laminae, in *Phyllangia* for instance. This is not correct: such structures may be termed papillose; but this will not permit of the corallites being classified as having pali. In the species about to be described the inner part of all the septa is more or less peculiarized by broad, widely separated, complicated granulations, or rough papillæ. The linear series of these ornaments simulate pali; but I am not disposed to admit that they are those accessory structures. Were they pali, the form would fairly come near to Gray's *Heterocyathus*, as it stood first of all—not as one of the synaptulate corals according to Milne-Edwards and Jules Haime, but a true member of the old group of Trochocyathaceæ.

As the form has no endotheca, is simple, and without pali, it comes within the Turbinolinæ, in the neighbourhood of *Desmophyllum*, *Smilotrochus*, and *Discotrochus*; but it differs from all.

Like the two well-known Japanese simple corals, the corallum has its base surrounding a shell; but in this instance the small *Ditrupa*-like annelid does not always interfere with the symmetry of the base.

Genus BRACHYTROCHUS.

The corallum is very short, free, or incrusting annelid-shells. The calice is circular, and deep centrally; there is no columella. The septa are exsert and papillose; the costæ are well developed, except on the rounded centre of the base, where they merge into a granular structure.

BRACHYTROCHUS SIMPLEX, sp. n. (Plate XXXIX. figs. 7-10.)

The calice is widely open, and the floor of the fossa is visible. The septa are in six systems, and there are four perfect cycles in each; the primaries are the largest, the most exsert, and project the most internally and externally; the secondaries are slightly smaller than the primaries, and larger than those of the third order. The fourth and fifth orders are the smallest, and rather approach the tertiaries.

All have large and wide papillæ internally; and those of the third and higher orders of septa reach furthest from the axis. The septa are rounded faintly and are thin and exsert.

The costæ are profusely granular. The inner granulations, or papillæ of the septa, radiate, as it were, from where the columella might have been.

Height $\frac{3}{20}$ inch. Breadth $\frac{4}{10}$ inch.

Locality. Gaspar Straits, 12 fathoms. From the Liverpool Museum.

Family OCULINIDÆ, Ed. & H.

OCULINA CUBAËNSIS, sp. n. (Plate XL. figs. 1, 2.)

The corallum incrusts dead Polyzoa and *Serpulæ*, and rises also in the form of irregular stems which branch and often coalesce. Gem-mation sometimes lateral and alternate, at other times in spiral series, and without order.

The calices are not very prominent, and are moderately deep. The columella is extremely small and trabecular; the septa are alternately large and small; and the primaries and secondaries are exsert, arched, and finely spinulose at their margin. There are rarely three complete cycles. The pali are before all the septa except the last, are long, rather papillose at the surface, tall, and their inner end meets the almost rudimentary columella. The costæ are often well seen over the sides and running between the corallites; at other times they are wanting. They are often unequal, a large one being followed by a very small one. All are minutely granular, so that they feel as if spiny.

Fissiparity is rare.

Breadth of calices $\frac{1}{4}$ inch.

Locality. Caribbean Sea.

This is allied to *Oculina tenella*, Pourtalès.

SCLEROHELIA HIRTELLA, Pallas, sp. (Plate XLI. figs. 3, 4.)

This fine species has been found at St. Helena, and as yet nowhere else; and no other form comprehended by the genus has been described. On a large *Ostrea* from the coast of St. Helena, there are several specimens which would at a glance be referred to the genus *Sclerohelia*; and their examination, whilst it confirms this impression, proves the extraordinary amount of variation which the calices may present.

The specific diagnosis is as follows:—

The corallum has a thick stem and many branches, the cœnenchyma being very thick, glistening, and finely granular. The costal striæ are slightly marked. The calices are alternate and opposite on the young branches and are placed irregularly on the larger ones, being generally but slightly prominent and shallow. The columella is well developed, being made up of 7 or 8 papillæ. There are three complete cycles of septa; and some of the fourth are found in one or two systems. The septa are very unequal and very projecting at the margin. The pali are well developed, and are placed before the secondary septa. Diameter of the calices $\frac{1}{5}$ inch.

A comparison between this structural description and that which can be given of the specimens on the *Ostrea* is very instructive.

1. A large dendroid mass having three large branches, two of which coalesce after some ramifications have been given off.

Calice 1. This is on the thick branch; and its base is costulate, and the surface granular. The shape is elliptical; the septa are in six systems; and there are four perfect cycles in two systems, an incomplete fourth cycle in one, and three complete cycles in the others. The columella is composed of three oblong masses in a line; the pali are thin, rather long, and are placed before two secondaries and two tertiaries on one half, and before two tertiaries and two secondaries in the other.

In the next calice to no. 1 (2) the columellary masses have united and have assumed a dense structure, arched above. No. 3 is a calice on a small branch, the calice being rather more circular in outline; the columella has two side-papillæ; and two of the pali are wanting.

And in another calice (4) the columella is as in no. 2; but the pali are thick and broad.

On other branches of the same corallum there are some calices with four cycles of septa in four systems, and the fifth orders wanting only in the half of the other systems; and in some the columella is long and solid, or long and incomplete, or round and made up of many processes.

On the surface of the trunk there are some calices which surmount rather elongated buds, and the septal number is not over 24, and the columella consists of one twist of a band-like structure greatly resembling a styloid columella at the top.

2. A small, stunted corallum on the same shell as the last, has well-developed calices and costal markings in some places, but, as in no. 1, not everywhere. The calices are of two kinds—those with a large columella made up of several trabeculæ forming a more or less globular or circular mass, and those with elongated columellæ and well-developed pali.

3. A small trunk on the lower side of the same shell presents calices with a large columella and small pali. The costæ are very marked around some calices.

These variations in the calicular arrangement in the same corallum and in the same species are very significant, and they prove that the presence or absence of costæ, the septal number, the number and dimensions of pali, and the size and development of the columella must not be taken separately to decide specific distinctions if some of the other structures retain their special characters.

This coral is a very interesting species, as it is only found off St. Helena; but it, when worn, and when the columella is small, singularly resembles the *Synheliæ* of the chalk.

CYATHOHELIA AXILLARIS, Ellis & Solander, sp.

This common species, from the Japanese seas, is described in Milne-Edwards and Jules Haime's 'Hist. Nat. des Coral.' vol. ii. p. 110. They omit to state that the pali are situated before the primary, secondary, and tertiary septa, and that in young calices the columella is on a much lower level than the tall papillæ of the crown of pali. The thickness of the septa varies according to age.

Family ASTRÆIDÆ.

Subfam. ASTRÆINÆ.

Genus ANTILLIA, Duncan, Quart. Journ. Geol. Soc. 1864, p. 28.

ANTILLIA LONSDALEIA, Duncan, Quart. Journ. Geol. Soc. vol. xx. pl. iii. figs. 4-4c.

A variety of this Miocene species which I described from the Tertiaries of San Domingo is found in the Japanese seas at no very great depth. It was sent over by Capt. St. John; and on examining the two specimens I could not distinguish a specific difference between them and the fossil form. The arrangement of the lobed septa, their high cyclical number, their ornamentation and endotheca are most close in their resemblance. The general shape differs a little; and the compressed form of the calice constitutes a variety only.

The side view of the corallum is given in Plate XLI. fig. 1, and the details of the calice in Plate XLI. fig. 2.

Division CLADOCORACEÆ.

DENDROCORA, gen. nov.

The corallum is bushy, the ramifications being frequent from all parts, short and frequently forming groups in one plane. The wall is thick except near the calices; the costæ are distinct, and thicker than the septa. The columella is lax and trabecular, having pali

which are placed before the tertiary septa in perfect systems. Fissiparity is common in the terminal calices, and they present short broken series. There is no epitheca. Endotheca tolerably abundant.

This genus differs from *Cladocora* in having no epitheca, in the fissiparous division, and in the thickness of the walls. It is distinguished from *Pleurocora*, to which it is more closely allied than to any other genus, in its general shape and the fissiparity of the terminal calices; and it is separated from *Goniocora* by having pali.

DENDROCORA FISSIPARA, sp. n. (Plate XL. figs. 5-7.)

The corallum is small and bushy, the branches being slender; the terminal calices are elongate, and undergo fissiparity by the division of the calice by a large septum. Ordinary calices are round, shallow, with exsert septa, very granular, in vertical lines, and slightly incised; and the columella has an open reticulated form, with processes centrally, and pali at the side. Septa in 6 systems, and usually three cycles in each, a fourth never being complete. The pali are before the third septa. The costæ are broader than the septa at the calice, and are sharply granular and very distinct. Height of coral 2 inches. Breadth of ordinary calice $\frac{1}{12}$ inch, of a series $\frac{4}{10}$ inch.

Locality. Off Bonito, West Africa. $4\frac{1}{2}$ fathoms. Liverpool Museum.

DIVISION ASTRANGIACEÆ.

ASTRANGIA MINUTA, sp. n. (Plate XL. fig. 8.)

The base is larger than the centre; and the costæ are moderately developed. The calice is very open and shallow; the columella is well seen, and consists of papillæ which resemble those of the smaller septa. The corallite is very short; and there are three complete cycles of septa, which are short, granular, unequal, arched, and slightly excised.

Breadth of calice $\frac{1}{10}$ inch. Height of corallum $\frac{1}{30}$ inch.

Locality. On a reef-coral from the shores of San Domingo.

ASTRANGIA EPITHECATA, sp. n. (Plate XL. fig. 9.)

The corallum is short, the calices open and shorter than the base; the fossa is shallow; and the epitheca comes to the margin. The columella is small, being formed by a circle of trabeculæ joining the septal ends. Septa wide apart, unequal, usually long, and in three cycles.

Breadth of calice $\frac{3}{20}$ inch. Height of corallum $\frac{1}{20}$ inch.

Locality. On West-Indian recent reef-coral.

A group of corals associated with several little Brachiopods of the genus *Krausia* (probably a variety of *Krausia persicum*), from Port Natal, in South-eastern Africa, presents some interesting results to a careful investigation. The corallites have the aspect of the genus *Cylicia*, Dana, as they are crowded, spring from a basal expansion, have a well-marked epitheca, deep fossæ, and the septal edge concave. At first sight the whole would be associated with

Cylicia tenella, Dana, which is placed amongst the Astrangiaceæ; but the following structural peculiarities render this a matter of doubt.

1. Some corallites attain the height of $\frac{4}{10}$ inch nearly equalling 10 millimetres.

2. All the corallites do not arise from the stoloniferous base, but some spring from others between the calice and the base; but it does not appear that these are buds. They are probably the result of polypes that became fixed on to the epitheca of the original one in their mobile stage.

3. The epitheca is shown perfectly in small corallites; but the larger and even some of the smaller have distinct but small costæ, which are marked with granules, and which join the angular and very slightly exsert ends of the septa.

4. The septal arrangement is irregular. There are six primary septa, and a number of others, the majority resembling the primaries. Usually there are 20 large septa reaching into the calice; and between each pair there is often, but not invariably, a rudimentary septum. In some calices the primaries appear to be five in number; and in a bud there is one primary and a small septum on either side of it. All are granular and incised more or less.

5. The endotheca is absent, except within the calice of two specimens, where it is extending between the septa near the wall, as if commencing to occlude the floor of the calice.

6. The columella is formed of processes from the septal ends, is small, and has three or more beautiful granular ornaments on the points where the reticulations meet.

The incised nature of the larger septa along their slanting internal margin is evident. Sometimes the septa do not even reach to the calicular margin; and some appear as spines from the inner part of the calicular wall. The third cycle is rarely complete if the rudimentary septa, which project between the larger $\frac{1}{50}$ inch or a little more, are wanting, as in the diagnosis of Milne-Edwards and Jules Haime, 'Hist. Nat. des Corall.' vol. ii. p. 608; and the third cycle do not always bend towards the secondary septa. If the rudimentary septa are counted, the fourth cycle is rarely complete.

The species *Cylicia tenella* and *C. verreauxi*, Ed. & H., differ in respect of the perfection of the third and imperfection of the fourth cycle, this last never being perfect in either. There is no specific distinction between them; and therefore the last-named species had better disappear. The form under consideration I deem a variety of *Cylicia tenella*, var. *natalensis* (Plate XL. fig. 3).

MADREPORARIA PERFORATA.

Family EUPSAMMINÆ.

BALANOPHYLLIA HELENÆ, sp. n. (Plate XLI. figs. 5, 6.)

The corallite has a small base, a narrow bent cylindrical stem, and a suddenly large calicular opening.

The costæ are not exsert at the calice, are distinct to the base,

slightly prominent, unequal, very numerous, perforated here and there, close together, and spinulosely granular, the grains being few and large. There is an epitheca, which reaches upwards from the base a short distance; and the wall is thin and reticulate. The calicular fossa is wide and shallow; the columella is oval and moderately large; and there are more than five cycles of septa in each of the six systems. The septa are thin, not exsert, long, and unite not far from the columella, and near the wall the larger are perforate.

Height $\frac{6}{10}$ — $\frac{8}{10}$ inch. Breadth of calice $\frac{3}{10}$ — $\frac{4}{10}$ inch.

Locality. St. Helena, on an *Ostrea*; probably 11 fathoms.

(Sent as having come up with an anchor from a great depth.)

BALANOPHYLLIA STRIATA, sp. n. (Plate XLI. figs. 7-9.)

The corallite is tube-like, there being but slight alteration in the breadth of the cylindrical and bent form during growth; it is long, slender, bent, and fixed by a wide base. The costæ are numerous, subequal, close, faintly granular; and the synapticulæ are visible on the intercostal spaces where the costæ have been worn, but not otherwise. There is an epitheca inferiorly. The costæ do not project upwards at the calice; but those of the primary and secondary septa and sometimes of the tertiary are a little higher than the others. The wall is thin at the margin, and the reticulation is slight. The calice is circular in outline, very deep; and the columella is very small, and appears as a few scattered papillæ. The septa are thin, long, not prominent, and do not reach far into the centre at the margin; but the larger reach far inwards at the base of the fossa. The larger are plain, and the rest are denticulate. The union is made close to the wall and halfway down the calice.

Height $1\frac{1}{10}$ inch. Breadth of calice $\frac{3}{10}$ inch.

Locality. Found with the species just described.

GENUS *PLACOPSAMMIA*, Reuss.

PLACOPSAMMIA DARWINI. (Plate XL. fig. 4.)

The corallum has a broad ascending base, which narrows suddenly and is continued upwards as a cylindrical tube-like corallum, one diameter being slightly greater than the other. Buds project from the same height as the parent, in a whorl, and pass upwards and outwards. There is no epitheca; and the costæ are well developed, nearly equal, broad, distinct, and sharply multigranular. The intercostal spaces show synapticulæ, and are distinct. The calice is elliptical in outline, and rather deep; the margin is densely reticulate and stout; and the septa, barely exsert, are thin, long, and do not project much from the margin. There are twelve nearly equal septa (1 & 2); and the tertiaries are not so well developed as those of the fourth cycle. All these last are rather spiny on their internal margins; and their approach and contact with each other is very slight and low down. There are four perfect cycles, and in one or two systems an order of the fifth. The columella is deeply seated, is well separate

from the septa, is lamellar and granular, the granules being long. It is long, arched, and thin at the surface.

Height of corallum $1\frac{1}{4}$ inch. Breadth of calices $\frac{3}{10}$ — $\frac{4}{10}$ inch.

Locality. Galapagos Islands. Collected by Mr. Darwin.

EXPLANATION OF THE PLATES.

PLATE XXXVIII.

- Fig. 1. *Conocyathus zelandiæ*, nat. size.
 2. Ditto, coral, magnified.
 3. Ditto, calice, magnified.
 4. *Deltocyathus orientalis*, side view.
 5. Ditto, side view, magnified.
 6. Ditto, calice, magnified.
 7. Ditto, a septum, magnified.
 8. *Paracyathus persicus*.
 9. Ditto, side view, magnified.
 10. Ditto, calice, magnified.
 11. *Paracyathus coronatus*, side view.
 12. Ditto, side view, magnified.
 13. Ditto, calice, magnified.
 14. *Polycyathus atlanticus*, side view.
 15. Ditto, side view, magnified.
 16. Ditto, calice, magnified.

PLATE XXXIX.

- Fig. 1. *Agelecyathus persicus*, side view.
 2. Ditto, side view, magnified.
 3. Ditto, calice, magnified.
 4. *Agelecyathus helenæ*, group.
 5. Ditto, costæ, magnified.
 6. Ditto, calice, magnified.
 7. *Brachytrochus simplex*, side view.
 8. Ditto, costæ, magnified.
 9. Ditto, calice, magnified.
 10. Ditto, septum, magnified.
 11. *Javania insignis*, side view.
 12. Ditto, upper part, side view, magnified.
 13. Ditto, calice, magnified.

PLATE XL.

- Fig. 1. *Oculina cubaënsis*, group.
 2. Ditto, calice, magnified.
 3. *Cylicia tenella*, var., calice, magnified.
 4. *Placopsammia darwini*, calice, magnified.
 5. *Dendrocora fissipara*, nat. size.
 6. Ditto, costæ, magnified.
 7. Ditto, calice, magnified.
 8. *Astrangia minuta*, calice, magnified.
 9. ——— *epithecata*, calice, magnified.

PLATE XLI.

- Fig. 1. *Antillia lonsdaleia*, side view, nat. size.
 2. Ditto, calice, nat. size.
 3. *Sclerohelia hirtella*, calice, magnified.
 4. Ditto, second calice, magnified.
 5. *Balanophyllia helenæ*, nat. size.
 6. Ditto, calice, magnified.
 7. *Balanophyllia striata*, nat. size.
 8. Ditto, costæ, magnified.
 9. Ditto, calice, magnified.