

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.

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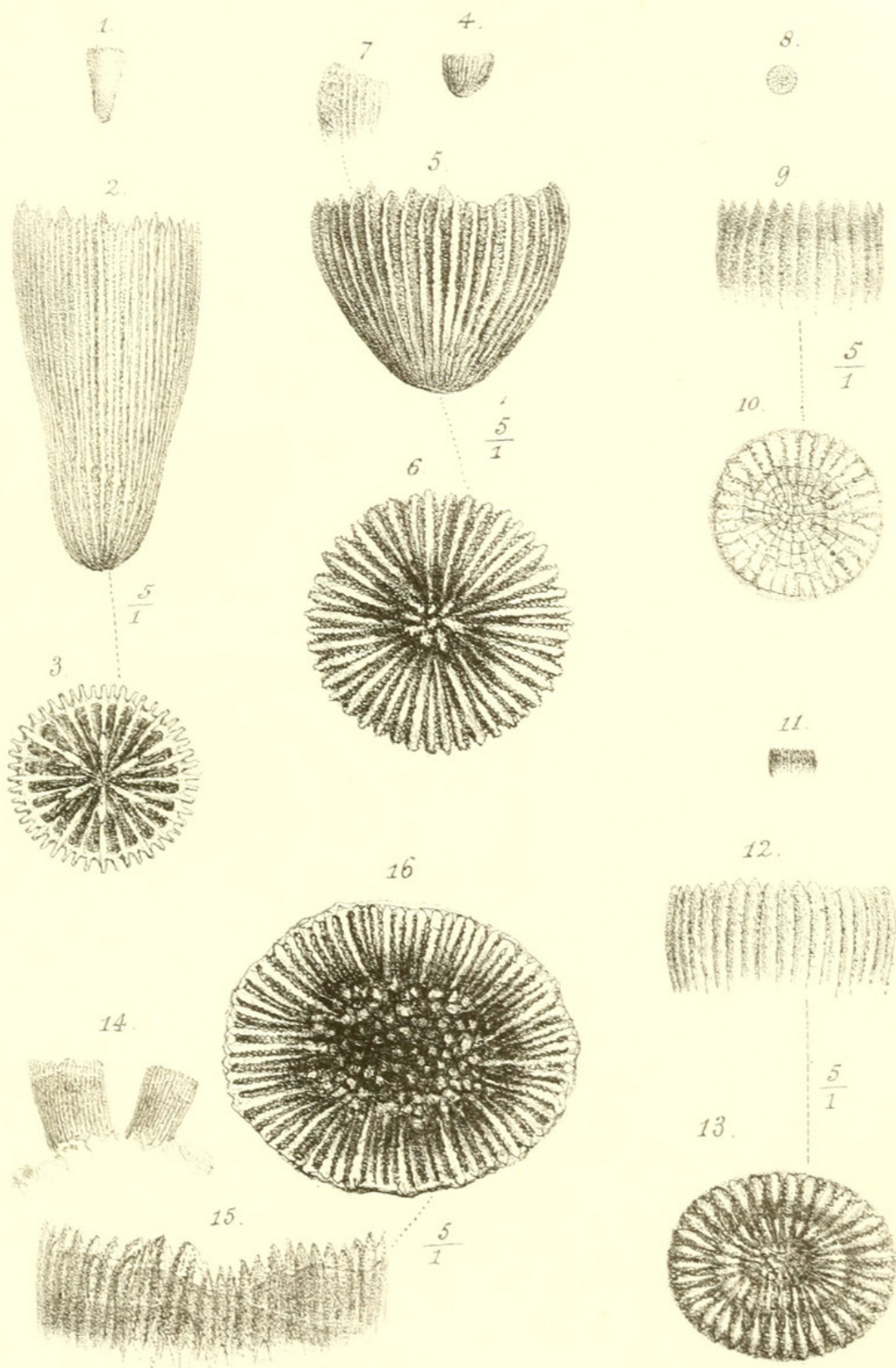
(Plates XXXVIII.—XLI.).

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.

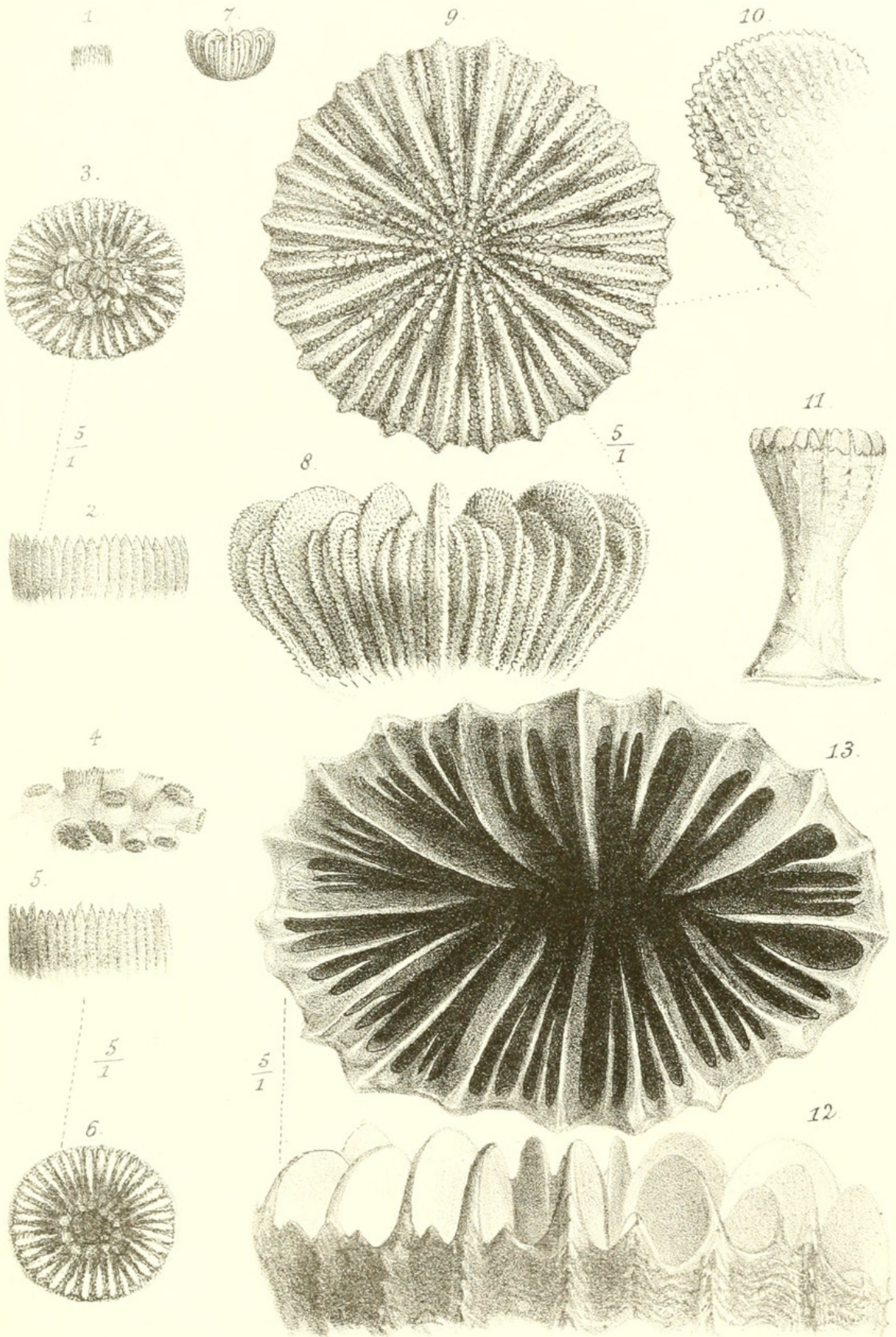
Three of the species closely resemble fossil forms; and they are *Conocyathus zealandiæ*, *Deltocyathus orientalis*, and *Antillia lonsdaleia*, variety.

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



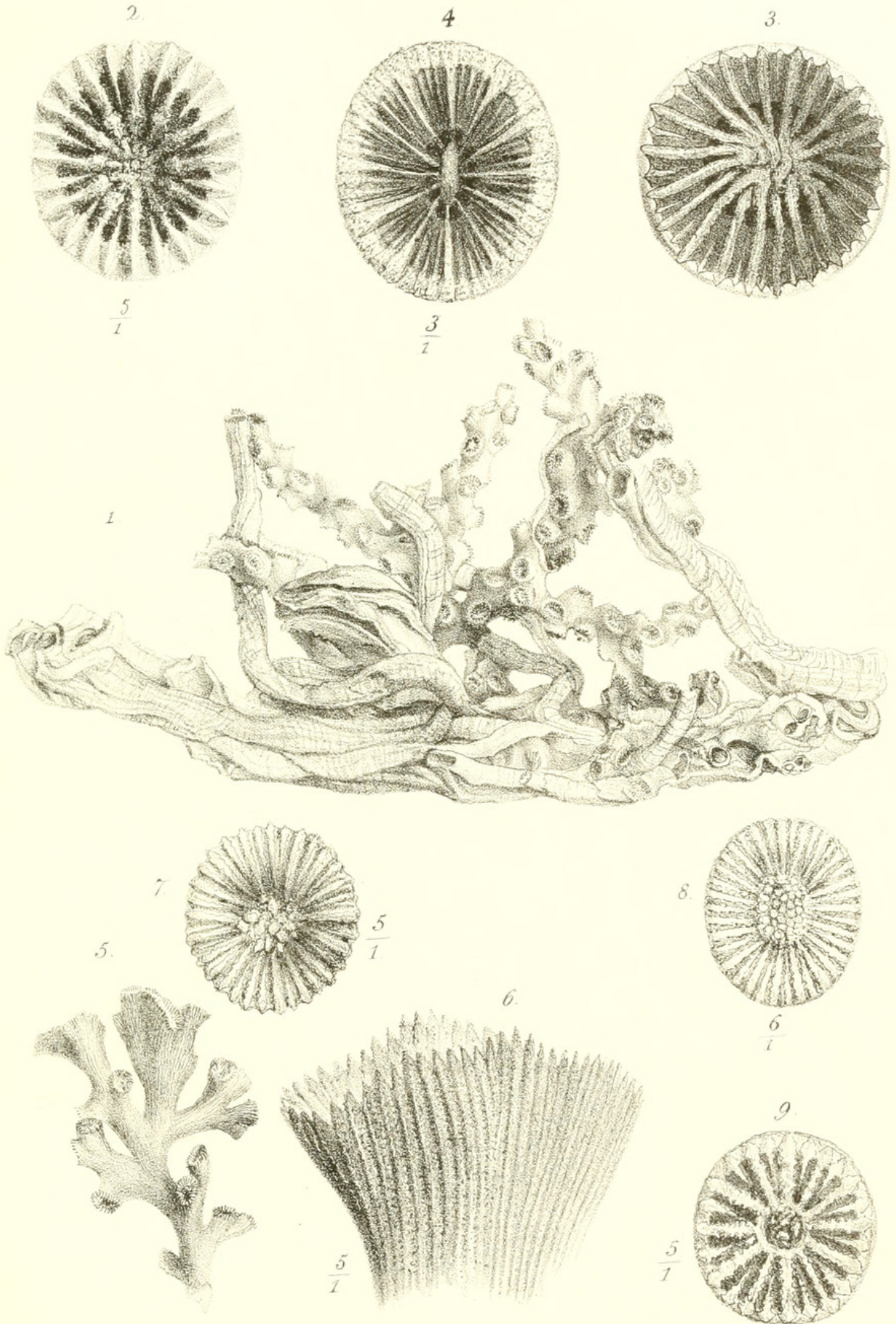
From nat. on stone by J. Erxleben.

M & N. Hanhart imp.



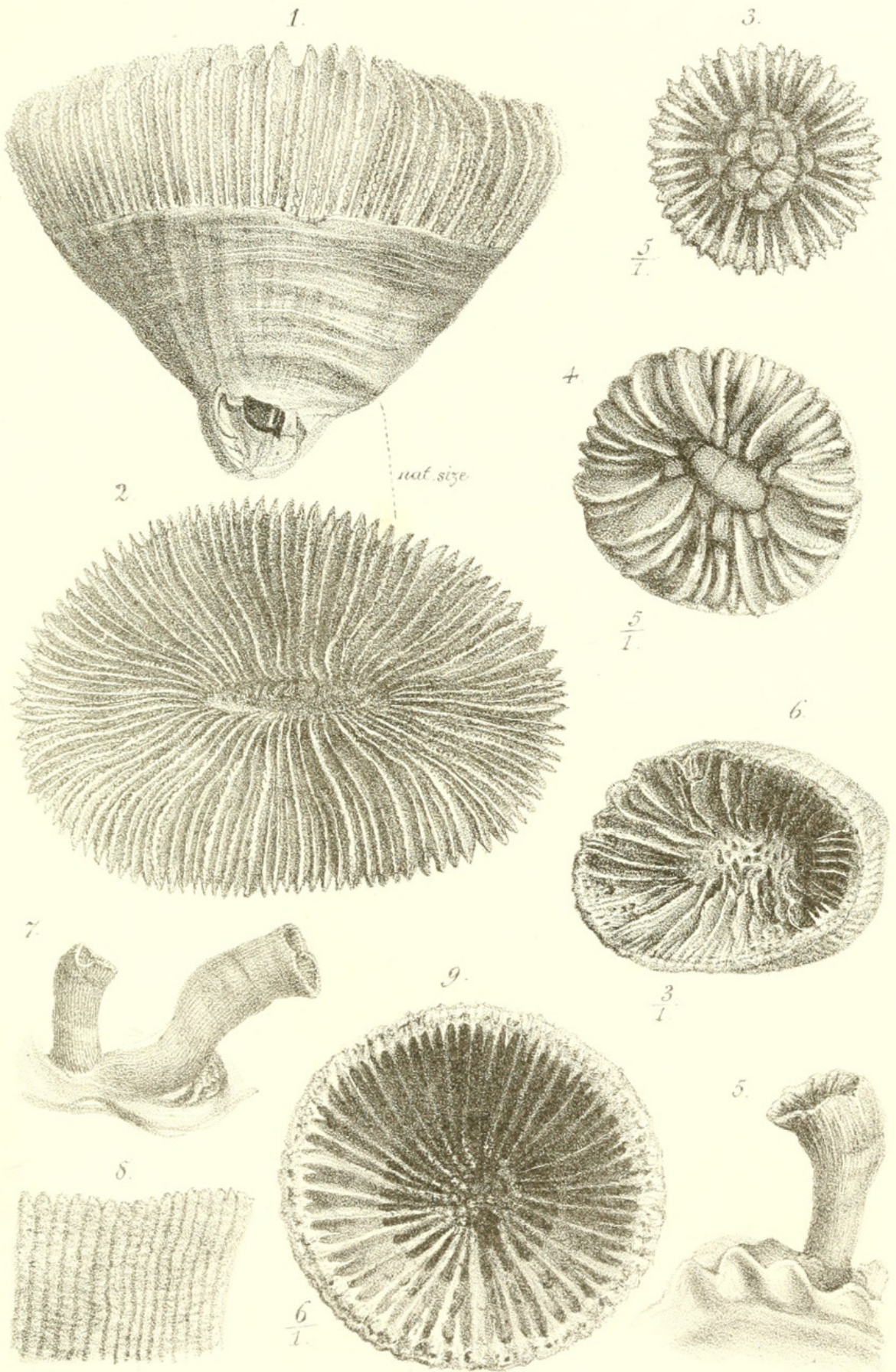
From nat. on stone by J. Erxleben.

M & N Hanhart imp.



From nat. on stone by J. Eixleben.

M & N. Hanhart imp.



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.

Javania 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 *Synhelix*), 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.

Javania 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.

Polycyathus.

Agelecyathus.

Dendrocora.

Javania.

Brachytrochus.

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.

Javana 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 TURBINOLIIDÆ.

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 cylindro-conical, 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



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