

DESCRIPTION OF SIX SPECIES OF CORALS,
FROM THE PALÆOZOIC FORMATION OF
VAN DIEMEN'S LAND.

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1. STENOPORA TASMANIENSIS, sp. n.*

Branched, branches cylindrical, variously inclined or contorted; tubes more or less divergent; mouths oval, divisional ridges strongly tuberculated; indications of successive narrowing in each tube, 1—2.

THIS coral, in its general mode of growth, resembles *Calamopora* (*Stenopora*?) *tumida*, (Mr. Phillips, Geol. Yorkshire, Part II. Pl. 1, fig. 62), but in the form of the mouth and other structural details, the differences are very great. *Stenopora Tasmaniensis* attains considerable dimensions, one specimen being $4\frac{1}{2}$ inches in length, and half an inch in diameter.

The branches have individually great uniformity in their circumference, but they differ with respect to each other in the same specimen; and there is no definite method of subdivision or direction of growth. The extremities are occasionally hollow; and one specimen, about $1\frac{1}{2}$ inches in length, and half an inch in breadth, is crushed completely flat. The tubes, in the best exposed cases, have considerable length, springing almost solely from the axis of the branch, and diverging very gently till they nearly reach the circumference, where they bend outwards. In the body of the branch,

* Though the characters of this genus are unpublished, it has been thought advisable not to give them fully in this notice, a very few species only having been examined. The coral is essentially composed of simple tubes, variously aggregated and radiating outwards. The mouth is round or oblong, and surrounded by projecting walls, having along the crest a row of tubercles. The mouth originally oval is gradually narrowed (*στενός*) by a band projecting from the inner wall of the tube, and is finally closed.

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the tubes are angular from lateral interference ; but, on approaching the outer surface, they become oval in consequence of the interspaces produced by the greater divergence. Their diameter is very uniform throughout, with the exception of the narrowings near the terminations of the full-grown tubes. The walls in the interior of the branches were apparently very thin, but there is a relatively considerable thickness of matter at the circumference. No traces of transverse diaphragms have been noticed within the tubes.

Cases illustrative of the changes to maturity and final obliteration in the oval termination of the tubes are rare, but the following have been observed. Where the mouth becomes free and oval, the walls are thin and sharp, and perpendicular within the tube. In some cases they are in contact ; but, in others, they are separated by grooves of variable dimensions, in which very minute foramina or pores may be detected. As the mouth approaches towards maturity, the grooves are more or less filled up, and the walls thicken, a row of very minute tubercles being discoverable along the crest. At this stage, the inner side of the tube ceases to be vertical, being lined by a very narrow inclined band. The mature mouths are separated by a bold ridge, generally simple, but not unfrequently divided by a groove ; the double as well as the single ridge being surmounted by a row of prominent tubercles almost in contact with each other. Only one example of the filling up of the mouths has been observed, but it affords satisfactory evidence of a gradual expansion of the inner band, before alluded to, and a final meeting in the centre. In this extreme state, there is a general blending of details, but the tubercles are for the most part distinct.

In this species, proofs of a narrowing of the mouth previously to the formation of the perfect tube, and the final contraction, are not very prominently exhibited in the long cylindrical straight branches ; but near the point where the tubes bent outwards, there is an annular indentation, which may be traced successively from east to east in a lineal direction, parallel to the surface ; and between the prominent narrowing and the perfect surface, the walls of the tubes were slightly rugose. In another short branch, believed to belong to this species, but in which the tubes diverged outwards very rapidly, the narrowing is strongly marked, but not to an equal extent throughout the specimen.

The matrix, in which the fossil is imbedded, is a coarse calcareous shale, or a gray limestone ; and in which occur also *Fenestella internata*, &c.

2. STENOPORA OVATA, sp. n.

Branched, branches oval ; tubes relatively short, divergence great ; mouths round ; contractions or irregularities of growth numerous.

The characters of this species have been very imperfectly ascertained. The branches are not uniformly oval, even in apparently the same fragment. The tubes diverged rapidly along the line of the major axis, and had but a very limited vertical growth. Their casts exhibit a rapid succession of irregularities of development. The mouths, as far as they can be determined, were round or slightly oval, and the dividing, tuberculated ridges sharp; but in consequence of the outer surface not being exposed, their perfect characters, and the changes incidental upon growth, could not be ascertained.

The coral is imbedded in a dark gray limestone.

1. FENESTELLA AMPLA, sp. n.

Cup-shaped ; celluliferous surface internal ; branches dichotomous, broad, flat, thin ; meshes oval ; rows of cells numerous, rarely limited to two, alternate ; transverse connecting processes sometimes cellular ; inner layer of non-cellular surface very fibrous ; external layer very granular, non-fibrous ; gemmiferous vesicle ? small.

Some of the casts of this coral have a general resemblance to *Fenestella polyporata*, as represented in Captain Portlock's Report on the Geology of Londonderry, Pl. XXII. A. fig. 1 a, 1 d; but there is no agreement between the Van Diemen's Land fossil, and the structure of that species as given in Pl. XXII. figure 3. of the same work, or in Mr. Phillips' original figures, Geology of Yorkshire, Part 2, Pl. I. figures 19, 20. A general resemblance also exists between *Fenestella ampla* and a coral obtained by Mr. Murchison from the carboniferous limestone of Kossatchi Datchi, on the eastern flank of the Ural mountains, but there is again a marked difference in structural details.

Fenestella ampla attained considerable dimensions, fragments apparently of one specimen covering an area of 4½ inches by 3 inches; and it displays considerable massiveness of outline, the branches at the points where they dichotomose often exceeding the tenth of an inch in breadth.

In the general aspect of the coral a considerable uniformity prevails, but the branches vary in breadth, swelling out greatly near the bifurcations; nevertheless, there is no marked difference of character between the base and the upper part of the cup, even in the number of the rows of cells.

In the best state of the cellular surface, which has been noticed, the mouths of the cells are relatively large, round or oval, and are defined by a slightly raised margin; and an undulating, thread-like ridge winds between them, dividing the interspaces into lozenge-shaped areas. The rows of cells, immediately preceding the bifurcation, sometimes amount to ten, and after the separation generally exceed two. The mouths of the lateral rows project into the meshes; and the transverse connecting processes are sometimes cellular. The interspaces between the mouths, as well as the undulating ridges, are granular, or very minutely tuberculated. Internally, the cells exhibit the usual oblique arrangement, overlying each other, and terminating abruptly against the dorsal part of the branch. The perfect casts of the cellular surface give the reverse of the characters just noticed, but more generally the impressions display scarcely a trace of any other structure than longitudinal rows of circular mouths.

On the inner layer of the non-cellular surface, twenty well-marked parallel fibres, with intermediate narrow grooves or corresponding casts, may sometimes be detected, and the number is always considerable. The mode of preservation did not permit the true nature of the fibres to be discovered, but in consequence of what has been noticed in other species, it is inferred that they are tubular. Their range is considerable, but in the specimen, which exhibits their structure most fully, they are frequently cut off by circular foramina. Their perfect surface is minutely granular. The outer layer, or back of the branches, is composed of an uniform crust without any indications of fibres, but covered with numerous microscopic papillæ, and corresponding pores penetrating the substance of the layer.

The only indications of gemmuliferous vesicles, are small circular pits occasionally situated over the mouth, and agreeing in position with the vesicles, which in other cellular genera, have been considered as gemmuliferous. In the Russian specimen before alluded to, casts of similar pits are very uniformly distributed between the casts of the mouths.

The youngest state of the coral has not been noticed, nor have

any marked changes incident upon age, except the gradual thickening of the non-cellular surface, by the coating over of the fibrous layer.

The matrix of the specimens is a dark grey splintery or an earthy limestone.

2. FENESTELLA INTERNATA, sp. n.

Cup-shaped; celluliferous surface internal; branches, dichotimous, compressed, breadth variable; meshes oblong, narrow; rows of cells 2—5, divided by longitudinal ridges; transverse connecting processes short without cells; non-cellular surface, inner layer, sharply fibrous, outer layer, minutely granular.

By the delicacy of its structure, this species is easily distinguishable from *Fin. ampla*; and in the rows of cells varying from two to five, as well as in their mode of development, there are further well-marked differences. It appears to have attained considerable dimensions, fragments having been noticed an inch and a-half in length and an inch in breadth.

The branches vary in width, swelling out gradually towards the bifurcations, but without any alteration in the form or size of the meshes; and as far as the state of the specimens will permit an opinion to be formed, no marked changes occurred during the development of the cup, except one about to be noticed. On the celluliferous surface of the branches, considerable, but uniform, alterations take place between the successive bifurcations. For a short distance above the point of separation, the branch is narrow and angular, and traversed along the centre by a ridge, and there is only one row of cellular mouths on each side. As the branch grew, the ridge widened, and ultimately became celluliferous, a row of mouths springing from its place (*internata*). The three ranges of cellular openings are, in this state of the branch, separated by two ridges, and these, as the development advanced, again widened and became cellular, the five rows being divided by four ridges. This appears to be the extreme stage of growth, another bifurcation taking place immediately after. In the earliest formed part of the cup only two or three rows of mouths prevail; and where the number is greater, a certain amount of irregularity in the linear arrangement is perceptible, resulting from the lateral expansion of the branch.

In the best preserved specimens, the mouths are relatively large, round or oval, and the margin is slightly raised. In the middle rows they are parallel or nearly parallel, and in the direction of the