PHYSICAL DESCRIPTION

OF

NEW SOUTH WALES

AND

VAN DIEMEN'S LAND.

ACCOMPANIED BY

A GEOLOGICAL MAP, SECTIONS, AND DIAGRAMS,

AND

FIGURES OF THE ORGANIC REMAINS.

BY

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"..... The duty really is, not to refute the experiments of others, nor to show that they are erroneous, but to discover truth, and that alone. It is startling when we reflect that all the time and energy of a multitude of persons of genius, talent, and knowledge are expended in endeavours to demonstrate each other's errors."— *Liebig's Chemistry of Agriculture, &c. &c.*

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FOSSIL FAUNA.

INTRODUCTION.

The Fossil Zoology of New South Wales and Van Diemen's Land, so far as our researches enable us to discover, is found to possess representatives of the three great divisions, of *Vertebrata*, *Radiata*, and *Mollusca*. The fourth, the *Articulata*, is but indistinctly indicated in small oblong impressions, resembling the *Trilobites*, not exceeding half an inch, and which are to be met with in Yass Plains and the Boree country, New South Wales, associated with *Favosites Gothlandica*, *Orthoceras*, and stems of *Encrinites*.

Throughout the geological fabric, these representatives show an extraordinary and almost solitary instance of paucity of genera, species, and individuals. The sequence, however, with which they appear in the geological formations, discovers laws similar to those which regulated the succession of genera and species in other parts of the world.

The periods of the existence and extinction of genera and species composing the Australian fossil fauna are obvious, and will form a subject of most interesting disquisition, when the two colonies shall receive the benefit of a thorough geological Ordnance survey.

For the present, it will be expedient to consider the organic remains of the two colonies, but in reference to two distinct epochs: the first as anterior to the deposition of Jerusalem coal, and corresponding to the Palæozoic series; the last as posterior to it, and belonging to the Pleiocene epoch.

PALÆOZOIC FAUNA.

POLYPARIA.

I am greatly indebted to Mr. Lonsdale, F.G.S., for the following important and interesting description and remarks upon the specimens of the Australian fossil *Polyparia* which I have collected in New South Wales and Van Diemen's Land, and which Mr. Morris had submitted to his examination.

STENOPORA.

A ramose spherical or amorphous tubular polypidom: tubes polygonal or cylindrical, radiated from a centre or an imaginary axis, contracted at irregular distances, but in planes parallel to the surface of the specimen; tubular mouths, closed at final (?) period of growth; ridges bounding the mouths, granulated or tuberculated; additional tubes, interpolated.

The examination of Strzelecki's collection of fossil *Polyparia*, from Van Diemen's Land, has extended the knowledge of the corals, for which the name of *Stenopora* was proposed in the Appendix to Mr. Darwin's work on Volcanic Islands, and induced the describer to give the preceding notice of the generic characters.

Stenopora Tasmaniensis. (Pl. VIII. fig. 2—2*e*.)

"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." (See Mr. Darwin's work on Volcanic Islands, p. 161.)

Several casts of a ramose *Stenopora*, believed to belong to this species, were noticed in the collection

examined, but they did not admit of a complete identification.

Locality.—Mount Wellington, Mount Dromedary, Norfolk Plains, Van Diemen's Land.

Stenopora ovata. (Pl. VIII. fig. 3—3*b*.)

"Branched, branches oval; tubes relatively short, divergence great; mouths round; contractions or irregularities of growth numerous." (Op. cit. p. 163.)

The structure of this species was not fully exhibited in the specimens originally examined; but in Strzelecki's series was a fine ramose coral, believed to be identifiable with *Sten. ovata*, as it possessed characters in accordance with those previously noticed: it supplied also others, which confirmed the inference, that this fossil is specifically distinct from *Sten. Tasmaniensis*.

The beautiful specimen alluded to, consisted of a main cylindrical branch, 3½ inches in height, 7 lines in diameter at the lower extremity, and 4 near the upper, where the curvature of the termination commenced. From this branch several others, varying in width from 2 to 7 lines, diverged either obliquely or at right angles: the tubes sprung successively from an imaginary axis, but with numerous interpolated additions, and radiated more or less rapidly, sometimes at very obtuse angles. In the centre of the branches, and before the deflection became marked, they were in contact and polygonal; and the contractions, though relatively distant, were very decided, giving that portion of the coral a peculiar aspect, and indicating apparently periodical renewals of growth. In no case, however, was there a satisfactory proof of the mouth of the tubes having been perfectly closed, as noticed on the exterior of a branch of *Sten. Tasmaniensis*, believed to mark a condition of the ultimate stage of developement. From

the points where the rapid divergence commenced, the tubes were more or less separated and cylindrical; and the contractions became very numerous, though each series was singly not so conspicuous as in the centre of the branches. The casts of the mouths, so far as they could be ascertained, were round, and instead of being encircled, as in the preceding species, with a row of granules or indentations, there was only a single impression of a relatively large tubercle at the cast of the interspace between four mouths, where the rows occurred regularly or between a less number where such was not the case.

Locality.—Mount Wellington, Mount Dromedary, Norfolk Plains, Van Diemen's Land.

Stenopora informis. (Sp. nov. Pl. VIII. fig. 4, 4*a*.)

Amorphous; tubes cylindrical, slender, unequally divergent; contractions variable.

This coral was considered to be distinct from the two preceding species on account of its mode of growth, and its affording no grounds for inferring that the specimens had formed the base of a ramose polypidom.

The section of this *Stenopora* which was examined was imbedded in a fragmentary rock cemented by a felspathic paste, and the whole of the calcareous or original substance of the coral had been removed. The exposed surface was irregular in outline, but the greatest width was two inches, and the greatest height one and a quarter. The diameter of the internal casts of the tubes was about a quarter of a line. Near the base of the specimen the tubes were vertical for a limited portion of the upward range; but even there, they exhibited no signs of lateral compression. The degree of divergence was very unequal, amounting in some places almost to the curvature of a quadrant, and gave the section the appearance of being composed

in part of dislocated fragments. The distance between the contractions also varied considerably, being often very small, but the lines of indentations had a great persistence: their parallelism, however, was limited on account of the irregularities in the mode of growth. The imbedded position of the coral completely prevented the characters of the tubular mouths and of the interstices from being ascertained. The original walls of the tubes were, as in the other species, apparently very thin, except at the points of contraction. Numerous examples of interpolated tubes were noticed.

Locality.—Spring Hill, Van Diemen's Land.

Stenopora crinita. (Sp. nov. Pl. VIII. fig. 5, 5*a*)

Hemispherical or globular; tubes polygonal, slender; contractions distant.

This fossil has a great general resemblance to the *Chætetes* of M. Fischer de Waldheim, particularly to *Chæt. radians*, (Oryct. *Gouvern. de Moscou*); but it is distinguished by the contractions characteristic of *Stenopora*, and by the additional tubes having been essentially produced by interpolations.

The specimen examined consisted wholly of calcareous spar, and formed part apparently of a globular or hemispherical mass, which must have possessed considerable dimensions, the radius of the fragment being 4½ inches. The tubes were about one-third of a line in diameter, and radiated in general very slightly; but they were irregularly bent in some portions of their range. They were polygonal throughout, both externally and internally, except at the contractions; and the infiltered calcareous matter had not only filled the interior of the tube, but had also replaced for the greater part the substance of the original walls. The contractions, as exposed in

a vertical section, presented series of parallel, transverse, slight indentations, from one to two lines apart, indicating a perfectly simultaneous process in the polypes; and even young or interpolated tubes, which commenced almost immediately below a row of indentations, exhibited as marked a contraction as the adjacent fully developed columns. In the superior terminal surface, as well as in transverse fractures in the plane of the contractions, the tubes were lined by a narrow band, slightly varying in breadth, but never approaching to the nature of a diaphragm.

Perfect terminal mouths were not observed: and in the instances on the upper surface of the specimen, which exhibited the most advanced state, the mouths were defined by white lines more or less circular, and separated by small intervals of a darker colour. The additional tubes were irregularly interpolated, and sometimes sprung from the lines of contraction, but sometimes commenced in the spaces between them. In the former cases the inferior terminations were generally more or less obtuse, while in the latter they were usually very sharp. The form of the adjacent mature tubes was more or less influenced by the interpolations, owing apparently to the expanding pressure of the growing young polype.

Locality.—Illawara, New South Wales.

Favosites Gothlandica? (Lamarck.)

Of the fossil assigned with a doubt to this species of *Favosites*, several specimens were included in Strzelecki's collection, but the mode of preservation did not permit their characters to be fully ascertained. In one instance only was a succession of connecting foramina detected. It constituted a single row of round or oval openings, much larger than in the ordinary *Favosites Gothlandica* of Europe, but very similar to the foramina of an American coral in Mr.

Lyell's cabinet, and believed to be only a trans-Atlantic form of Lamarck's species. Whether the Australian fossil varied in the arrangement of these connecting openings, and agreed with the American and European in having sometimes one, sometimes two, rows of foramina on the same facet of a column, or whether it possessed uniformly a single row, and consequently a specific difference, could not be determined. It was, therefore, deemed advisable to assign the specimens provisionally to the nearest known species.

Locality.—Yass Plains, New South Wales.

Amplexus arundinaceus. (Sp. nov. Pl. VIII. fig. 1.)

Oval; exterior longitudinally ribbed, transversely annulated; septa slightly convex or flat, margins faintly crenulated.

This *Amplexus* differed from the published species known to the describer, by the rounded longitudinal ribs and transverse annular irregularities. In external aspect it resembled some coal-measure calamites.

The length of the finest fragment examined was about two inches, and the major and minor axes were respectively 7 and 6 lines; but in the same mass of black limestone were other portions, of slightly smaller dimensions. The crenulations near the margins of the septa or diaphragms were unequal in range as well as strength, and in some cases they were scarcely detectable. In one instance, under a favourable oblique light, converging radii were traced from nearly half the periphery of the oval, across more than two-thirds of the area; but the opposite extremity of the diaphragm was uneven, and not traversed by radii or crenulated. The most marked convex irregularity was exhibited in the superior septum, and resembled that delineated by M. de Koninck in one of his figures of *Amp. coralloides* (*Amp. Sowerbii*, Phillips), and there was a further agreement in the Australian fossil

having also a few relatively bold furrows, or crenulations, between the centre of the convexity and the margin of the diaphragm. (Desc. *Anim. Foss. Terr. Houill. &c., de la Belgique.* Pl. B. fig. 6. *c.*)

Locality.—Shoalhaven, Barbers, New South Wales.

It is not possible to allude to the occurrence of a *Favosites* and an *Amplexus*, in Strzelecki's collection without soliciting attention to the additional evidence they afford in support of previous inferences respecting the age of the deposits in which fossil polyparia were found by Mr. C. Darwin; or to the curious increase of agreement thus presented between the *Palæozoic Fauna* of Europe and extinct *Faunæ* of New South Wales and Van Diemen's Land.

Fenestella ampla. (Pl. IX. fig. 3—3*d.*)

"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; gemmuliferous vesicle? small." (Appendix to Mr. Darwin's work, p. 163.)

Among the specimens of this coral contained in the collection under consideration, was one which afforded some interesting changes dependent upon age, the absence of which in the series originally examined was alluded to in the notes upon the species. (Loc. cit. p. 165.) In the uppermost portion of this specimen, the casts of the cellular surface exhibited similar characters to those displayed in Mr. Darwin's series, with the addition, occasionally, of a crescent-shaped impression under the mouth, and due, it is believed, to a local modification of the sculpturing on the surface of the other cells. A little lower the ridges, or furrows representing them, began to disappear, and

still lower, by a further thickening of the exterior, all traces of them were obliterated, the interspaces between the mouths displaying irregular protuberances; and that which was considered as a state bordering upon decrepitude exhibited casts of minute oral apertures, with larger projections immediately beneath, marking the original extension of the mouths.

Locality.—Spring Hill, Mount Wellington, Eastern Marshes, Van Diemen's Land.

Fenestella internata. (Pl. IX. fig. 2—2*b*.)

"Cup-shaped; celluliferous surface internal; branches dichotomous, compressed, breadth variable; meshes oblong, narrow; rows of cells 2—5, divided by longitudinal ridges; transverse connecting processes shut, without cells; non-cellular surface, inner layer sharply fibrous, outer layer minutely granular." (Appendix to Mr. Darwin's work, p. 165.)

Locality.—Mount Wellington, Van Diemen's Land; St. Patrick's Plains, Raymond Terrace, New South Wales.

Fenestella fossula. (Pl. IX. fig. 1, 1*a*.)

"Cup-shaped; celluliferous surface internal; branches dichotomous, slender; meshes oval; rows of cells two; transverse processes non-cellular; inner layer of non-celluliferous surface minutely fibrous, external layer smooth or granular." (Op. cit. p. 166.)

Locality.—Mount Wellington, Van Diemen's Land; St. Patrick's Plains, Raymond Terrace, New South Wales.

Hemitrypa sexangula. (Pl. IX. fig. 4, 4*a*.)

"Network fine, hexagonal; meshes round, in double rows." (Op. cit. p. 167.)

Locality.—Mount Wellington, Van Diemen's Land.

MOLLUSCA.

Mr. J. Morris, who furnished the preceding section, of Botany, with a valuable paper upon the Fossil Flora of New South Wales and Van Diemen's Land, has kindly favoured me with the following account of the fossil *Mollusca* found in my collection.

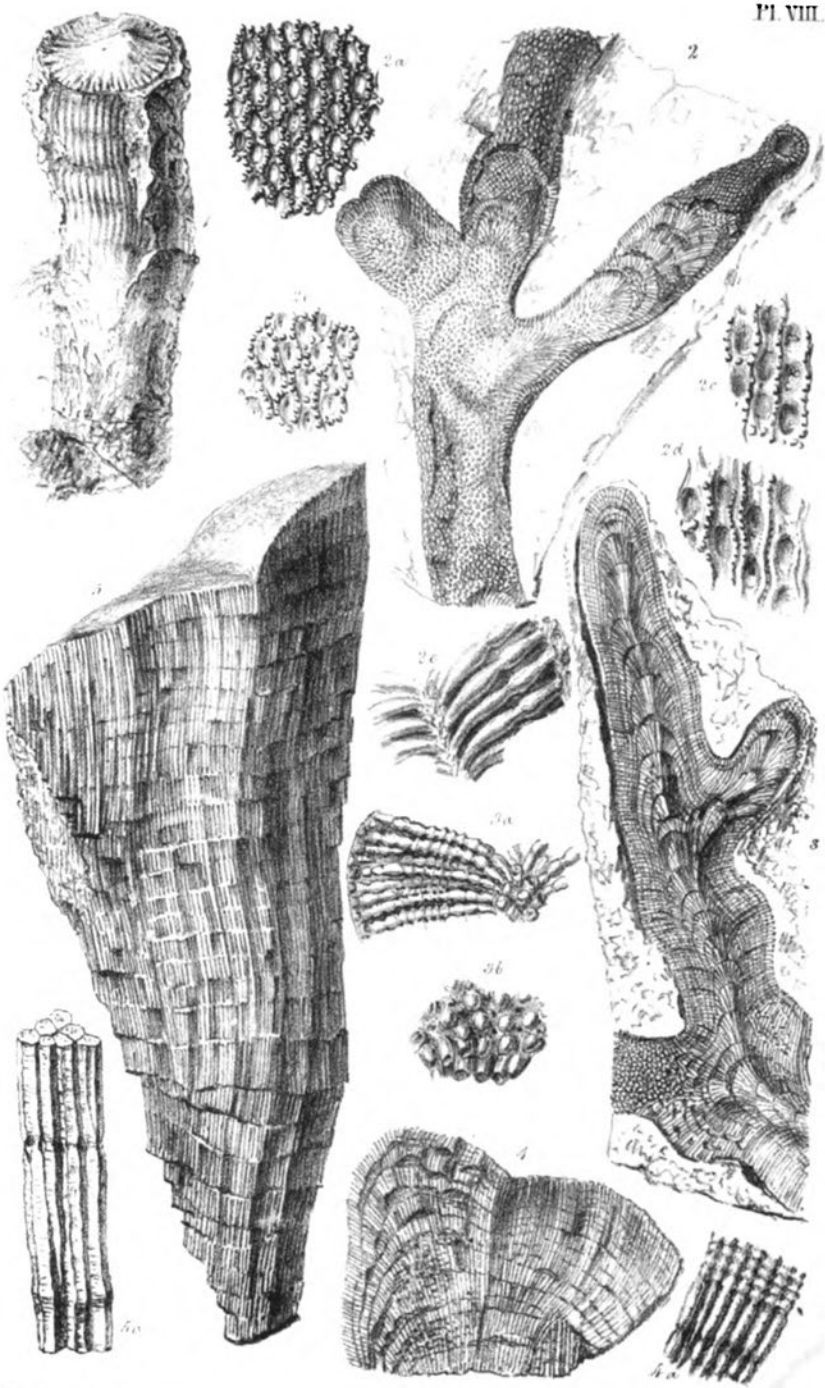
CONCHIFERA.

Allorisma curvatum. (Pl. X. fig. 1.)

Shell transverse, inequilateral, closed anteriorly, slightly gaping posteriorly, gibbose, front compressed, posterior side produced and incurved; beaks inflated, rounded, and approximate; surface concentrically marked with distinct but rather irregular sulcations, crossed by very faint radiating obtuse ridges; ligament large, external; posterior muscular impression distinct, anterior obscure; breadth 4½ inches; length 3 inches.

This shell bears considerable resemblance to the *Pholadomya Munsteri* (D'Archiac and De Verneuil), but the anterior side is more obtuse, and the posterior less produced, than in that species, and slightly gaping; the folds on the surface are also much more irregular. It has the general form of *Pholadomya*, and might be included under the genus *Homomya Ag.*, established for those species of *Pholadomya* in which the radiating costæ are wanting, or not very prominent, if their absence alone could be considered sufficient for a generic division. I have provisionally placed this shell in the genus *Allorisma* (King), instituted for the reception of certain species of *Sanguinolaria*, as *S. sulcata*, *S. elongata*, &c., which have, according to that author, peculiar dental characters, and a more or less deep siphonal scar in the palleal impression.*

* Mr. Tate, of Alnwick, has kindly furnished me with a specimen of *S. sulcata*, showing clearly that the palleal impression was perfectly entire.



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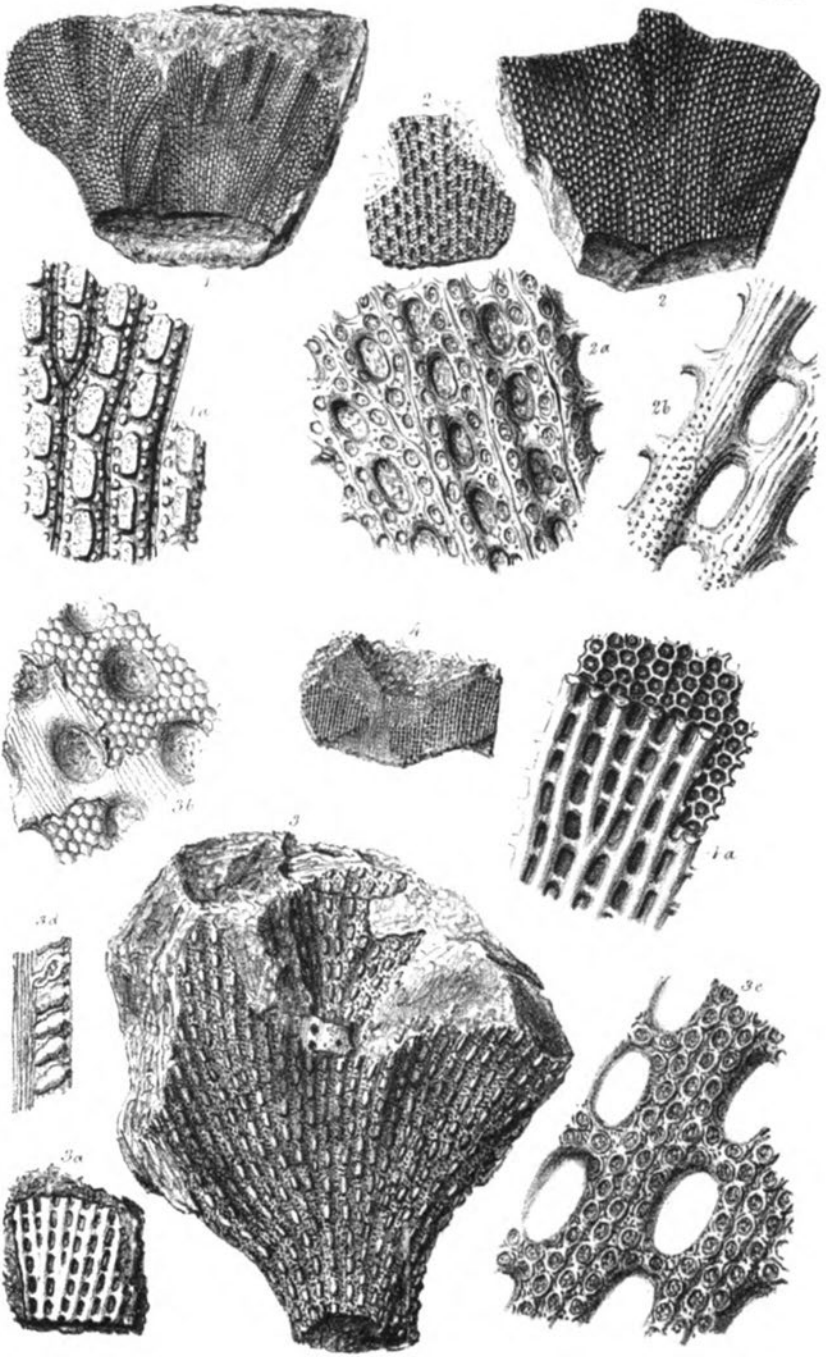

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