AUSTRALIAN MUSEUM SCIENTIFIC PUBLICATIONS

Etheridge, R., 1890. Descriptions of Upper Silurian fossils from the Lilydale Limestone, Upper Yarra District, Victoria. *Records of the Australian Museum* 1(3): 60–67, plate viii–ix. [31 July 1890].

doi:10.3853/j.0067-1975.1.1890.1227

ISSN 0067-1975

Published by the Australian Museum, Sydney

DESCRIPTIONS OF UPPER SILURIAN FOSSILS FROM THE LILYDALE LIMESTONE, UPPER YARRA DISTRICT, VICTORIA.

By R. Etheridge., Junr.

(Palæontologist to the Australian Museum, and Geological Survey of New South Wales.)

The fossils about to be described were collected at the Cave-hill Quarries, Lilydale, Upper Yarra District, near Melbourne, Victoria, by Mr. A. J North, of the Australian Museum.*

I am informed by Mr. R. A. F. Murray, Government Geologist of Victoria, that no description of this limestone has been published, and that beyond the fact that it is a member of the Upper Silurian of that Colony, little is known of it. I hope to be able to show, by the determination of the following fossils, that the Lilydale Limestone is a portion of the Upper Silurian, known as the Wenlock Series.

The limestone, judging simply from the specimens which have passed through my hands, varies in colour from light grey to dark bluish-grey, and is highly fossiliferous. In places it is crystalline and homogenous, with scattered rather flesh coloured patches; in parts minutely brecciated, with here and there patches of a more or less oolitic character; in fact no two specimens exactly agree with one another in appearance and mechanical composition. It weathers and decomposes to an almost pure white colour and becomes very friable. The fossils so far recognised are at least three forms of Stromatoporidea; a peculiar *Favosites*, to be described under the name of *F. grandipora*; and three species of Gasteropoda.

The Stromatoporidea will require a more prolonged study than I am able to give them at the present moment, and must be relegated to a future report. Besides the univalves described, there is a *Bellerophon*, but not sufficiently well preserved to be determinable. Lastly a Rugose coral, which will probably prove to be one of the Cyathophyllidæ.

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* Supplemented by a small series presented by Mr. J. Campbell, of the Lilydale Quarries.

The following are the systematic descriptions :—

Class ACTINOZOA.

Order ZOANTHARIA.

Section ZOANTHARIA SCLERODERMATA (Madreporaria).

Family FAVOSITIDÆ.

Genus Favosites, *Lamarck* (pars.), 1816.

FAVOSITES GRANDIPORA, *sp. nov.*

(Pl. viii., Figs. 6 – 9.)

Sp. Char.—Corallum generally forming sublobate, ramose masses, but variable in size, apparently dichotomously branched, the whole free surface occupied by the calices of the corallites, the axial portion of the corallum being much in excess of the peripheral. Corallites long and slender, in the axial region polygonal, but from the deposition of secondary matter, or sclerenchyma, becoming oval or irregular in outline ; usually equal in size, but with smaller angular calices interspersed throughout ; the larger are one millimeter in diameter, the tubes gradually curving outwards to the narrow periphery, and then becoming almost horizontally inflected ; opercula not observed. Walls thin, but more or less thickened by a deposit of sclerenchyma. Septa obsolete. Pores very large, regular, round, usually forming a single row in the median line of each face of the corallites. Tabulæ simple, complete, as fine hair-like lines, mostly horizontal, but at times a little arched upwards, and seldom oblique.

Obs.—*Favosites grandipora* is by far the most representative fossil of the deposit. Its growth was certainly ramose, the largest stem observed being two and a quarter inches in diameter, but this was probably exceeded, as other examples, massive and non-ramose, and corresponding in macroscopic characters to the above, are probably only the interior portions of large stems.

The remarkable size, regularity, and contiguity of the pores is a very prominent feature. Other uniserial forms of *Favosites*, as to the position of the pores, are known, but are chiefly Devonian in age, *F. turbinata*, Billings, *F. hamiltonensis*, Rominger, *F. intella*, Winchell, &c. The close serial arrangement of these large pores gives rise to a very peculiar appearance in longitudinal sections, when erosion of the corallite wall has just commenced, and sufficient to render the pores partially confluent. The breaking up of the wall thus brought about simulates so many thick incomplete tabulæ, after the manner of those of *Favosites (Emmonsia) hemispherica*, Yandell.* The pores are as conspicuous on the

* Nicholson, Tab. Corals Pal. Period, 1879, t. 3, f. 3*b*.

fractured surfaces of specimens as in microscopic sections; and the margins are apparently plain.

The tabulæ on the other hand are perfectly complete, thin, delicate, and about three in the space of one millimeter to three in that of two millimeters, but irregularly placed as a rule. The original form of the corallites was undoubtedly polygonal, but from the deposition of sclerenchyma they have become more or less cylindrical and oval, or irregular in section. I have not seen any good examples of the surface, but so far as observed the mouths appear to be simply at right angles to longer axes of the corallites, to be without opercula, and not to have either lip raised above the other.

A very marked difference exists in ramose portions in the width of the axial and peripheral portions, the former largely predominating, whilst the non-amalgamation of the walls in the same region is usually very apparent. Septa seem to be absolutely absent, whether as spines or tubercles. I have adopted the character of the nural pores as the distinguishing feature of *F. grandipora*, notwithstanding the fact that in some species of *Favosites* the number of pores on each corallite face is variable. In the present instance, however, the arrangement of the pores appears a constant feature throughout a suite of fifty specimens, and it may therefore be justifiably used for specific distinction in this case. In Pl. viii., Fig. 7, is represented the horizontal section of the axial region taken from a polished specimen, and therein will be noticed the broken-up condition of the primordial wall. It is, however, nearly always visible at the angles of the cells, to the exclusion of the sides, and then has a more or less stellate appearance. In some thin sections prepared for the microscope, on the other hand, now before me, this wall is tolerably continuous and regular. The secondary deposit remains very constant in its thickness, and does not appear to attain the inordinate growth towards the final period of increase of the corallites, so characteristic of the genus *Pachypora*.

Class GASTEROPODA.

Qrder PROSOBRANCHIATA.

Family EULIMIDÆ.

Genus Niso, Risso, 1826.

(Nist. Nat. Europe, Mérid., iv., p. 218.)

NISO (VETOTUBA) BRAZIERI, *sp. nov.*

(Pl. viii., Figs. 4 & 5; Pl. ix., Figs. 2 & 3.)

Sp. Char.—Shell turriculate, polygyrate, subulate, elongately conical, and very slowly tapering, straight sided, and no more than twelve whorls; the latter are flat, narrow, with closely

fitting sutures; umbilical cavity large extending the entire length of the spire; aperture unknown; ornament not preserved, probably a nearly smooth shell. Length (average) two and a half inches.

Obs.—In the internal cast the whorls are more convex, and the sutures well defined. (Pl. viii., Fig. 5.)

Under the name of *Niso ? darwinii*, the late Prof. de Koninck described* a small shell from the Upper Silurian, probably Wenlock, beds of Yass, possessing the peculiar continuous umbelical tube of the recent and Tertiary genus *Niso*. We now have from Lilydale a similar although much larger shell, possessing the same character. I have made a longitudinal section of a *Niso* from the Muddy Creek beds in Victoria (Pl. ix., Fig. 1), and a comparison with that of our more ancient fossil, will at once indicate their close resemblance. In the vertical section of both the umbilical tube is visible, and this can also be seen in one of Prof. de Koninck's figures† of the Yass species. There is a like correspondence between the cross sections of the two shells (Pl. viii., Figs. 3 & 4), bearing in mind that the section of the recent species is near the apex, and that of the fossil near the base.

Niso is known in time as far back as the Middle or Lower Tertiaries, and its connection with the Palæozoic forms is continued through the Secondary rocks by the genus *Palæoniso*, Gemmellaro.

The material before me is not sufficient to enable me to work this species out in its entirety, but I find myself in the same difficulty as did Prof. de Koninck, in definitely referring so old a form to a recent and comparatively young genus, geologically speaking. I suspect that the ultimate examination of more perfect specimens will reveal an organization differing from *Niso*, in which case I would propose for it the name *Vetotuba*.‡

Family TURBINIDÆ.

Genus Cyclonema, *Hall*, 1852.
(Pal. N. York, ii., p. 89.)

CYCLONEMA ? AUSTRALIS, *sp. nov.*

(Pl. ix., Figs. 4 & 5.)

Sp. Char.—Shell turbinate, moderatey elongated, much expanded below,—whorls six, ventricose, the body whorl disproportionately larger than the others,—aperture more or less circular; umbilicus not visible; operculum unknown; whorls traversed by successive spiral keels, which are always

* Rech. Foss. Pal. Nouv. Galles du Sud, 1876, Pts. 1 & 2, p. 127, t. 4, f. 11.
† *Loc. cit.*, f. 11c.
‡ Vetus, old; tubus, a tube or pipe.

simple, and nearly always equidistant, except on the ventral surface where they become rather closer, leaving very regular valleys between them, usually equal in width to that of three keels; the whole of the keels and valleys are crossed by fine, regular, oblique, equidistant, continuous, longitudinal striæ. Length (average) one and a half inches.

Obs.—The spiral keels are remarkably regular, and simple in structure, at least twenty and perhaps more traversing the body whorl; they retain their size as a rule, but instances have occurred where they are alternately larger and smaller. The oblique transverse striæ are uniform in size throughout their course, and do not in themselves enlarge on crossing the keels, but the mere intersection of the two does give rise to a slight nodular appearance. The spaces thus enclosed between the two series of lines are oblong.

It cannot be denied that both this shell and those usually referred to *Cyclonema* by authors, materially differ in appearance from Hall's types of the genus. If a *Cyclonema*, it is a very large form, but at first sight it appeared to me referable to the allied genus *Oriostoma*, M. Chalmas, as defined by Dr. G. Lindström,* but the lengthened spire gives rise to a marked difference in the appearance of the two shells, nor does *C. ? australis* appear to have that laxity of coil seen in species of *Oriostoma*.

C. ? australis is allied to the shell termed *C. carinatum*, var. *multicarinatum*, by Lindström,† but which I should have taken to be a species distinct from the other Gotland forms. Our species is a larger shell, with coarser and more numerous revolving keels on the whorls. The operculum should be sought for, as this will probably afford a means of accurately determining the genus.

Genus Oriostoma, *M. Chalmas*, 1876.

(Journ. Conch., Paris, xxiv., p. 103.)

ORIOSTOMA NORTHI, *sp. nov.*

(Pl. ix., Figs. 6 and 7.)

Sp. Char.—Shell discoid or ammonitiform, biconcave, nonalate; back unsymmetrically convex; spire very short, depressed below the plane of the body whorl; whorls about six, all exposed; body whorl generally convex on the upper surface, sloping downwards and inwards, bounded exteriorly by a strong spiral keel, from whence the surface gradually slopes away outwards to form the unsymmetrical convex back; the

* Silurian Gastropoda and Pteropoda of Gotland (*K. Svenska Vet. Akad. Handlingar*, 1884, xix., No. 6), p. 156.

† *Loc. cit.*, p. 179, t. 18, f. 31-32.

keel is continuous, forming the periphery of the inner whorls on the upper surface, the innermost ones rising slightly above the plane of the second to form the low spire ; ventral surface generally concave as a whole, except the body whorl which is convex, with an ill-defined spiral obtuse keel. Upper surface of the whorls crossed by direct, or very slightly sigmoidal, transverse, simple, or occasionally bifurcating costæ, crenulating the spiral keel, and passing on to the back where they either become lost or faint, reappearing at the obtuse keel of the inferior side and passing similarly across the remaining portion of the whorls. Form of mouth and operculum unknown.

Obs.—In mature individuals the back broadens, the sides of the body whorl become more rounded, the costæ towards the aperture broaden out into folds, and the whole shell puts on a nautiloid appearance. Furthermore the costæ on the lower surface become obliterated. These changes have been already noticed by Dr. Lindström in *Oriostoma discors*, of which he remarks that "the spiral ridges are more prominent in small specimens, or on the old whorls of the larger ones, and are apt to disappear on the larger and younger whorls." The costæ bifurcate both at the suture and the bounding keel, and are as a rule about their own distance apart, but in passing over the keel of the body-whorl they very distinctly impart a crenulated appearance.

Although resembling *Oriostoma discors* in general appearance, the present species differs from it in the presence of only one keel on the body-whorl. This, on the inner whorls is sutural, instead of being median. The ornamentation is also very different, that of *O. discors*, consisting of close, thin, anastomising lamellæ, in place of the previously described costæ of *O. northi*.

The groups of shells so characteristic of the Wenlock strata, to which *O. northi* belongs has not, to my knowledge, been before described from Australian Silurian rocks, although a note attached to one of the Quarter Sheets of the Victorian Geological Survey,* published many years ago, records the occurrence of a somewhat allied shell, *Oriostoma sculptum*, J. de C. Sby., sp., in the neighbourhood of Kilmore.

One word on the genus. According to M. Munier Chalmas' original definition, the spire is said to be an uncoiled one, and the whorls free. On the other hand Dr. Lindström says, "whorls . . . . joined, seldom a little disjointed near the aperture." It seems to me that a more particularised diagnosis than this would be advantageous. Dr. Paul Fischer † goes even further and says the whorls are contiguous.

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* Quarter Sheet 4, S.W. Geol. Survey Victoria, (Note B*b*20).

† Man. Conchyl. 1887, p. 813.

Family TROCHIDÆ.

Genus Trochus, *Linnæus.*

TROCHUS (SCALÆTROCHUS) LINDSTRÖMI, *sp. nov.*

(Pl. viii., Figs. 1 and 2.)

Sp. Char.—Shell pyramidal-conical, of more than six whorls, with an acuminating sharp spire; under surface flattened, not concave, but depressed immediately around the columellar centre, which is quite devoid of an umbilicus; whorls concave or concavely-biangulate, close sutured; body whorl with a very sharp peripheral edge, dividing the upper superior from the inferior surface of the shell, aperture transversely ovate; inner lip sharp, probably bevelled inwards; surface ornamented by obliquely-curved, somewhat rough and irregular, subimbricating laminar striæ.

Obs.—"It is with great diffidence the following species have been described as belonging to the old genus *Trochus*. The only reason for placing them there is the general exterior shape of the shell, it having not been possible to find any evidences from the microscopic structure of the shell nor from any traces of a nacreous stratum or an operculum. On the other hand there are so many genera of shells which have persisted from the Silurian age through all the following and so still continue, and it may therefore not be thought an impossibility that also the *Trochi* existed already in the Silurian times."

So writes Dr. G. Lindström* on the Trochidæ of the Wenlock rocks of Gotland, but the union of the perforate and non-perforate forms made by this author, seems to me manifestly a retrograde movement, more especially when several genera have already been proposed for the reception of the perforate *Trochi*, such as *Palæotrochus* Hall, *Eotrochus* Whitfield, *Flemingia* de Koninck, and probably *Pycnomphalus*, Lindst. The entire absence of an umbilicus at once separates *Trochus lindströmi* from all these genera, and places it more in accord with *Trochus niloticus*, Linn., I do not, however, feel at all satisfied that this species, and its probable ally *Euomphalus clarkei*, de Kon.,† from the Wenlock rocks of Yass can with certainty be referred to *Trochus*. Indeed, the step-like outline of the whorls reminds us of Meek's genus *Omphalotrochus*, but this is umbilicate, like the others mentioned above. On the whole it seems to me that we have the indication of a further unrecognised genus, for which I would suggest the provisional name of *Scalætrochus*.‡

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* *Loc. cit.*, p. 145.

† Rech. Foss. Pal. Nouv. Galles du Sud, 1876, Pt. 1, p. 41, t. 1, f. 7, 7*a*.

‡ Scalæ, a flight of steps.

The essential characters, as apart from *Trochus*, will be the columellar depression, the step-like form of the whorls, a simple columella, and an aperture without plicæ or teeth.

Trochus (Scalætrochus) lindströmi is unquestionably allied to the shell called by de Koninck *Euomphalus higshyi*, but the apical angle of the two shells is very different. The step-like form of the whorls is met with in some species of De Koninck's genus *Flemingia*, but this genus is also umbilicate.

RE-DESCRIPTION OF *PSEUDAPHRITIS BASSI*, CASTELN.

By J. Douglas Ogilby.

The Museum having had the good fortune to receive lately, through the Department of Fisheries, a fine example of this little-known species within a day or two of its capture, I think that a full description thereof will not be out of place.

It is due to the discernment of Mr. Frederick Smithers, Travelling Inspector of Fisheries, that I am enabled to add this interesting fish to the already rich ichthyological fauna of the colony.

The example described below was obtained by that gentleman at Bega in fresh water, and he is of opinion that it is not uncommon there, and descends also into brackish water; the present specimen is six and a quarter inches in length, but Mr. Smithers tells me that it grows to a larger size.

In 1872 Count Castelnau published a description of this fish from a single specimen taken in Bass' Straits, and formed for its reception a new genus, *Pseudaphritis*, on grounds however which prove to be entirely inadequate; these grounds he himself defines as follows: "the scales are rather large; the first dorsal has seven rays, (*i.e.* eight spines), and just in front of the anal there is a short fin composed of two spines." These three reasons for constituting a new genus may be disposed of as follows: in our specimens of *Pseudaphritis bassi* the number of scales on the lateral line varies between sixty-one and sixty-three; in *Aphritis urvillii* between sixty-three and sixty-five; and in all our examples of the latter the first dorsal fin possesses seven spines, and the anal is preceded by two small semi-detached spines. It follows therefore, as a matter of course, that Castlenau's name becomes a mere synonym of *Aphritis*.

ADDENDA ET CORRIGENDA.

PAGE	LINE	
8.	1.	Omit "Re-."
8.	1.	For "an" read "a new."
8.		Omit foot-note *
9.	30.	For "44" read "48."
10.	1.	Omit "Re-."
10.	1.	For "an" read "a new."
10.		Omit foot-note.
18.		Foot-note † for "1877" read "1887."
20.	32.	For "milee" read "miles."
23.	33.	For "viverinus" read "viverrinus."
24.	36.	For "Lymnodynastes" read "Limnodynastes."
27.	30.	For "Barwon" read "Barron."
30.	20.	For "nalabatus" read "ualabatus."
30.	42.	For "Scenoœpus" read "Scenopœus."
31.	10.	Omit "Ptilotis" and substitute „
31.	17.	For "epioletus" read "epicletus."
31.	17.	For "Agavista" read "Agarista."
31.	36.	For "Gonyodactylus" read "Gonyocephalus."
31.	38.	For "Myxophies" read "Mixophyes."
36.		Omit foot-note.
37.		Omit foot-note.
38.		Omit foot-note.
41.	6.	For "Lucodore" read "Leucodore."
49.	23.	Add "4" after "Ser."
51.	24.	For "moveable" read "movable."
52.	6.	Add "4" after "Ser."
61.	30.	For "macroscopic" read "microscopic."
65.	30.	For "mising" read "mosing."
69.	5.	For "cresentic" read "crescentic."
78.	2.	For "(155)" read "(15·5),"
81.	23.	For "of the total" read "in the total."
81.	23.	For "four-sevenths of" read "four-sevenths in."
81.		Omit "and is" in foot-note.
86.	8.	For "artica" read "arctica."
86.	19.	Add "Herd." after "viridis."
87.	6.	Omit "," before "ovum."
91.	40.	For "subtymppanal" read "subtympanal."
98.	41.	For "mmch" read "much."
99.	18.	For "this" read "thus."
99.	30.	For "percepttble" read "perceptible."
123.	2.	For "Madroporaceæ" read "Madreporaceæ."
123.	8.	For "cænenchyma" read "cœnenchyma."
Pl. xi.		The figures are reversed.
„ xxi.		(Explanation) For "Microcystina" read "Microcystis."

Note "DOTICUS PESTILENS: *A correction.*—From a communication kindly forwarded by Mr. F. P. Pascoe, it appears that the genus for which I adopted the MS. name *Metodoticus* (see p. 75), has been described under the name *Doticus* (Ann. Mag. Nat. Hist. ix. p. 27, 1882). The Victorian Apple-pest should, therefore, be known as *Doticus pestilens*, instead of *Metadoticus pestilens*, as at first suggested. A figure of the insect, and some account of its life-history, are contained in Mr. French's recently published 'Handbook of the Destructive Insects of Victoria.'—A. S. O."

EXPLANATION OF PLATE VIII.

Fig. 1. *Trochus (Scalwtrochus) lindströmi*, Eth. fil. Side view of a somewhat damaged specimen.

„ 2. The same. Ventral view.

„ 3. *Niso*, sp. Cross section of an example from the Tertiary beds of Muddy Creek, Victoria—x 7.

„ 4. *Niso (Vetoiuba) brazieri*, Eth. fil. Cross section.

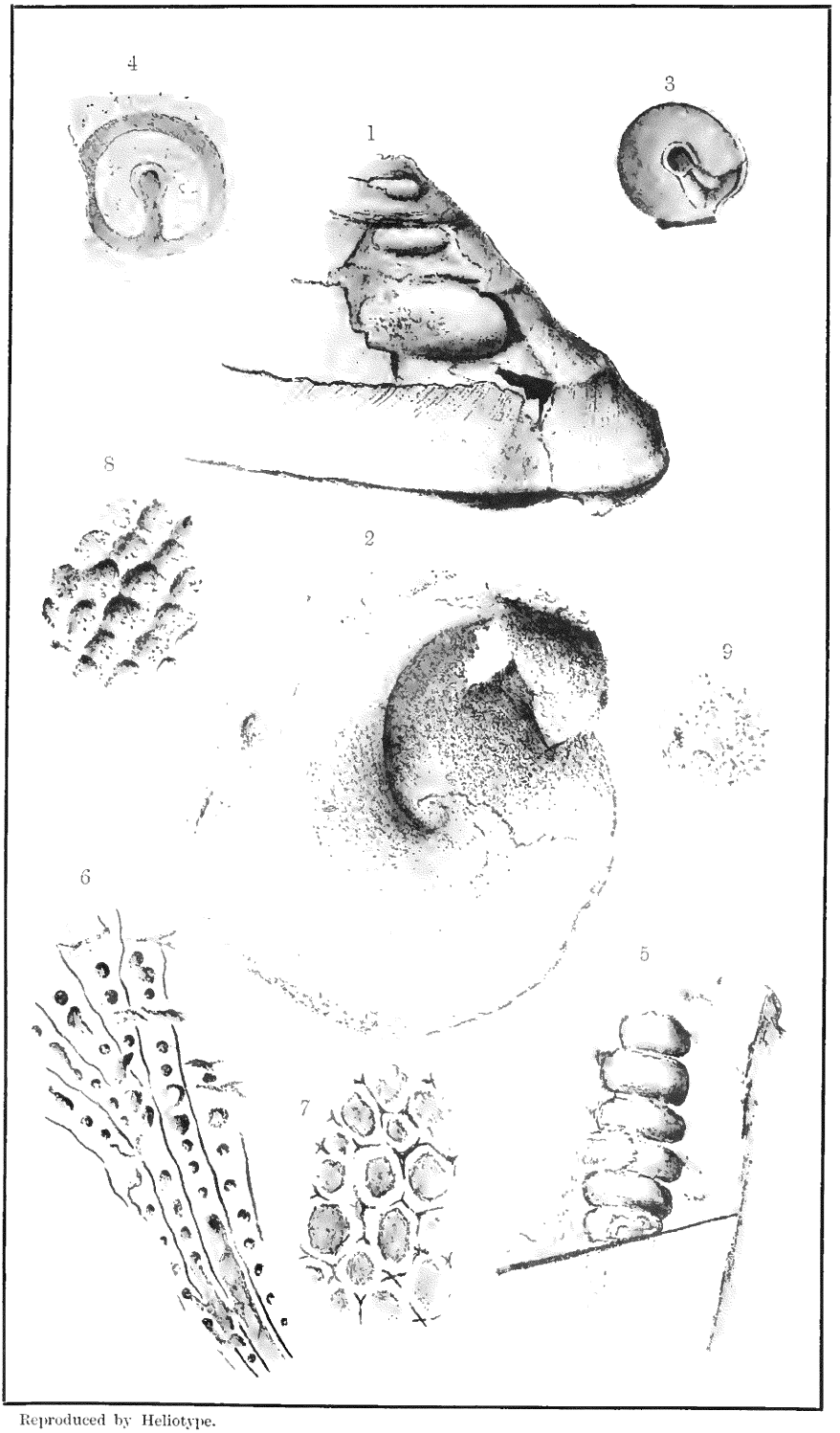
„ 5. The same apex downwards, and partly in section.

„ 6. *Favosites grandipora*, Eth. fil. Four corallites in section, showing the single row of large pores in one of the walls of each—x 5.

„ 7. The same. Horizontal section, showing forms of the calices, remains of the proper wall, and secondary thickening—x 5.

„ 8. The same. Portion of the natural surface of a corallum—x 6.

„ 9. The same. Horizontal section of unthickened tubes—x 6.



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EXPLANATION OF PLATE IX.

Fig. 1. *Niso*, sp. Vertical section of a species from the Tertiary beds of Muddy Creek, Victoria—x 3.

,, 2. *Niso (Vetotuba) brazieri*, Eth. fil. Portion of a specimen, partly in relief and partly in broken section, showing the umbilical tube.

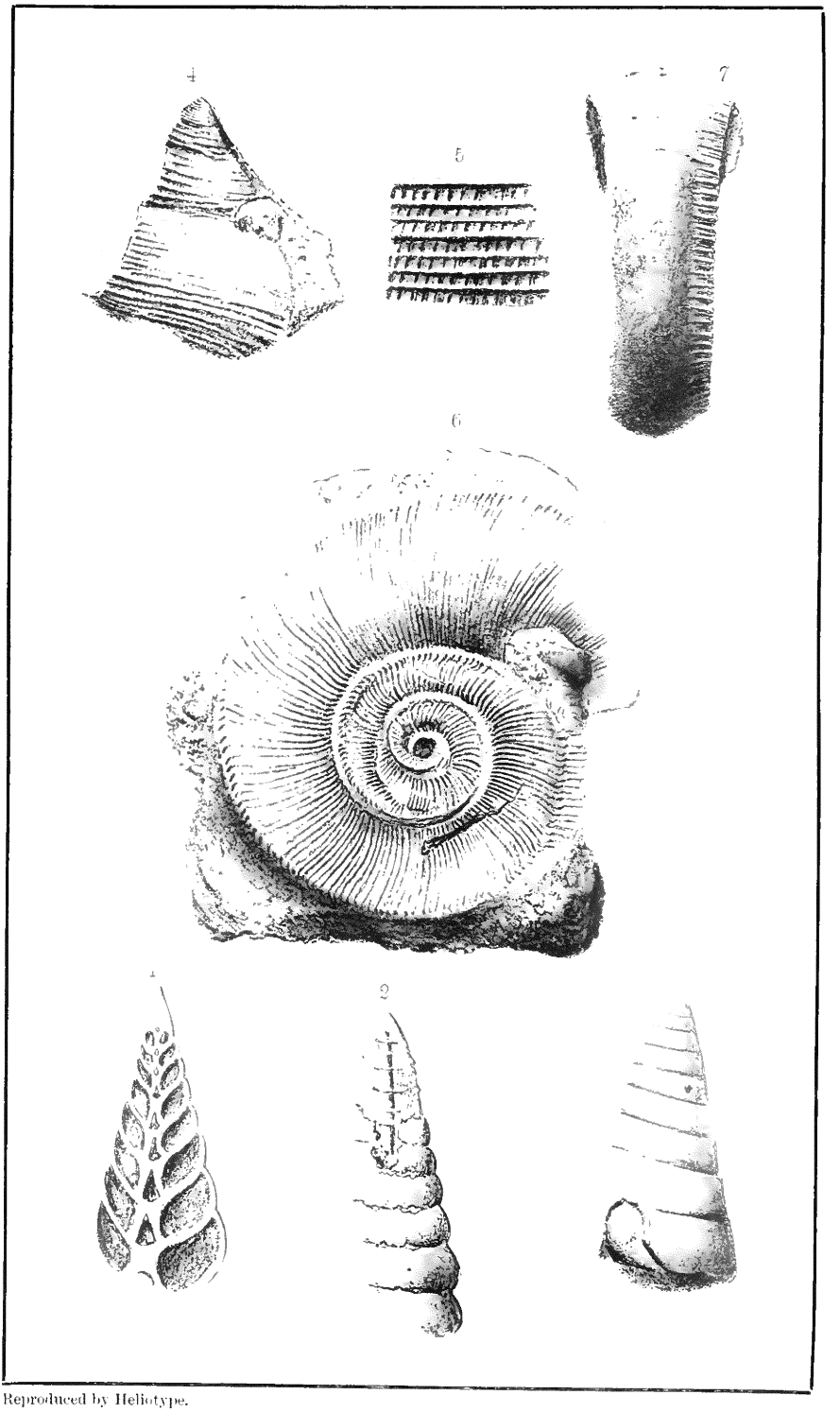
,, 3. The same. Specimen with ten whorls.

,, 4. *Cyclonema australis*, Eth. fil. Portion of an individual showing the general features of the species.

,, 5. The same. Portion of the surface ornament—x 6.

,, 6. *Oriostoma northi*, Eth. fil. Upper view of a nearly complete specimen.

,, 7. The same. View of the back.



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