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XIII.—*New and peculiar Mollusca of the Order Solenoconchia procured in the 'Valorous' Expedition.* By J. GWYN JEFFREYS, LL.D., F.R.S.

Solenoconchia.

Genus DENTALIUM.

*Dentalium candidum**, Jeffr.

BODY whitish, with a faint tinge of brown: *mantle* very thin, forming a collar, which encircles the inside of the upper part of the shell: *tentacles* very numerous, with pear-shaped tips, issuing between the mantle and the shell: *foot* when at rest conical, having a semicircular lobe or flap on each side, so as to give it a tricusped appearance; the lobes are fringed or puckered at the edges. The animal from which I took the above description was sluggish and probably half-dead, in consequence of its having been dredged up from a depth of 1100 fathoms.

SHELL having the shape of a narrow funnel, tapering, slightly curved, rather thin, opaque, more or less glossy: *sculpture*, about forty fine and regular rounded longitudinal striæ, which disappear towards the front margin; these striæ are crossed by extremely numerous and close-set circular microscopic lines: *colour* glistening-white: *margin* at the anterior or broader end jagged, at the posterior or narrower end abruptly truncated; there is no notch, groove, slit, or channel. L. 1.75. B. 0.3.

Station 5, 410 fms.; 6, 1100 fms.; 8, 1750 fms. 'Porcupine' Expedition, 1869, west coast of Ireland, 664–1476 fms.; Bay of Biscay, 2090–2435 fms.

Allied to *D. grande*, of Deshayes, from Japan. The present species differs from *D. striolatum*, Stimpson (*D. abyssorum*, M. Sars), in being straighter, less cylindrical, and of a thinner and more delicate texture, and in having twice the number of ribs.

Dentalium capillosum †, Jeffr.

SHELL tapering to a fine point, slightly curved, rather solid, opaque, and mostly lustreless: *sculpture*, numerous and sharp (not rounded) longitudinal striæ, some of which are intermediate and smaller than the rest; they disappear towards the posterior or narrow end, which is quite smooth and glossy

* Glistening-white.

† Covered with threads or hair-like markings.

for a quarter of an inch: *colour* whitish: *margin* at the posterior end having a short and narrow notch. L. 1.4. B. 0.15.

Station 12, 1450 fms.; 13, 690 fms.; 16, 1785 fms. 'Porcupine' Expedition, 1869, Bay of Biscay, 862 fms.; north of the Hebrides, 542 fms.: 1870, off the coast of Portugal, 220-1095 fms. Off Bahia Honda, Gulf of Mexico, 418 fms. (Pourtales). 'Challenger' Expedition, off the Azores, 450 and 1000 fms.

This appears to attain a size considerably exceeding that given in the above description, as fragments measure nearly $\frac{1}{16}$ inch in breadth.

*Dentalium ensiculus**, Jeffr.

SHELL tapering, considerably and regularly curved throughout, compressed or flattened, thin, nearly transparent, and glossy: *sculpture*, a sharp keel on both the dorsal and ventral sides (giving the appearance of a double-edged scimitar), besides occasionally a few slight and irregular longitudinal keels or raised striæ and concentric lines of growth: *colour* clear-white: *slit* of moderate length and very broad, semicylindrical, placed on the upper or dorsal side; the posterior or narrower end of the shell is nearly bisected to form the slit, the upper part being abruptly truncated; when viewed sideways the lower part appears split; the point is rounded and entire. L. 0.9. B. 0.1.

Station 12, 1450 fms.; 16, 1785 fms.: fragments are not uncommon. 'Porcupine' Expedition, 1869, off the west of Ireland, 1366 fms.; Bay of Biscay, 862 fms.: 1870, off the coast of Portugal, 740-1095 fms.

The annual or occasional growth is sometimes shown by the irregular formation of the new or succeeding portion of the shell, which is narrower than the former or preceding portion.

Dentalium subterfissum†, Jeffr.

SHELL slender and finely tapering, more curved towards the point, rather thin, nearly semitransparent, and glossy: *sculpture*, from 12 to 16 delicate and sharp regular longitudinal striæ, which are continued to both ends: *colour* whitish: *margin* at the posterior end bulbous: *slit* long and narrow, placed on the lower or ventral side; its length is double that of the greatest diameter of the shell. L. 0.6. B. 0.075.

* A little sword.

† Slit underneath.

Station 12, 1450 fms.; a fragment only, but evidently belonging to this species, which I have described from specimens taken in the 'Porcupine' and 'Challenger' Expeditions. 'Porcupine' Expedition, 1869, off the west coast of Ireland, 1180-1476 fms. 'Challenger' Expedition, lat. 37° 26' N., long. 45° 14' W., 1000 fms.

The slit in *D. subterfissum* is on the under or ventral side of the shell, being the same position as in the *D. inversum* of Deshayes, and the reverse of that in his *D. rubescens* and in *D. ensiculus*. The organization of the animal is unknown; but *D. inversum* may be the type of a distinct genus.

A single and dead specimen of another shell, apparently belonging to the genus *Dentalium*, occurred in Station 16, 1785 fathoms. It is narrowly cylindrical, rather solid, glossy, smooth, and a quarter of an inch long. Its peculiarity consists in the posterior termination forming a second and narrower cylinder, which issues out of the larger and longer one, as if from a sheath. This process has an entire and circular point; so that the shell cannot be a species of *Siphodentalium*. I propose to name it *Dentalium vagina*. Perhaps two imperfect specimens of a *Dentalium* from Station 12, 1450 fathoms, may belong to the same species.

SIPHONODENTALIUM, M. Sars.

In the 'Journal de Conchyliologie' for 1874, p. 258, the Marquis di Monterosato proposed the abbreviation of this generic name to *Siphodentalium*; and I agree with him that it would be convenient.

Siphodentalium vitreum, M. Sars.

Dentalium vitreum, M. Sars, Nyt Magaz. Naturvid. 1851, Bd. vi. p. 178 (*Siphonodentalium*, 1858).

D. lobatum, G. B. Sowerby, Jun., Thes. Conch. (1866), vol. iii. p. 100, fig. 44.

BODY whitish, gelatinous, and nearly transparent: *mantle* rather thick, forming a collar round the foot: *tentacles* thread-like, very slender, and having oblong tips or bulbs; they are not numerous, but extensile and irregular in length, issuing from underneath the edge of the mantle: *foot* cylindrical, extensile, and attaining a length equal to that of the shell; when at rest it is conical; but the point fully stretched out expands into a round and somewhat concave disk with serrated or notched edges: *excretal fold* or tail at the narrowest end of the shell, tubular, and having the front split open and exposed

diagonally; edges jagged; externally covered with very fine and close-set cilia: *liver* dark-brown: *ovary* lemon colour.

Station 6, 410 fms.; 9, 1750 fms.; 12, 1450 fms. Finmark, 40–100 fms. (M. and G. O. Sars, M'Andrew, Malmgren). Spitzbergen (Torell, Goodsir). Swedish Arctic Expedition, 1868, 730 fms. 'Lightning' Expedition, 1868, North Atlantic, 550 fms. 'Porcupine' Expedition, 1869, between the Faroes and Orkneys, 560 fms.: 1870, off the coast of Portugal, 740–1095 fms. Gulf of St. Lawrence, 150–200 fms. (Whiteaves). Fossil: Norway, older Glacial deposit, 90 feet above the sea-level (M. Sars and Kjerulf).

The very young resembles *Siphodentalium affine*, M. Sars, but is more conical or less cylindrical.

Siphodentalium affine, M. Sars.

Siphonodentalium affine, M. Sars, Christ. Vid. Selsk. Forh. 1864, p. 299, tab. vi. f. 34, 35.

Station 12, 1450 fms.; a single specimen. Finmark, 100–300 fms. (G. O. Sars). 'Porcupine' Expedition, 1869, West of Ireland, 1215–1380 fms.: 1870, Channel slope, 690 fms.

Siphodentalium lofotense, M. Sars.

Siphonodentalium lofotense, M. Sars, *loc. cit.* p. 297, tab. vi. f. 29–33.

Station 9, 1750 fms. Norway, 30–300 fms. (M. and G. O. Sars, J. G. J.). Hebrides and Shetland, 40–140 fms. (J. G. J.). 'Porcupine' Expedition, 1869, West of Ireland, 90–1630 fms.: 1870, Bay of Biscay, 227–1095 fms.; Vigo Bay, 20 fms.; Mediterranean, 51–1456 fms. Gulf of Gascony, 60–80 fms. (De Folin). Mediterranean, 50–600 fms. (Acton, Spratt, Nares, Monterosato).

Specimens from the Bay of Biscay and the Mediterranean are usually much smaller than those from more northern seas.

*Cadulus tumidosus**, Jeffr.

SHELL forming a short spindle, slightly bulging in the middle on the lower or more concave part, and very gibbous on the back or outside, somewhat curved, contracted towards both ends, but much narrower at the base, rather solid, glossy and semitransparent: *sculpture* none, except microscopic and close-set lines: *colour* whitish: *mouth* roundish-oval, obliquely truncated or sloping to the back; the inner margin is furnished with a slight circular rib or thickening like that in many

* High-swelling.

species of *Helix*: base notched on each side, as in *C. subfusiformis*. L. 0·2. B. 0·075.

Station 12, 1450 fms.: one specimen is abnormally arched. 'Porcupine' Expedition, 1869, Channel slope, 557 fms.: 1870, Bay of Biscay, 292–1095 fms. 'Josephine' Expedition, 110–550 fms. Fossil at Messina (Seguenza).

This is much larger and more gibbous than *C. subfusiformis*; and, like that species, it varies in shape and size. It has the character on which Monterosato lays stress in generically separating *C. subfusiformis* from *C. ovulum*, viz. in the mouth or anterior opening being more or less thickened inside by a circular rib.

*Cadulus gracilis**, Jeffr.

SHELL more curved and cylindrical than *C. subfusiformis* (to which it is evidently allied), not swollen in the middle, but throughout nearly equal in breadth; the mouth slopes more, and has a slight circular rib or thickening within; base broader; oblique marks of growth are conspicuous. L. 0·2. B. 0·04.

Station 13, 690 fms.; a single specimen.

Cadulus Olivi, Scacchi.

Dentalium Olivi, Sc., Notiz. foss. Gravina (Ann. Civ. 1835), p. 56, tab. 2. fig. 6, a, b.

Station 12, 1450 fms.; fragments only. 'Porcupine' Expedition, 1869, West of Ireland, 1230 fms.; south of the English Channel, 862 fms.: 1870, Channel slope, 539 fms. Sicilian Tertiaries (Scacchi, Tiberi, and others).

Awl-shaped and variable in size. Probably *Dentalium coarctatum* of Lamarck, and certainly that of Deshayes and Philippi, is *Dischides bifissus*.

C. gadus of Montagu resembles *C. Olivi*; but it is not only very much smaller, but is proportionally shorter and less slender, and the anterior end is more contracted. The locality given by Montagu ("many parts of the British Channel"), with the mariner's name "Hake's-tooth," is at least very doubtful as regards this species; and it is not unlikely that he may have mistaken for the "Hake's-tooth" *Ditrypa arietina* (a testaceous Annelid), which is frequently found adhering to the grease or "arming" of the deep-sea lead in soundings. But his description and figure evidently apply to a species of *Cadulus* from the noted collection of old George Humphreys, the

* Slender.

shell-dealer, of which I possess specimens. This species was dredged by the late Professor Barrett at Jamaica; and it is a fossil of the Sicilian Tertiaries. I received specimens of the latter from the Marquis di Monterosato as "*Cadulus subfusiformis*, Sars," and from Dr. Tiberi as "*Siphonodentalium Olivi*, var. *minor*, Scac."

An undescribed species of *Cadulus*, dredged by Admiral Sir Edward Belcher in the N.W. Pacific (for specimens of which I am indebted to his kindness), is also allied to *C. Olivi*; but the narrower and smaller extremity has four slight notches and corresponding slits. It is therefore possible that the genera *Siphonodentalium* and *Cadulus* should be united, and that *Dischides* must "follow suit."

*Cadulus cylindratulus**, Jeffr.

SHELL forming a narrow cylinder, slightly contracted at each end, gently curved, thin, transparent, and glossy: *sculpture* none, except a few microscopic and faint lines of growth: *mouth* somewhat obliquely truncated, but not thickened: *base* circular, with numerous minute notches, which are not perceptible to the naked eye. L. 0.325. B. 0.075.

Station 12, 1450 fms.; a single specimen. 'Porcupine' Expedition, 1869, off the West of Ireland, 1215-1476 fms.; very rare.

XIV.—On the Fundamental Error of constituting *Gromia* the Type of Foraminiferal Structure. By G. C. WALLICH, M.D., Surgeon-Major Retired List H.M. Indian Army.

RATHER more than forty years have elapsed since the first attempt was made by Dujardin to classify the Rhizopods. During the latter half of this period, the study of these singular organisms has not only been invested with much additional scientific interest, but has received a powerful impetus from its intimate connexion with the geological and biological relations of the deep-sea bed. And yet our knowledge of the Rhizopods as a whole, and especially of the animal portion of their structure, is by no means so complete as it ought to have been, considering the amount of attention that has been bestowed upon it. This, I venture to think, is in a great

* Cylindrical.