

three Foxes would keep near the edge of a hole of water and kill the Looms; they would then carry them up a few hundred yards on the land, where they were relieved by other Foxes, who carried them up some distance, and then deposited them, for others to carry them to some place in the cliff; but we could never manage to find out their storehouse.

7. On the Mollusca procured during the 'Lightning' and 'Porcupine' Expeditions, 1868-70. (Part V.¹) By J. GWYN JEFFREYS, LL.D., F.R.S., F.Z.S.

[Received November 1, 1882.]

(Plates XLIX., L)

Since the publication of the last part of this memoir I have, through the kindness of several eminent palæontologists in Italy, had an opportunity of examining their rich collections of Subapennine and Sicilian Tertiary shells, and of carefully comparing them with their living analogues. This kind of study is indispensable to all zoologists in every department; and it teaches us at least two important facts, viz., 1st, the exact concordance in the most minute particulars of so many species in their fossil and recent state, notwithstanding the lapse of the enormous and incalculable time which has intervened; and 2nd, the extensive changes which have taken place during the same period between the depth of the ocean and the height of land in the North-Atlantic area. The latter fact has been demonstrated in a short paper which I contributed to the Geological Society in 1880, "On the Occurrence of Marine Shells of existing Species at different heights above the present Level of the Sea," and which has reference to the present work.

The Expedition made this summer in the French vessel 'Le Travailleur' for exploring the depths of the Lusitanian seas for a third time, as well as of the seas lying between Cadiz, the Canaries, Madeira, and the Azores, has been most successful and productive; and I have been indebted to the obliging favour of my friend Dr. Paul Fischer, for the opportunity of examining the interesting Mollusca which were thus procured. The complete investigation of the Mollusca in even this comparatively limited area must be inexhaustible. What shall we say then to the investigation of all the various and hitherto unknown fauna which inhabit the depths of every ocean throughout the whole world!

I will now continue my account of the Mollusca from the 'Lightning' and 'Porcupine' Expeditions.

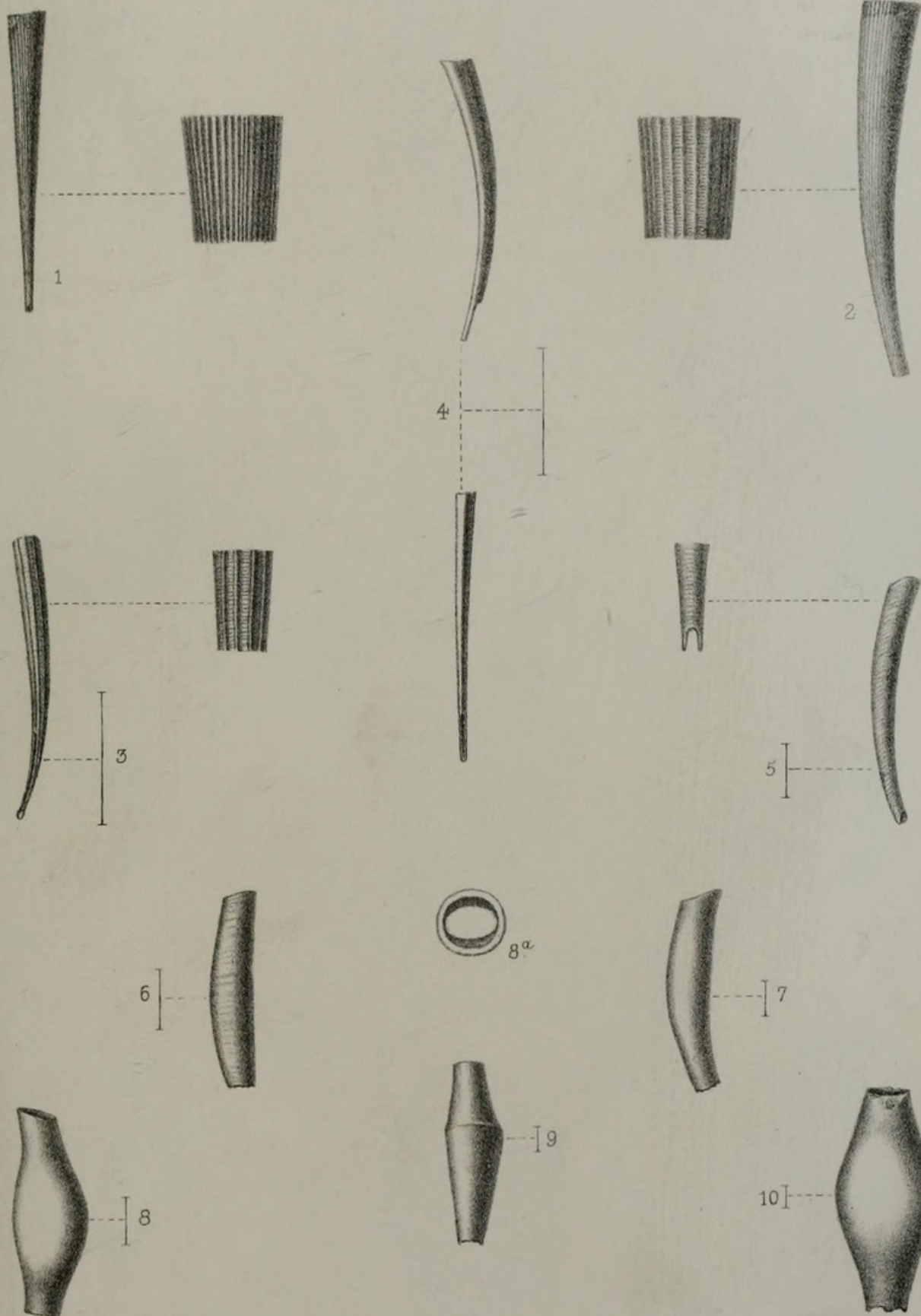
Class SOLENOCONCHIA.

Family DENTALIIDÆ.

✓ 1. DENTALIUM DENTALIS, Linné.

D. dentalis, L. S. N. p. 1263; G. B. Sowerby, Thes. Conch. pl. ccxxiv. f. 24, 27.

¹ For Part I. see P. Z. S. 1878, p. 393; for Part II. see P. Z. S. 1879, p. 553; for Part III. see P. Z. S. 1881, p. 693; and for Part IV. see P. Z. S. 1881, p. 922.

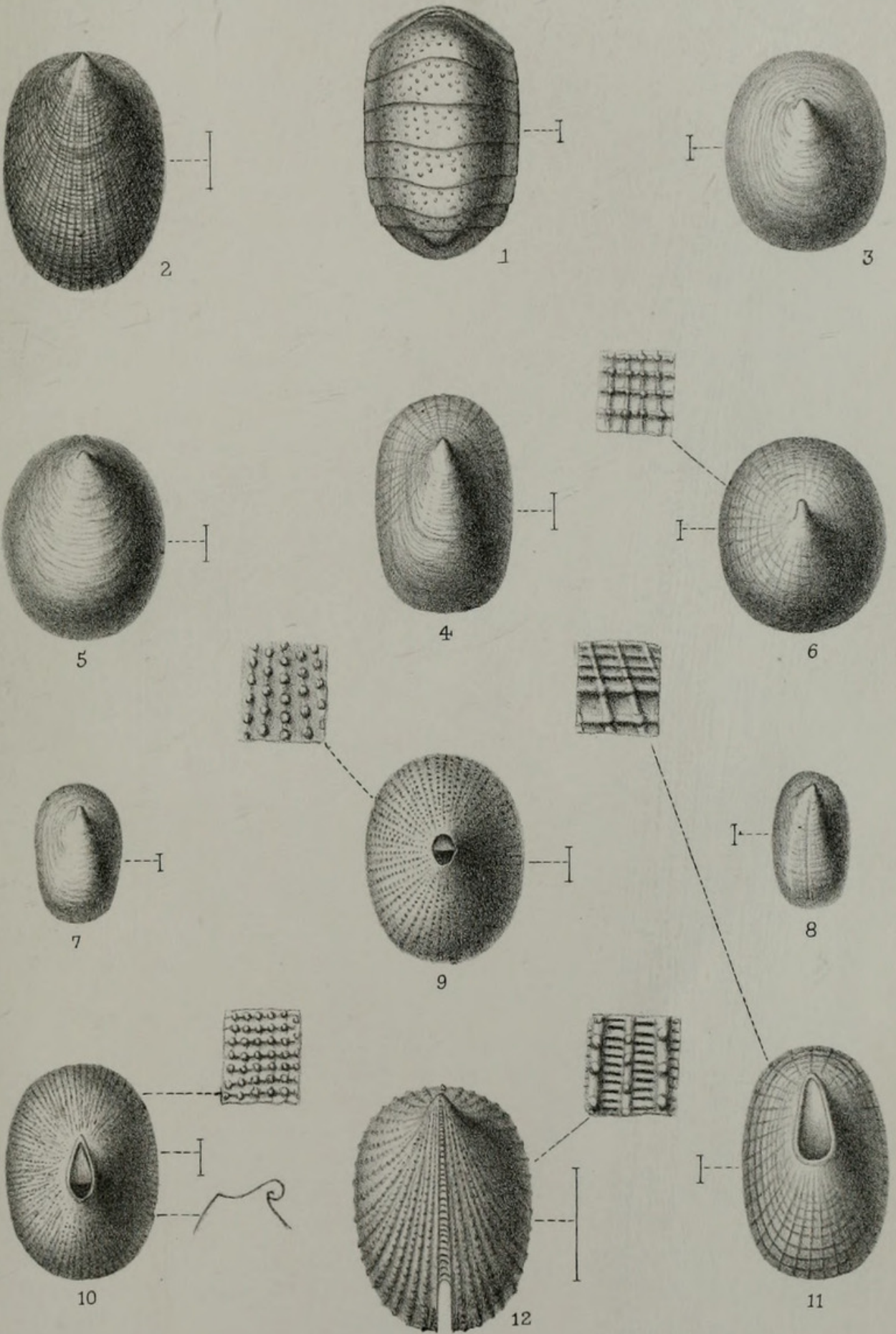


C. Berjeau del. et lith.

Hanhart imp.

MOLLUSCA OF THE "LIGHTNING" AND.
"PORCUPINE" EXPEDITIONS.





C. Berjeau del. et lith.

Hanhart imp.

MOLLUSCA OF THE "LIGHTNING" AND
"PORCUPINE" EXPEDITIONS.



'Porcupine' Exp. 1870: Atl. St. Vigo B., Tangier B.; Med. Cartagena B., 50, G. Bona, Benzert Road, G. Tunis, Adventure Bank.

Distribution. Finistère to the Archipelago and Sea of Marmara, Adriatic, Morocco, off Cape of Good Hope ('Challenger' Exp.), Canary Isles and Madeira; 0-150 fms. The Irish and Cornish localities mentioned in 'British Conchology,' iii. pp. 196 & 197, are doubtful, although it is not improbable that this species may be found there as well as on the opposite coast of France. Mighels, in his 'Catalogue of the Shells of Maine,' gives "*D. dentale*," saying that a specimen had been taken from the stomach of a haddock caught far out at sea in very deep water. It is more likely to have been the *D. striolatum* of Stimpson.

Fossil. Upper Tertiaries: Red and Coralline Crag, Antwerp, S. France, Italy, Morea, Archipelago. Post-tertiary: S. France.

I have noted 18 synonyms, the principal being *D. novemcostatum* of Lamarck and *D. costatum* of J. Sowerby. *D. striolatum* of Risso is a variety, and must not be mistaken for Stimpson's species. The specific names *dentalis* and *entalis* are not adjectives.

✓ 2. DENTALIUM PANORMITANUM (*panormum*), Chenu.

D. panormum, Chenu, Ill. Conch. t. 6. f. 13 (1842-47); G. B. Sowerby, Thes. Conch. pl. ccxxiv. f. 18.

'Porcupine' Exp. 1869, St. 1, 45a, 45b. 1870: Atl. C. Sagres, 36; Med. Capo de Gata, off Jijeli, 55, Adventure Bank, 58.

Distribution. Bay of Biscay ('Travailleur' Exp. 1880), Mediterranean and Adriatic; 30-195 fms.

Fossil. Upper Tertiaries: Antwerp Crag, Italy and Sicily.

Having examined and compared an extensive series of specimens from various places, I have come to the conclusion that, according to the received notions of a species, this must be considered distinct from *D. dentalis* and not merely a variety. Independently of the much greater length, the ribs are finer and far more numerous and regular, and they are extremely slight or become mere striæ on the anterior part or in front. The shell is also more tapering and proportionally narrower. It attains the length of 3 or 4 inches. Some specimens have the same pipe at the posterior extremity as in *D. dentalis*.

It appears to be *D. pseudo-antalis* of O. G. Costa (but not of Lamarck), *D. pseudo-entalis* of Scacchi (not of Deshayes), and *D. lessoni* of G. B. Sowerby (not of Deshayes) in part, *D. arguticosta* of Brugnone, and *D. semiclausum* of Nyst. As it has been in all probability confounded by other authors with *D. dentalis*, it is almost impossible to disentangle the synonymy of both these species.

✓ 3. DENTALIUM TARENTINUM, Lamarck.

D. tarentinum, Lam. An. s. Vert. v. p. 345, var. B: B. C. iii. p. 195; v. p. 197, pl. lv. f. 2.

'Porcupine' Exp. 1869, St. Galway B.

Distribution. West of Ireland, Holyhead, Cardigan B., and Bel-

gium to the Adriatic, and throughout the Mediterranean to Smyrna ; 0-543 fms.

Fossil. Miocene: Belgium, Piacentino and Parma. Upper Tertiaries: S. France, Italy. Post-tertiary: Ireland, Lancashire, Cheshire, S. France, and Tuscany.

Synonyms several, including *D. fasciatum* and perhaps *D. nebulosum* of Gmelin, and the *D. entalis* of most continental writers as well as of E. Forbes. As fossil it is *D. fusticulus* of Brugnone. Da Costa's name *vulgare* is certainly prior to Lamarck's name; but it would be inconvenient now to substitute it for *tarentinum*, which has been for between sixty and seventy years accepted and used by nearly every conchologist.

The stomach of this *Dentalium* is a repertory of littoral Foraminifera. It is not, like *Spatangus* or *Synapta*, an indiscriminate swallower of sand, but a fastidious Pig from the herd of Epicurus, luxuriously picking out the choicest morsels with its extensile and delicate captacula. Adriatic specimens of the shell collected by Professor Stossich are $2\frac{1}{4}$ inches in length and very fine.

✓ 4. DENTALIUM CAPILLOSUM, Jeffreys. (Plate XLIX. fig. 1.)

D. capillosum, Jeffr. in Ann. & Mag. N. H. Feb. 1877, p. 153.

'Porcupine' Exp. 1879: St. 47. 1870: Atl. 13, 16, 17.

Distribution. G. Mexico, off Bahia Honda (*Pourtales*), 'Challenger' Exp., off the Azores, 'Valorous' Exp.; 418-1785 fms.

Differs from *D. tarentinum* in being proportionally narrower and more uniformly cylindrical, straighter and not abruptly curved towards the point, and in the close-set striæ which completely and regularly cover every part of the shell, instead of being much finer on the smaller or posterior part. Fragments from the 'Valorous' Expedition show that it grows to a much larger size than any other North-Atlantic species. In the 'Travailleur' Expedition of 1882, several living specimens were dredged between Lisbon and the Canaries, of an extraordinarily large size and thickness, and having a long terminal slit.

✓ 5. DENTALIUM CANDIDUM, Jeffreys. (Plate XLIX. fig. 2.)

D. candidum, Jeffr. in Ann. & Mag. N. H. Feb. 1877, p. 153.

'Porcupine' Exp. 1869: St. 16, 21, 23, 23a, 28, 31, 37, 38.

Distribution. 'Valorous' Exp.; 410-1750 fms.

Some fragments are of an extraordinary thickness.

✓ 6. DENTALIUM AGILE, M. Sars.

D. agile (M. Sars), G. O. Sars, 'On some remarkable forms of Animal Life from the great deeps off the Norwegian coast,' i. 1872, p. 31, pl. iii. f. 4-15.

'Porcupine' Exp. 1869: St. 3, 5, 6, 7, 11, 13, 14, 15, 36, 39, 41, 45, 65. 1870: Atl. 1, 2, 3, 3a, 13, 16, 17 (very thick), Setubal B., off C. Espichel, 22, 24-34; Med. 40, 55, Adventure Bank.

Distribution. Loffoden I. to Bergen coast (*Sars* and others),

Bay of Biscay ('Travailleur' Exp.), Mediterranean (*Spratt* and others), Adriatic (*Stossich*), Azores ('Josephine' Exp.), Canaries ('Challenger' Exp.), G. Mexico (*Dall*), New England and Maine (*Verrill & Packard*); 30-1963 fms.

Fossil. Upper Tertiaries: S. Italy, Sicily, and Rhodes.

Prof. G. O. Sars was right in distinguishing this species from *D. striolatum*; and I was wrong in uniting them, although other naturalists may not be satisfied. The shell is usually smooth, but sometimes more or less strongly striated lengthwise towards the point. A specimen from the west of Ireland is more than 3 inches long. See also my remarks in the *Ann. & Mag. N. H.* for Feb. 1877 and July 1882.

It is the *D. incertum* of Philippi but not of Deshayes, *D. striatum* of Scacchi, and *D. lacteum* of O. G. Costa but not of Deshayes.

✓ 7. *DENTALIUM STRIOLATUM*, Stimpson.

D. striolatum, Stimps. Proc. Boston Soc. Nat. Hist. 1851, p. 114.

'Lightning' Exp., St. 5, 7.

'Porcupine' Exp. 1869: St. 3, 23a, Little Minch.

Distribution. From Spitzbergen and the Faroe Islands to the Bay of Biscay and the Azores, the Mediterranean, as well as all along the eastern coasts of North America from Newfoundland to Maine, off Valentia with *D. entalis*; 10-570 fms.

Fossil. Pliocene: Sicily. Post-tertiary: Norway, Scotland, North of England; 0-1360 ft.

As Mr. Norman justly remarked in the 'Journal of Conchology' for Jan. 1879, it is very difficult to distinguish some Norwegian specimens of *D. striolatum* from *D. entalis*. I will not say they may not be the same species. The principal difference seems to consist in the present species being less regularly cylindrical and being abruptly pinched up near the point, as well as in the longitudinal striae at that end. It is unmistakably the same species as *D. abyssorum* of M. Sars, 1858, as he afterwards admitted. Besides the latter synonym, it is the *D. brevifissum* of Brugnone, but not of Deshayes or Nyst. Professor Whiteaves, in 1874, regarded *D. attenuatum* of Say as identical with *D. dentalis* of Gould and *D. abyssorum* of Sars. Judging from specimens named by Professor Verrill "*Dentalium occidentale*, Stimpson" (*D. dentalis*, Gould), this is another synonym, the specimens belonging to a more strongly ribbed variety of the present species. Not *D. striolatum* of Risso, 1826, which is a variety of *D. dentalis*.

✓ 8. *DENTALIUM ENTALIS*, Linné.

D. entalis, L. S. N. p. 1263: B. C. iii. p. 191, pl. v. f. 1; v. p. 197, pl. lv. f. 1.

'Lightning' Exp., St. 2, 3, 4, 5.

'Porcupine' Exp. 1869: St. 1, 2, 6, 9, 13, 14, 18, 24, 25, 33, 35, 45a, 45b, 64, 68, The Minch, Little Minch. 1870: Atl. 30.

Distribution. Iceland, Northern Russia, and Scandinavia to Corunna, Maine, Vancouver I.; 4-200 fms. It is much more com-

mon in the north than in the south of England, where it seems to be replaced by *D. tarentinum*. I have not been able to identify *D. entalis* as Mediterranean or Adriatic, although the name occurs in nearly every work on the shells of those seas in consequence of *D. tarentinum* having been mistaken for it.

Fossil. Pliocene: Red and Belgian Crag. Post-tertiary: Norway, Scotland, and N. England; 4-1360 ft. Not miocene as stated by Hörnes and others, nor Sicilian (on Tiberi's authority), nor Subapennine as doubtfully indicated by Issel.

D. pretiosum of Nuttal, and *D. indianorum* of Philip Carpenter.

✓ 9. *DENTALIUM SUBTERFISSUM*, Jeffreys. (Plate XLIX. fig. 3.)

D. subterfissum, Jeffr. in Ann. & Mag. N. H. Feb. 1877, p. 154.

'Porcupine' Exp. 1869: St. 16, 19, 21.

Distribution. 'Valorous' Exp. 1450 fms. (fragment). 'Challenger' Exp. (off Azores), 1000 fms.

The peculiar position of the slit is the same as in *D. inversum* of Deshayes, a miocene fossil.

✓ 10. *DENTALIUM ENSICULUS*, Jeffreys. (Plate XLIX. fig. 4.)

D. ensiculus, Jeffr. in Ann. & Mag. N. H. Feb. 1877, p. 154.

'Porcupine' Exp. 1869: St. 19, 40. 1870: Atl. 16, 17, 17a.

Distribution. 'Valorous' Exp., 1450 & 1785 fms. 'Challenger' Exp. (off St. Thomas), 470 fms.

11. *DENTALIUM RUBESCENS*, Deshayes.

D. rubescens, Desh. Anat. et Mon. du genre *Dentale*, 1825, p. 43, pl. ii. f. 23, 24.

'Porcupine' Exp. 1870: Med. St. 50, 50a, Benzert Road, G. Tunis, Adventure Bank.

Distribution. Charente-Inférieure (*Aucapitaine*)?, Mediterranean, Adriatic, and Canary I.; 2-40 fms.

Fossil. Pliocene: Italy.

D. fissura of Philippi and others, but not of Lamarck, whose species is a Grignon fossil. Perhaps also *D. translucidum* of Deshayes, although he describes the colour as "viridula."

Perfect specimens have a small terminal pipe or sheath, which is partly enclosed in the shell, but protrudes from it as in *D. entalis* and many other species; it is slightly channelled on each side. McAndrew noticed a white variety from Goletta, near Tunis.

✓ 12. *DENTALIUM FILUM*, G. B. Sowerby, Jun.

D. filum, Sow. Thes. Conch. (1866) p. 99, pl. ccxxv. f. 45.

'Porcupine' Exp. 1870: Atl. St. Vigo B., 13; Med. 55.

Distribution. Bay of Biscay, Vigo and north of Spain, and various parts of the Mediterranean; 20-1093 fms.

Fossil. Pliocene: Calabria and Sicily.

BODY of a whitish colour, except the gills and liver, which are very perceptible through the transparent shell: foot worm-shaped, long and extensile, having the point or extremity arrow-head-

shaped, or conical with a triangular lobe on each side; these lobes seem to serve as flaps or wings to aid the locomotion of the animal, and are expanded or contracted accordingly: *captacula* very numerous (apparently from 50 to 100), cylindrical, slender, and extensile, each terminating in an oblong bulb: *mantle* forming a slight collar inside the mouth or front opening of the shell: *gills* or branchiæ brown, arranged in two leaves: *liver* yellow, granular; the lower fourth of the shell is empty and not occupied by the animal. The *captacula* are always in active and incessant motion, even when the other parts of the animal are at rest. The action of the foot is somewhat like that of *Crenella* or *Modiolaria*.

I admit that my friend Dr. Fischer is right in giving this species the name imposed by Sowerby, although I do not agree with the latter in saying that Mr. McAndrew's shell is the same as that from the Philippines. The latter species is larger and proportionally broader towards the front or anterior end, and is consequently less slender and thread-like; and it is also more curved. I would suggest for that species the name *subrectum*.

I described the present species in the Ann. & Mag. N. H. for July 1870, as *D. gracile*; but that name had been preoccupied by Prof. Meek for a North-American fossil.

The colour of the shell is clear white; Sowerby described it as "pallide fulva." There is a terminal sheath as in *D. rubescens*. My largest specimen is half an inch in length. It is more regularly cylindrical than the young of *D. rubescens*, narrower and nearly equal in breadth throughout. Very young specimens of the present species have a bulbous point like *D. entalis* and other species.

1. SIPHODONTALIUM TERES¹, Jeffreys. (Plate XLIX. fig. 5.)

SHELL cylindrical, gradually tapering to the basal point or posterior extremity, gently curved, thin, glossy, and semitransparent; *sculpture*, none except fine and numerous lines of growth: *colour* whitish: *mouth* circular: *base* slightly but distinctly notched above and below. L. 0.35, B. 0.05.

'Porcupine' Exp. 1870, Atl. St. 16, 17, 17a.

The position of the terminal notches in this species differs from that of the slits in *Dischides*, being placed one on the convex and the other on the concave end of the shell in *S. teres*, instead of being bilateral as in that shell.

Type 2. SIPHODONTALIUM AFFINE, M. Sars.

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

'Porcupine' Exp. 1869: St. 19, 28, 30. 1870: Atl. 3, 16, 17, 17a.

Distribution. Loffoden I., 100–300 fms. (M. Sars). 'Valorous' Exp., 1450 fms. Nova Scotia, 35 fms. (Verrill)?

Not the young of *S. vitreum* (see B. C. v. p. 196), which in all states of growth is more conical and not so cylindrical as *S. affine*; and the base or point is also different. The present species is not half the size of *S. teres*, and is much less slender and tapering.

¹ Slender.

✓ 3. SIPHODONTALIUM LOFOTENSE, M. Sars.

Siphonodentalium lofotense, M. Sars, Christ. Vid. Selsk. Forh. 1864, p. 297, t. vi. f. 29-33: B. C. v. p. 195, pl. ci. f. 2.

'Porcupine' Exp. 1869: St. 2, 6, 10, 14, 16, 18, 23, 25, 28, 1870: Atl. 9, Vigo B., 26-30; Med. 50, 55.

Distribution. Norway, Shetland and the Hebrides, Bay of Biscay, throughout the Mediterranean from Marseilles to the coast of Syria, 'Valorous' Exp., New England; 30-1750 fms.

Fossil. Pliocene: Calabria and Sicily.

An undescribed species, allied to *S. lofotense*, was dredged by the late Mr. McAndrew in the Gulf of Suez; it differs in the mouth being encircled by a rim and in the base being bifid instead of merely notched.

✓ 4. SIPHODONTALIUM QUINQUANGULARE, Forbes.

Dentalium quinquangulare, Forb. Rep. Æg. Inv. p. 188.

Siphonentalis tetragona, G. O. Sars, Moll. reg. arct. Norv. p. 105, t. 20. f. 13, a-c.

'Porcupine' Exp. 1869: St. 3, 14, 15, 17, 38. 1870: Atl. 1, 2, 3, 3a, 6, 8, 9, 13, 17a, 24-34; Med. 45, 55, Adventure Bank.

Distribution. Norway, Bay of Biscay and N. Spain, Mediterranean from Algiers and Marseilles to the Ægean, Jamaica, Barbadoes, var. off Culebra I. ('Challenger' Exp.); 5-650 fms.

Fossil. Pliocene: S. Italy and Sicily.

I do not consider this the *Dentalium tetragonum* of Brocchi or a variety of it, to which his and Gmelin's *D. sexangulum* (not *D. sexangulare* of Lamarck and Deshayes) apparently belongs. Specimens of Brocchi's species from the Subapennine Tertiaries, for which I am indebted to the kindness of Professor Bellardi and the late Signor Lawley, are clearly a species of *Dentalium*, and have the base (or apex, whichever it may be called) truncated and fitted with a central short pipe as in *D. dentalis* and allied species. Some of these specimens are four-angled, while others have 5 or 6 angles.

I am not at all satisfied with the generic place of this peculiar shell. The sculpture is that of most species of *Dentalium*, and the fry have also a bulbous or pear-shaped base; but the terminal notches, usually one on each side, agree with those in most species of *Siphonodentalium*. Some Norwegian specimens have five notches, and are jagged like *S. vitreum*. If the position of these terminal notches or slits constitutes a generic character, *D. subterfissum* and *D. rubescens* ought to be separated from *Dentalium* with much greater reason than *Antalis*. Although the present species is so common in Norway and the west of Ireland, as well as southwards to the Mediterranean, it has strangely enough not yet occurred in Shetland, where the conditions of habitability are similar.

✓ 5. SIPHODONTALIUM VITREUM, M. Sars.

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

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

'Lightning' Exp., St. 1.

'Porcupine' Exp. 1869: St. 19, 42, 89. 1870: Atl. 17.

Distribution. Arctic ocean from Spitzbergen and Novaia Zembla to Finmark, 'Valorous' Exp., G. St. Lawrence to southern coast of New England; 15-1750 fms.

Fossil. Miocene: Vienna Basin (*Hörnes*)? Post-tertiary: Norway, 82° 30' N. lat. (*Feilden*), Canada; 4-240 ft.

Not *Dentalium vitreum* of O. G. Costa.

✓ *DISCHIDES BIFISSUS*, S. V. Wood.

Dentalium bifissum, S. V. Wood, (Publ. Pal. Soc.) Crag Moll. i. p. 190, t. xx. f. 3, a-b.

'Porcupine' Exp. 1870: Atl. St. Vigo B., Setubal B.; Med. 50, 50a, Benzert Road, Adventure Bank.

Distribution. G. Gascony, Mediterranean from Gibraltar to Sicily, Morocco, Canaries; 5-180 fms.

Fossil. Pliocene: Coralline Crag, Italy. Post-tertiary: Selsea.

BODY whitish, gelatinous: *mantle* rather thick, forming a collar round the front opening of the shell: *captacula* issuing from within the mantle, numerous, capable of so great an extension as to exceed the shell in length; stalks very slender; terminal bulbs oval: *foot* cylindrical and narrow, protruded from the middle of the mouth as from a sheath; it is occasionally thrust out in a darting manner and suddenly withdrawn, and so swiftly that the point of the foot could not be observed; the foot is usually curved towards the point: *anal tube* protruded beyond the narrower end or extremity of the shell; it consists of an outer and inner part, the latter being folded to suit the slit on each side: *gills* rather short, of a brownish colour.

There are several useless synonyms. This species appears to be *Dentalium coarctatum* of Deshayes, but not of Lamarck. It was erroneously considered by me *Dentalium olivi* of Scacchi, for which see *Cadulus*. A species of *Dischides*, dredged by the late Admiral Sir E. Belcher in the North Pacific, somewhat resembles the present species, but is proportionally wider and the terminal slits are shorter and more open. The generic character of *Dischides* is the bilateral position of the terminal slits. *Gadus bilabiatus* and *G. parisiensis* of Deshayes, Eocene fossils, are not unlike *D. bifissus* in shape; but the terminal point or base is jagged as in *Siphodentalium vitreum*, and the slit is much shorter. Besides, *Gadus* has been very long and notoriously used in Ichthyology.

✓ 1. *CADULUS OLIVI*, Scacchi.

Dentalium olivi, Sc. Not. foss. Gravina (Ann. Civ. 1835), p. 56, t. 2. f. 6, a b.

'Porcupine' Exp. 1869: St. 17. 1870: Atl. 9.

Distribution. Florö, Norway, a fragment (*Norman*), Bay of Biscay, Palermo (*Monterosato*), 'Valorous' Exp., New England (*Verrill*); 80-1450 fms.

Fossil. Pliocene: Italy.

C. pandionis of Verrill and Smith from New England. Nyst considered *Dentalium gadus* of Montagu identical with *D. coarctatum* of Lamarck and *D. "Olivii"* of Scacchi. This was clearly a mistake, all the three shells being quite different, and Lamarck's being a well-known species of *Ditrypa* and belonging to the Annelida. The present species is apparently *Siphonodentalium hyalinum* of Brugnone. It may be *D. ventricosum* of Bronn. Calcara referred *D. olivi* to *D. coarctatum* of Brocchi, which is Lamarck's species. According to Fischer the latter is probably the same as Montagu's *D. gadus*. I proposed in 1869 the generic name *Loxoporus*, if Philippi's name *Cadulus* were not applicable to this group of shells; and later in the same year Stimpson proposed the name *Helonyx*. This genus differs from *Siphonodentalium* in the constriction of the mouth, and in the middle portion of the shell being more or less swollen. In *C. olivi*, the point or base (if we regard the shell as an inverted narrow siphon) has several slits, as in *S. vitreum*; but the mouth is thickened or encircled with a rim, and is obliquely truncated. It is variable in size and comparative slenderness, both in the living and fossil states.

✓ 2. *CADULUS CYLINDRATUS*, Jeffreys. (Plate XLIX. fig. 6.)

C. cylindratus, Jeffr. in Ann. & Mag. N. H. Feb. 1877, p. 158.

'Porcupine' Exp. 1869: St. 20, 28, 30, 31.

Distribution. 'Valorous' Exp., Bay of Biscay ('Travailleur' Exp. 1880); 652-1450 fms.

✓ 3. *CADULUS GRACILIS*, Jeffreys. (Plate XLIX. fig. 7.)

C. gracilis, Jeffr. in Ann. & Mag. N. H. Feb. 1877, p. 157.

'Porcupine' Exp. 1870: Atl. St. 16, 17, 17a.

Distribution. 'Valorous' Exp., Bay of Biscay ('Travailleur' Exp. 1880); 690 fms.

✓ 4. *CADULUS SUBFUSIFORMIS*, M. Sars.

Siphonodentalium subfusiforme, M. Sars, Vid. Selsk. Forh. 1864, p. 21, t. vi. f. 36-44.

'Porcupine' Exp. 1869: St. 10. 1870, Atl. 2.

Distribution. Norway, Shetland, Bay of Biscay ('Travailleur' Exp. 1880), Palermo (*Monterosato*, as *C. abyssicola*); 40-650 fms.

Fossil. Miocene: Vienna Basin (*Hörnes*)? Post-tertiary: Barholmen near Christiania (*Crosskey & Robertson*); 30 ft.

I had mistaken the present species for that to which *Monterosato* afterwards obligingly gave my name. In *C. subfusiformis* the mouth is circular and abruptly truncated; in *C. jeffreysi* the mouth is roundish-oval and obliquely truncated. Professor G. O. Sars first called my attention to this difference. Both species occur on the western coast of Norway as well as in Shetland.

5. *CADULUS PROPINQUUS*, G. O. Sars.

C. propinquus, G. O. Sars, Moll. reg. arct. Norv. p. 106, t. 20. f. 15, a-b.

'Porcupine' Exp. 1870: Atl. St. 16, 17, 17 a.

Distribution. Norway, Bay of Biscay ('Travailleur' Exp. 1880), New England (*Verrill*)?; 100-450 fms.

Professor Verrill's notice and figures of this species, which are given with his usual care and accuracy, differ so much from European specimens, that I cannot satisfactorily quote his habitat. *C. propinquus* is smaller and less swollen than *C. jeffreysi*, not so contracted at the point; and especially the mouth is not obliquely truncated, but circular.

✓ 6. *CADULUS JEFFREYSI*, Monterosato.

C. subfusiformis, B. C. v. p. 196, pl. ci. f. 3.

Helonyx jeffreysii, Monterosato, 'Poche note sulla Conchiologia Mediterranea,' 1875, p. 10.

'Porcupine' Exp. 1869: St. 1, 2, 3, 4, 6, 9, 10, 14, 16, 22, 23a, 25, 27-30, 61, 89. 1870: Med. 50, Adventure Bank.

Distribution. Norway (and var. *tumidula*, as *C. tumidosus* of G. O. Sars, not of me), Shetland, Valentia (west of Ireland), Bay of Biscay (var. *tumidula*), Mediterranean from Marseilles to the Ægean, Canary I. ('Challenger' Exp.), Josephine Bank and Azores ('Josephine' Exp.), New England (*Verrill*); 40-1125 fms.

Fossil. Pliocene: Calabria and Sicily.

C. diploconus, Seguenza. Although it somewhat varies in size, the shell is always much larger and more swollen than *C. subfusiformis*, to which I had erroneously referred it.

B.M. ✓ 7. *CADULUS TUMIDOSUS*, Jeffreys. (Plate XLIX. fig. 8.)

C. tumidosus, Jeffr. in Ann. & Mag. N. H. Febr. 1877, p. 156.

'Porcupine' Exp. 1869: St. 39. 1870: Atl. 16, 17, 17a (and var. *minor*), 22, 24, 31-34 (var. *minor*).

Distribution. 'Valorous' Exp., Bay of Biscay ('Travailleur' Exp.), Canaries ('Challenger' Exp.); 1093-1450 fms.

Fossil. Pliocene: Messina.

Some specimens are faintly or indistinctly striated lengthwise. In all probability many of the species described by Mr. Dall from the 'Blake' dredgings in the Gulf of Mexico and Caribbean Sea, as well as of those described by Mr. Watson from the 'Challenger' Expedition, may ultimately prove to be united with some of the species which I have described. It is very difficult to define the line of variation, and much more that of specific distinction. At all events the above may be considered "forms" if not species.

✓ 8. *CADULUS AMPHORA*¹, Jeffreys. (Plate XLIX. fig. 9.)

SHELL resembling in shape an ancient wine-vessel without handles, bulging towards the middle, gently curved, narrowing towards each end but more contracted at the base or point, rather solid, glossy, and opaque: *sculpture* consisting of a slight but distinct keel which encircles the shell on the upper two fifths of its length; that part is somewhat excavated or flattened; no striæ of growth are perceptible:

¹ Like an amphora.

colour white: *mouth* circular, not oblique or sloping: *base* notched on each side. L. 0.1, B. 0.35.

'Porcupine' Exp. 1870: Atl. St. 16. A single specimen.

✓ 9. *CADULUS GIBBUS*¹, Jeffreys. (Plate XLIX. fig. 10.)

SHELL barrel-shaped, gibbous in the middle, whence there is an abrupt slope towards each end; these are equal in breadth: it is rather solid, glossy, and semitransparent: *sculpture* none: *colour* white: *mouth* obliquely truncated: *base* slightly notched, but not quite perfect. L. 0.1, B. 0.05.

'Porcupine' Exp. 1870, Atl. St. 13; a single specimen.

Distribution. Bay of Biscay ('Travailleur' Exp., 1880); one specimen.

Allied to *C. ovulum* of Philippi, but much smaller and not so oval, and the ends are equal in size. The last named species was dredged by Admiral Acton in the Bay of Naples, and by Dr. Fischer in the Bay of Biscay during the 'Travailleur' Expedition of 1880.

Class GASTROPODA.

Family I. CHITONIDÆ.

The controversial contributions to the vexed history of this confessedly abnormal group in a taxonomical and anatomical point of view seem to be endless. In the 'Proceedings of the Royal Society' for December 1880 will be found a careful and elaborate paper by Mr. Adam Sedgwick on the kidney of *Chiton*, showing that Middendorff was right and Schiff and von Ihering were wrong as to the existence and position of that organ.

Genus CHITON.

A. *Acanthochites*, Leach.

Girdle covered with spines, and having also tufts of bristles.

✓ 1. *CHITON FASCICULARIS*, Linné.

C. fascicularis, L. S. N. p. 1106: B. C. iii. p. 211, pl. v. f. 2; v. p. 197, pl. lv. f. 3.

'Porcupine' Exp. 1869: St. Lough Foyle. 1870: Atl. Gibraltar B.

Distribution. Norway to the Ægean and Adriatic (but southern habitats unreliable); Mogador (*McAndrew*); 0-145 fms.

Fossil. Pliocene: Coralline Crag and S. Italy. Post-tertiary: Selsea.

Perhaps the *C. fascicularis* of Linné may have been *C. discrepans*. In Philippi's collection at Berlin are specimens of both species named *C. fascicularis*. If the Linnean name has been misapplied, Pennant's name *crinitus* ought to be substituted for it. Leach called the present species *Acanthochætes vulgaris*.

Dr. Edward Brandt has examined and compared the nervous system of *Chiton fascicularis* and *Patella vulgata*. He considers

¹ Gibbous.

that there is a real affinity between *Chiton* and *Patella*, and that *Chiton* does not materially differ from other mollusks. Mr. Dall also regards the Chitons and Limpets as closely allied. See his exhaustive and valuable remarks on the morphology and classification of the Chitons in the 'Scientific Results of the Exploration of Alaska' (1879), in which he proposed no fewer than 33 genera distributed into 9 groups. Dr. McIntosh has noticed that Chitons scoop out sandstone like Limpets. Specimens occurred on the coast of Bohuslän, in 12 fathoms, on the leaves of *Laminaria saccharina*.

✓ 2. CHITON DISCREPANS, Brown.

C. discrepans, Brown, Ill. Conch. p. 65, pl. xxi. f. 20: B. C. iii. p. 214; v. p. 198, pl. lv. f. 4.

'Porcupine' Exp. 1870: Atl. St. Gibraltar B., with *C. fascicularis*.

Distribution. Norway and Sweden (*Lovén*)?, Cornwall and Channel Isles to Mogador, Mediterranean and Adriatic; 0-25 fms.

Fossil. Pliocene; S. Italy. Post-tertiary: Selsea.

There are a few obsolete synonyms.

B. *Acanthopleura*, Guilding.

Girdle spinous, without tufts.

✓ 3. CHITON MENDICARIUS, Mighels.

C. mendicarius, Migh. Boston Journ. Nat. Hist. 1841, i. p. 49; 1842, iv. p. 42, pl. 4. f. 8.

C. Hanleyi, B. C. iii. p. 215; v. p. 198, pl. lv. f. 5.

'Porcupine' Exp. 1869: St. 2, 65. 1870: Atl. 24 (plate only).

Distribution. Loffoden and Faroe I. to South Devon, Mediterranean (*Monterosato*), Caribbean Sea (*Petit*), eastern coasts of North America; 8-300 fms.

Fossil. Post-tertiary: Norway.

C. Nagelfar of *Lovén* and *C. abyssorum* of M. Sars appear to be this species of unusually large size. The late Mr. Barlee dredged in Shetland a specimen an inch long. My Piedmontese shell which I named *C. Hanleyi* turned out to be the young of *C. caietanus*. *C. strigillatus* of S. Wood, a Coralline-Crag shell, is more probably *C. apiculatus* of Say, which is also a North-American species; but the fossil is only known from disjointed plates. The "Crag" Mollusca include many North-American species. The inside of each plate in the middle is strengthened by a thick bow-shaped rib.

C. *Lepidopleurus*, Leach.

Girdle irregularly granular.

✓ 4. CHITON CAIETANUS, Poli.

C. caietanus, Poli, Test. utr. Sic. i. p. 10, t. iv. f. 1, 2.

'Porcupine' Exp. 1870: Med. Algesiras B. (young).

Distribution. C. Croisic (*Cailliaud*), C. Breton (*de Folin*), Spain (*McAndrew* and others), Mediterranean and Adriatic (*Poli* and others) to Ægean (*Forbes*); 5–20 fms.

✓ 5. CHITON CINEREUS, Linné.

C. cinereus, L. S. N. p. 1107: B. C. iii. p. 218; v. p. 198, pl. lvi. f. 2.

‘Lightning’ Exp. St. 4, 5.

‘Porcupine’ Exp. 1869: St. 2, Lough Foyle. 1870: Atl. 36 (plate).

Distribution. Greenland (*Fabricius*)?, Iceland, Faroe I., Finmark to Vigo Bay; 1–150 fms. Apparently not Mediterranean nor Adriatic.

Fossil. Pliocene: Sicily (*Monterosato* and *Tiberi*). Post-tertiary: Norway and Scotland; 0–80 ft.

One of the synonyms is *C. asellus* of Spengler.

6. CHITON ARCTICUS, G. O. Sars.

Lepidopleurus arcticus, G. O. Sars, Moll. reg. arct. Norv. p. 112, t. 7. f. 7, a–h.

‘Lightning’ Exp. St. 3, 4.

Distribution. Spitzbergen, Greenland as *C. cinereus* (*M. Sars*) probably, Finmark and Vadsö (*G. O. Sars*); 20–100 fms.

Fossil. Post-tertiary: Norway, as *C. cinereus* (*M. Sars*) probably.

This differs from the white variety of *C. cinereus* in its comparatively greater length and more raised or arched form, in the less distinct or regular catenation of the granules which cover the surface, and in the prominence of the lateral areas.

✓ 7. CHITON ALVEOLUS, M. Sars.

C. alveolus (*Sars MS.*), Lovén, Ind. Moll. lit. Scand. occ. hab. p. 27.

Lepidopleurus alveolus, G. O. Sars, Moll. reg. arct. Norv. p. 110, t. 7. f. 3, a–c.

‘Porcupine’ Exp. 1870: Atl. St. 1.

Distribution. Norway, Bay of Biscay (‘Travailleur’ Exp.); 120–664 fms.

The late Professor Sars, in his remarks on the occurrence of animal life in the depths of the sea, 1868, referred this species of his to *C. cancellatus*; but *C. alveolus* is larger and longer or more oblong, and it has a different sculpture.

✓ 8. CHITON RARINOTA¹, Jeffreys. (Plate L. fig. 1.)

SHELL oblong-oval, arched, rather thin and glossy: *plates* broader in the middle than at the sides; lateral areas indistinct: *sculpture* consisting of white tubercles, which are few in number and irregularly scattered; these are round in the middle of the shell, but become

¹ Having few marks.

more raised and oval at the sides; under a microscope can be detected numerous and close-set lines or striæ, which are arranged lengthwise: *colour* whitish: *beaks* none, except on the tail-plate, where they are nearly circular: *inside* glossy. L. 0·1, B. 0·05.

'Porcupine' Exp. 1870: Atl. St. 3 a, 17. Two specimens.

Although this is a very small species, and might be regarded as the young of some other species, I must observe that I have carefully compared both specimens with the young of all other European species of *Chiton* known to me, and some specimens of which last mentioned species are much smaller than those which I have now described. The peculiar character of having so very few and scattered tubercles is not presented by any other of those species. The girdle is membranous and thin.

9. CHITON MARGINATUS, Pennant.

C. marginatus, Penn. Brit. Zool. iv. p. 71, t. xxxvi. f. 2; B. C. iii. p. 221; v. p. 199, pl. lvi. f. 5.

'Porcupine' Exp. 1870: Atl. St. Vigo B.

Distribution. Greenland (coll. Möller, in mus. Copenhagen), Faroe I., Norway to Mogador, Mediterranean and Adriatic, eastern and western coasts of North America; 0-40 fms.

Fossil. Pliocene: Sicily (*Monterosato*). Post-tertiary: Norway, Selsea; 0-100 ft.

C. cinereus of Laskey, Lowe, and Forbes and Hanley (not of Linné), *C. variegatus* of Philippi and other authors, and *C. dentiens* of Gould.

D. Lophyrus, Poli.

Girdle imbricated or regularly granular.

10. CHITON ALBUS, Linné.

C. albus, L. S. N. p. 1107: B. C. iii. p. 220; v. p. 199, pl. lvi. f. 3.

'Lightning' Exp., St. 1, 2, 5.

Distribution. Spitzbergen, Novaia Zembla, Russian Lapland, White Sea, Finmark southward to Isle of Man, Faroe Isles, Iceland, Greenland, Wellington Channel, Behring Strait, eastern and western coasts of North America; 0-337 fms.

Fossil. Post-tertiary: Fort William.

Family II. PATELLIDÆ.

✓ PATELLA VULGATA, Linné.

P. vulgata, L. S. N. p. 1258: B. C. iii. p. 236, pl. v. f. 3; v. pl. lviii. f. 1-4.

'Porcupine' Exp. 1869, St. Donegal B. 1870: Atl. Gibraltar B.

Distribution. Throughout the western coast of Europe from the Faroe Isles and Bergen to Gibraltar, as well as the Mediterranean and Adriatic; between tide-marks and even above high water, on

rocks and stones. *C. Verd I. (de Rochebrune)*. Not Arctic, nor Asiatic, nor American.

Fossil. Pliocene: Red Crag. Post-tertiary, especially in raised sea-beaches: Scandinavia, Great Britain and Ireland, France, and Italy; 0-1360 ft.

An extremely variable species, as regards shape, size, position of the apex, sculpture, colour, inner coating, habitat, and every other characteristic than that of being conical. All the North-Atlantic so-called species, except *P. ferruginea* or *safiana*, but including the varieties noticed in 'British Conchology' and *P. lusitanica* of Gmelin or *punctata* of Lamarck, run one into another by insensible gradations.

Although the following more properly relates to the habits of the Mammalia than to those of the Mollusca, it is not devoid of interest in this place. In a letter from Dr. Fleming to Prof. Jamieson (Mem. Wern. Soc. 1823), he says that at Scalpa, "in the course of conversation with the keeper of the lighthouse Mr. Reid, a judicious observing man, I was informed that rats (the brown or Norway rat, which abounds in the Hebrides) after a shower go down upon the rocks, while the Limpets are crawling about, and by a sudden jerk with their noses detach them from the rocks for food. Should the first effort fail, another is never attempted against the same individual, now warned and adhering closely to the rock; but the rat proceeds instantly to others still off their guard, until enough of food has been procured." See also an interesting paper by Mr. J. Clark Hawkshaw on the habits of the Common Limpet in the 'Journal of the Linnean Society' (Zoology) for 1878.

As may be expected, the synonyms are numerous, and include *P. vulgaris* of Belon, whose name is older than that of Linné by about two centuries.

✓ *HELCION PELLUCIDUM*, Linné.

Patella pellucida, L. S. N. p. 1260.

H. pellucidum, B. C. iii. p. 242, pl. v. f. 4; v. p. 199, pl. lviii. f. 1, 2.

'Porcupine' Exp. 1869: St. Donegal B. 1870: Atl. Vigo B.

Distribution. Iceland, Faroe I., N. Cape to Mogador, Mediterranean (Linné)? Antibes (Martin, f. *Petit*)?; 0-20 fms., usually on *Laminariæ*.

Fossil. Pliocene: Sicily (*Seguenza*). Post-tertiary: Norway, Scotland, and N. Ireland; 0-130 ft.

In the 'Philosophical Transactions' for 1696 Sir Robert Sibbald mentioned this as the "Oval Limpet" in his letter to Dr. Lister on Skye shells.

There are at least half a dozen synonyms. On the other hand, Cantraine thought it very possible that *Helcion pellucidum*, *Tectura virginea*, and *Gadinia gussoni* (the last being his *Patelloidea vitrea*) belong to one and the same species! Lamarck gives the type of the present genus (*Helcion pectinatum*) as Mediterranean on the authority of Born.

1. *TECTURA VIRGINEA*, Müller.*Patella virginea*, Müll. Prodr. Zool. Dan. p. 237.*T. virginea*, B. C. iii. p. 248 ; v. p. 200, pl. lviii. f. 4.

'Lightning' Exp., St. 4.

'Porcupine' Exp. 1869 : Lough Foyle. 1870 : Atl. Vigo B., 26 (var. *conica*), 31-34 (same var.); Med. 50, Adventure Bank, off Rinaldo's Chair.*Distribution*. North Atlantic from Iceland and Norway to Madeira, Canaries, C. Verd I. (*de Rochebrune*), St. Helena (*Melliss*)!, Azores, Mediterranean to the Archipelago, and Adriatic ; 0-150 fms.*Fossil*. Miocene : Marne Vaticano (*Ponzi*). Pliocene : Red and Antwerp Crag, Italy, Rhodes. Post-tertiary : Scandinavia, Great Britain and Ireland, Italy ; 0-460 ft.

For synonyms see 'British Conchology ;' but this species is not the *Patella pileolus* nor *P. asmi* of Middendorff, ex vis. typ. With respect to the question as to the relative precedence in date of the generic name *Tectura* (or *Tecture*) and *Acmæa*, I would remark that part v. of the 'Zoologischer Atlas' of Eschscholtz (now before me), which contains a diagnosis of *Acmæa*, was published in 1833 ; *Tecture* was published in 1830. The Dorpat edition of the 'Atlas,' published in 1828, does not name any type or species.

An adult specimen dredged by Admiral Acton in the Bay of Naples from 60 fathoms has a completely spiral and persistent apex or nucleus. Some Mediterranean and Adriatic specimens have the same shape and coloured markings as those from the North Atlantic ; and the position of the apex is very variable. I therefore cannot regard the *Lottia unicolor* of Forbes as a distinct species. Post-tertiary specimens are occasionally very large ; one collected by Thudén in Sweden is two thirds of an inch long.

✓ 2. *TECTURA FULVA*, Müller.*Patella fulva*, Müll. Prodr. Z. D. p. 237.*T. fulva*, B. C. iii. p. 250 ; v. p. 200, pl. lvii. f. 5.

'Lightning' Exp. : St. 2, 5.

'Porcupine' Exp. 1869 : 1, 6, 9, 68, Little Minch.

Distribution. Finmark to Cape Clear, near Heligoland (*Weinkauff*), Bay of Biscay ('Travailleur' Exp. 1881)!, off Tripoli ('Shearwater' Exp.)! ; 10-487½ fms.*Fossil*. Pliocene : Red Crag, and Sicily. Post-tertiary : Norway ; 100-440 ft.3. *TECTURA RUGOSA*¹, Jeffreys. (Plate L. fig. 2.)

SHELL oblong-oval, convex, rather thin, opaque and lustreless : *sculpture* a few slight and indistinct striæ which radiate towards the margin ; these are crossed by much stronger, close-set, and lamellar or ridge-like striæ in the line of growth, which give a wrinkly appearance ; the points of decussation are nodulous ; the nucleus and upper part of the shell are quite smooth : *colour* whitish : *beak* somewhat incurved and overhanging the front margin :

¹ Full of wrinkles.

mouth oblong-oval: *margin* entire: *inside* glossy, showing the impression of the radiating striæ. L. 0.2, B. 0.15.

'Porcupine' Exp. 1870: Atl. St. 16. Three specimens.

This species differs from *T. fulva* in being more raised and oblong, as well as in the peculiar sculpture and position of the beak.

✓ 4. *TECTURA PUSILLA*¹, Jeffreys. (Plate L. fig. 3.)

SHELL roundish-oval, somewhat depressed, rather thin, opaque and lustreless: *sculpture* extremely numerous, crowded and regular, delicate, minute striæ, which radiate towards the margin as in other species, and cover the whole surface: *colour* whitish: *beak* placed at less than one third from the front margin; it is slightly incurved and pinched-up; apex apparently deciduous: *mouth* roundish-oval: *margin* thin: *inside* smooth and glossy: *scars* indistinct. L. 0.125, B. 0.1.

'Porcupine' Exp. 1870: Atl. St. 16, 17a. A few dead specimens.

✓ 5. *TECTURA ADUNCA*², Jeffreys. (Plate L. fig. 4.)

SHELL oblong, raised but contracted near the beak so as to make the latter more prominent, rather thin, opaque and lustreless: *sculpture*, several fine striæ which radiate towards the margin; most of them are alternately larger and smaller; they do not extend to the upper part of the shell: *colour* whitish: *beak* placed in front, about one third of the whole length; it is strongly incurved or hooked, and has a subspiral and deciduous apex: *mouth* oblong: *margin* thin, entire: *inside* smooth and glossy: *head-scar* semi-circular. L. 0.2, B. 0.125.

'Porcupine' Exp. 1870, Atl. St. 17a. A single and imperfect specimen, but characteristic. Mr. Dall has seen it, and says it is probably his *Cocculina beanii*. I will, however, retain provisionally the specific name which I have given.

Dall's species was dredged in the 'Blake' Expedition off the West Indies in 399–562½ fathoms, and by Professor Verrill off the coast of New England in 100–365 fathoms.

✓ 6. *TECTURA GALEOLA*³, Jeffreys. (Plate L. fig. 5.)

SHELL resembling an ancient helmet or casque, strong and thick for its size, opaque and lustreless: *sculpture*, numerous and close-set fine and minute radiating striæ, which cover the whole of the exterior; there are also occasional and well marked lines of growth, which are somewhat crowded towards the margin: *colour* whitish: *beak* small, incurved, and pointed, placed very near the front margin and almost overhanging it: *margin* entire, compressed and forming a rim on the front half: *inside* smooth: *scars* as in *Lepeta cæca*. L. 0.225, B. 0.175.

'Porcupine' Exp. 1870: Atl. St. 24. A single specimen.

If the peculiar shape of this shell may be regarded as a generic character, I would suggest for it the name *Dallia*, as a mark of respect for the great malacologist Mr. Dall, who has examined my specimen.

¹ Tiny.

² Hooked.

³ A hollow vessel shaped like a helmet.

He says it is "not an Acmeid," and would place it near *Capulus*; but he qualifies his remark by saying that "it is barely possible it may be a *Cocculina*." He is an unquestionably good authority on this as well as other departments of the Mollusca; and I venture with much hesitation to differ from him.

ADDISONIA ECCENTROS, (EXCENTRICA) Tiberi.

Gadinia excentrica, Tib. in Journ. Conch. vi. p. 37, pl. ii. f. 6.

'Porcupine' Exp. 1870: Atl. St. 16; Med. Adventure Bank.

Two specimens.

Distribution. Coral-fishery, Sardinia (*Tiberi*); a single specimen, with *Gadinia gussoni*.

I have made a slight change in the specific name by substituting a classical word for one which is not Latin.

This remarkable shell appears to be the *Addisonia paradoxa* of Dall (Proc. U.S. Nat. Mus. 1882, p. 405), which was dredged by Verrill off the New-England coast in 69-130 fathoms. Dall long ago pointed out that Tiberi's species was not a *Gadinia*. Tiberi's *G. compressa* (recent and fossil), of which through his kindness I possess specimens, is certainly a species of *Lepetella*, Verrill, and comes near *L. tubicola*, which has been lately found by G. O. Sars on the western coasts of Norway. *Addisonia* appears to be allied to *Pilidium*. See the above-cited 'Proceedings of the United-States National Museum' for Dall's excellent and elaborate paper on the families *Cocculinidæ* and *Addisoniidae*, consisting of the genera *Cocculina* and *Addisonia*. The present species is not the *Patella excentrica* of Sandberger from the Mayence Basin.

Although the genera *Umbrella* and *Tylodina* (which are closely allied) have a patelliform shell, there is a peculiarity in that respect which connects them with *Aplysia* and the Nudibranchs, viz. in the spiral and heterostrophe nucleus. *Tylodina duebeni* of Lovén occurred at Stations 24 and 27 of the 'Porcupine' Atlantic dredgings in 1870. It seems rather strange that M. Gaston Moquin-Tandon, in his long and studiously exhaustive memoir on the *Umbrella* of the Mediterranean, did not notice this peculiarity, nor even assign or propose any place for that genus in the classification of the Mollusca, while he freely criticised all previous writers on the anatomy of the animal.

✓ 1. *PROFILIDIUM ANCYLOIDES*, Forbes.

Patella ancyloides, Forb. in Ann. Nat. Hist. v. p. 108, pl. ii. f. 16.

Propilidium ancyloide, B. C. iii. p. 254, pl. vi. f. 1; (*P. ancyloides*) v. p. 200, pl. lviii. f. 7.

'Lightning' Exp., St. 5.

'Porcupine' Exp. 1869: St. 1, 6, 13, 14, 19. 1870: Atl. 16, 17, 17a; Med. Adventure Bank.

Distribution. 'Valorous' Exp., Loffoden I. to Galway coast, Kimmeridge B. Dorset (*Pleydell*)?, Naples (*Acton*), Trapani, Sicily (*Seguenza*); 10-1450 fms.

Fossil. Pliocene: Sicily. Post-tertiary: Christiania; 30-100 ft. *Rostrisepta parva* of Seguenza.

✓ 2. *PROPILIDIUM SCABROSUM*¹, Jeffreys. (Plate L. fig. 6.)

SHELL roundish-oval, expanded, rather thin, semitransparent and of a dull hue: *sculpture*, numerous but not close-set, slight striæ which radiate from the beak and are more or less covered with short tubercles, especially behind; there are also several concentric ridges as in the last-named species: *colour* whitish: *beak* small, pinched up, incurved, and forming a minute spire of two whorls: *mouth* roundish-oval: *margin* thin: *inside* glossy: *septum* thick and strong. L. 0.15, B. 0.15.

'Porcupine' Exp. 1870: Med. St. Adventure Bank. A single specimen.

Differs from *P. ancyloïdes* in being round instead of oval, and in having much fewer and tuberculated striæ; but I am not quite satisfied that it is more than a curious variety. It somewhat resembles the young of *Gadinia garnoti*; but that shell has not the internal septum which is characteristic of the present genus.

✓ 3. *PROPILIDIUM PERTENUE*², Jeffreys. (Plate L. fig. 7.)

SHELL oval, convex, very thin and delicate, transparent, and glossy: *sculpture*, none: *colour* whitish: *beak* small, cylindrical, and incurved, forming a minute spire of two whorls: *mouth* oval: *margin* even: *inside* glossy: *septum* small. L. 0.1, B. 0.075.

'Porcupine' Exp. 1870: Atl. St. 17, 17 a (4 specimens); Med. off Rinaldo's Chair (1 specimen).

Distribution. Palermo (*Monterosato*); 162½ fms.

The young of *P. ancyloïdes*, much smaller than the species now described, are more expanded or depressed, and have the same sculpture as the adult; they are also proportionally solid as well as of a dull hue.

The inner layers of most of the specimens are permeated by a microscopic and branching spore-like organism, perhaps of a fungoid nature.

An imperfect specimen of another small and apparently distinct species occurred also in Station 17. It has the characteristic septum, but otherwise resembles a *Lepetella*. The beak is very much shorter than in *P. pertenuæ*; and the spire has barely one turn.

I had originally given the species above described the MS. name *tenue*.

✓ 4. *PROPILIDIUM COMPRESSUM*³, Jeffreys. (Plate L. fig. 8.)

SHELL differs from *P. pertenuæ* in being oblong instead of oval, and in being laterally compressed like *Patella* [*Lepetella*] *latero-compressa* of Rayneval, a Monte-Mario fossil and, according to Dr. Tiberi, living in the Bay of Naples; and it is also not quite smooth, but is marked by a few slight longitudinal striæ; the beak is proportionally longer, somewhat twisted to one side, and nearly overhangs the hinder margin, instead of being placed (as in *P. pertenuæ*) at about one third of the distance from it. L. 0.1, B. 0.065.

'Porcupine' Exp. 1870: Atl. St. 17. A single specimen.

¹ Roughened.

² Very thin or slight.

³ Pressed together.

Family III. FISSURELLIDÆ.

✓ 1. FISSURISEPTA GRANULOSA¹, Jeffreys. (Plate L. fig. 9.)

SHELL roundish-oval, conical, but somewhat depressed except towards the apex, thin, opaque, and lustreless: *sculpture*, very numerous fine and delicate striæ which radiate from the apex or beak, and are closely covered with minute tubercles; some of these striæ do not quite extend to the apex, and are alternately larger and smaller; the apex is irregularly tubercled: *margin* finely crenated or notched by the striæ: *foramen* nearly circular: *inside* smooth, but not polished: *septum* triangular, covering about half only of the foramen on the underside. L. 0.125, B. 0.1.

'Porcupine' Exp. 1870: Atl. St. 24. A single specimen.

Distribution. Dröbak, Norway; 50 fms.

In my paper on Norwegian Mollusca ('Annals and Magazine of Natural History' for June 1869) I named this remarkable shell as *F. papillosa* of Seguenza; but I afterwards found that I was mistaken as to the species. The shell now described is more delicate, and the sculpture is much finer, with regular and close-set striæ which are studded with far more numerous and minute tubercles. The foramen is circular in the present species, and triangular in *F. papillosa*.

Seguenza's genus *Fissurisepta* differs from *Fissurella* in having an internal septum or plate, as in *Propilidium* and *Puncturella*, and a foramen as in the last named genus; but it wants the spire which is peculiar to those two genera, and which is never deciduous.

✓ 2. FISSURISEPTA PAPILLOSA, Seguenza.

F. papillosa, Seg. Paleont. Malac. d. Messina (Ann. dell' Accad. d. Aspir. Nat. 1862), separate copy, p. 10, tav. iv. f. 2, 2a, 2b.

'Porcupine' Exp. 1870: Atl. St. 16, 17, 17a. Several specimens.

Fossil. Miocene?: Rometta near Messina. Pliocene: Calabria.

This species varies with respect to the size of the tubercles or papillæ. Some recent and fossil specimens have very few and slight scattered tubercles, or are nearly smooth. The recent are rather larger than the fossil specimens, and have usually stronger tubercles.

✓ 3. FISSURISEPTA ROSTRATA, Seguenza.

F. rostrata, Seg. Paleont. Malac. d. Messina (Ann. dell' Accad. d. Aspir. Nat. 1862), separate copy, p. 10, tav. iv. f. 3, 3a, 3b.

'Porcupine' Exp. 1870: Atl. St. 16, 17, 17a. Several specimens of this extraordinary shell, exactly agreeing with fossil specimens from Sicily which I received from my kind friend and correspondent, Prof. Seguenza.

Distribution. Bay of Biscay ('Travailleur' Exp. 1881); 1093 fms. Off Bermudas ('Challenger' Exp.); 1375 fms.

Fossil. Miocene?: Sicily. Pliocene: Sicily.

✓ 1. PUNCTURELLA PROFUNDI, Jeffreys. (Plate L. fig. 10.)

P. profundus, Jeffr. in Ann. & Mag. N. H. March 1877, p. 232.

¹ Covered with granules.

'Porcupine' Exp. 1870: Atl. St. 16, 17, 17a. Several specimens.

Distribution. 'Valorous' Exp., Bay of Biscay ('Travailleur' Exp. 1881); 1003–1450 fms. Off Culebra I., Danish W. Indies ('Challenger' Exp.); 390 fms.

This is easily distinguishable from any species of *Fissurisepta* in having a conspicuous and persistent spire, as well as in the shape of the septum.

The only difference between *Puncturella* and *Rimula* seems to consist in the comparative length of the slit. This is proportionally much longer in the young than in the adult of the typical species, *P. noachina*.

2. PUNCTURELLA NOACHINA, Linné.

Patella noachina, L. Mant. Plant. p. 551.

Puncturella noachina, B. C. iii. p. 257, pl. vi. f. 3; v. p. 200, pl. lix. f. 1.

'Lightning' Exp.: St. 2, 4, 5, off the Faroe I.

'Porcupine' Exp. 1869: St. 6, 9, 13, 14 (and var. *princeps*; and var. *levior*, laterally compressed, keeled in the line of the slit or fissure, and nearly smooth), North Channel, 70, off Lerwick. 1870: Atl. 2, 3a, 17, 17a, 24, 27, 28.

Distribution. From Wellington Channel and Greenland to the southern coast of New England, Iceland, Spitzbergen, and Jan Mayen I. to Scarborough, Novaia Zembla, Okhotsk Sea, N. Japan, and Corea, Strait of Magellan (Acton and 'Challenger' Exp.), between C. of Good Hope and Kerguelen I. ('Challenger' Exp.); 4–430 fms.

Fossil. Miocene?: Sicily. Pliocene: Coralline Crag and S. Italy. Post-tertiary: Scandinavia, Scotland, and Yorkshire, Sicily, and Labrador, mostly in "glacial" deposits; 0–470 ft.

The odontophore has been well figured by Friele, and shows that it is of a Rhipidoglossan type.

The genus *Cemoria* of Leach MS., as defined by Risso, is certainly not the genus *Puncturella*; his type is doubtfully referred to the *Patella equestris* of Linné.

✓ 3. PUNCTURELLA CLATHRATA¹, Jeffreys. (Plate L. fig. 11.)

SHELL forming an oblong cone, rather solid for its size, opaque and lustreless: *sculpture*, numerous fine longitudinal striæ and stronger concentric ridges, the intercrossing of which produces a cancellated appearance; the striæ do not reach much beyond half-way from the margin, where the ridges become slighter and crowded up to the apex: *colour* pale brownish white: *beak* smooth, incurved, twisted a little to the left, and ending in a spire of a single whorl: *foramen* forming a long triangular slit: *mouth* oblong: *margin* finely scalloped: *inside* smooth and glossy: *septum* large, triangular as in *P. profundus*. L. 0.15, B. 0.1.

'Porcupine' Exp. 1870: Atl. St. 17a. A single and somewhat imperfect specimen, but peculiar and characteristic.

¹ Latticed.

Distribution. Off Culebra I. ('Challenger' Exp.); 390 fms.

It differs from the young of *Fissurella græca*, which it resembles in shape, in having not only a different kind of cancellation but especially an internal septum.

✓ 1. *FISSURELLA GRÆCA*, Linné.

Patella græca, L. S. N. p. 1262.

F. græca, B. C. iii. p. 266, pl. vi. f. 4; v. p. 200, pl. lix. f. 5.

'Lightning' Exp., St. off the Faroe I.

'Porcupine' Exp. 1870: Atl. St. Vigo B., 24, C. Sagres, Tangier B.; Med. G. Tunis.

Distribution. Shetland (*Forbes*) to the Archipelago and Egypt, Adriatic, Mogador, Madeira, Canaries; 0-95 fms.

Fossil. Miocene: Vienna Basin and Switzerland (*Hörnes*)? Pliocene: English and Belgian Crags, Transylvania, S. France, N. Africa, Italy, Morea, Rhodes. Post-tertiary: England and Ireland, Sicily, Ischia I.; 0-1360 ft.

Varies greatly in the sculpture: in some specimens it is strong, coarse, and sparse; in others fine and close. Very young shells have no foramen or slit, but a prominent spire. I have a monstrosity which grew and lived in the Hamburg aquarium; after commencing in the usual way, it became expanded and was composed of laminæ like those of a common oyster. Linné evidently included several species in his *F. græca*, as is shown by his citations of Lister, Adanson, and Gualteri.

There are several obsolete and questionable synonyms.

✓ 2. *FISSURELLA GIBBERULA*, Lamarck.

F. gibberula, Lam. An. s. Vert. vi. (2) p. 15 (1822).

'Porcupine' Exp. 1870: Med. St. Benzert Road, Rasel Amoush.

Distribution. Brittany to the Archipelago and Egypt, Adriatic, Canaries (*McAndrew*), Guinea (*Dunker*), Panama (*P. Carpenter*); 0-120 fms.

Fossil. Pliocene: Italy. Post-tertiary: Sicily; 0-22 ft.

I am by no means satisfied that this so-called species is more than a dwarf variety of *F. græca*. Many intermediate forms occur. The size of the foramen and the degree of gibbosity are unreliable characters.

Perhaps the present species may have been the long-lost or doubtful *Patella pustula* of Linné, which is described as "gibboso-convexa." The word "præcedenti" might have been a mistake for "sequenti," viz. to *P. græca* instead of *P. fissura*, because the other characters belong to *Fissurella* and not to *Emarginula*. However, it is not the *F. pustula* of Lamarck.

F. gibba of Philippi (1836), and a few other synonyms. Gibbus is a classical word, not gibberulus.

✓ 3. *FISSURELLA NUBECULA*, Linné.

Patella nubecula, L. S. N. p. 1262; Martini, Conch. Cab. i. t. 12. f. 105.

'Porcupine' Exp. 1870: Atl. St. Vigo B.

Distribution. Cornish coast (*coll. Turton*)?, Bay of Biscay (*de Folin*), Cadiz (*Paz, f. Hidalgo*), throughout the Mediterranean, Mogador, C. Verd I., and Senegambia (*Riebisch, f. Weinkauff*), Guinea (*Dunker*); 3–100 fms.

Fossil. Pliocene: S. Italy.

Among the synonyms is *F. nimbosa* (afterwards *rosea*) of Philippi, but not *Patella nimbosa* of Linné.

✓ 1. EMARGINULA FISSURA, Linné.

Patella fissura, L. S. N. p. 1261.

E. fissura, B. C. iii. p. 259, pl. vi. f. 3; v. p. 200, pl. lix. f. 2.

‘Lightning’ Exp.: St. 4, 5, off the Faroe I.

‘Porcupine’ Exp. 1869: 2, 6, 14, 18, 23a, L. Foyle, N. Channel, 68, The Minch, Little Minch, near Belfast (and var. *elata*). 1870: Atl. Vigo B., 24 (var. *elata*); Med. Capo de Gata, Adventure Bank.

Distribution. Finmark and Faroe I. to the Canaries, Mediterranean and Adriatic; 0–295 fms.

Fossil. Miocene?: Sicily (*Seguenza*). Pliocene: Edeghem (*Nyst*)?, Coralline and Red Crag, Antwerp Crag, S. France, Italy. Post-tertiary: Norway and Sweden, Scotland and Ireland, Sicily; 0–200 ft.

E. conica of Schumacher, and *E. reticulata* of Sowerby.

✓ 2. EMARGINULA ROSEA, Bell.

E. rosea, Bell, in Zool. Journ. i. p. 52, pl. 4. f. 1: B. C. iii. p. 261; v. p. 200, pl. lix. f. 3, 3a.

‘Porcupine’ Exp. 1870: Med. St. 26.

Distribution. Southern counties of England, Blankenberg, Brittany, N. Spain, Mediterranean and Adriatic (var. *pileolus*); 7–95 fms.

Fossil. Pliocene: Coralline Crag, N.W. Germany, Italy, and Rhodes.

It is extremely problematical whether this is *E. rubra* of Lamarck. His description of the colour (“*rubrâ aut albo rubroque variegatâ*”) is not applicable; and the habitat (“*les mers de l’Europe?*”) is given with a doubt. He does not even notice any transverse striæ.

The aberrant form or variety (*E. pileolus*, Michaud = *E. capuliformis*, Philippi, = *E. curvirostris*, Deshayes, = *E. costæ*, Tiberi) is connected with the typical form by intermediate and insensible gradations.

✓ 3. EMARGINULA CRASSA, J. Sowerby.

E. crassa, J. Sow. Min. Conch. p. 73, t. 33, upper figures: B. C. iii. p. 263; v. p. 200, pl. lix. f. 4.

‘Porcupine’ Exp. 1869: St. 6, 24, 25, 89.

Distribution. Bodö in Norway to the coasts of Anglesea and Dublin, Weymouth B. (*Thompson, f. Pleydell*)?; 0–300 fms.

Fossil. Miocene?: Sicily (*Seguenza*). Pliocene: Coralline and Red Crag, Belgium, S. Italy. Post-tertiary: Norway, Sicily; 0–100 ft.

E. decussata of Philippi and *E. gigantea* of Seguenza. A variety from the Coralline Crag was named *E. crassalta* by the late Mr.

Searles Wood. Mr. Robert Bell showed me a specimen from the Red Crag which measured $2\frac{1}{2}$ inches in length by $1\frac{3}{4}$ inch in breadth. The odontophore has been figured by Friele.

✓ 4. *EMARGINULA CANCELLATA*, Philippi.

E. cancellata, Phil. En. Moll. Sic. i. p. 114, t. vii. f. 15 : B. C. v. p. 200, pl. ci. f. 4.

'Porcupine' Exp. 1870 : Med. Adventure Bank (fragment).

Distribution. Guernsey (*Gallienne*)!, G. Gascony (*Fischer*), Mediterranean from Marseilles to the Archipelago and Egypt, and Adriatic, off Madeira ('Travailleur' Exp. 1882) ; 8-250 fms.

Fossil. Miocene? : Modena (*Foresti*). Pliocene : S. France, Italy, Rhodes. Post-tertiary : Sicily.

I find four obscure and obsolete synonyms.

✓ 5. *EMARGINULA HUZARDI*, Payraudeau.

E. huzardii, Payr. Moll. de Corse, p. 92, t. v. f. 1, 2.

'Porcupine' Exp. 1870 : Med. St. 55.

Distribution. Throughout the Mediterranean and Adriatic, Madeira (*Watson*) ; 8-40 fms.

Fossil. Pliocene : Antibes (*A. Bell*), Calabria (*Seguenza*).

E. depressa of Risso, whose publication bears the same date as that of Payraudeau ; but the specific name given by the latter is generally accepted and used. A large variety is the *E. cusmichiana* of Brusina and *E. fissurelloides* of Nardo.

6. *EMARGINULA PAPILLOSA*, Risso.

E. papillosa, Risso, Hist. Nat. de l'Eur. mér. (1826), t. iv. p. 260, pl. x. f. 147.

'Porcupine' Exp. 1870 : Alt. St. 24, 25, 27, 28 ; Med. Capo de Gata.

Distribution. Mediterranean and Adriatic ; 10-40 fms.

Fossil. Pliocene : Nice (*Risso*), Messina (*Seguenza*).

E. adriatica of O. G. Costa, 1829.

7. *EMARGINULA COMPRESSA*, Cantraine.

E. compressa, Cantr. Diagn. esp. nouv. Moll. (Bull. de l'Acad. roy. Brux. ix. 2, 1835), p. 22.

E. tuberculosa, Libassi, Mem. Conch. foss. Palermo (Atti, iii. 1859), p. 15, fig. 1.

'Porcupine' Exp. 1870 : Atl. St. 24, 27, 28, 28a.

Distribution. None recorded in a recent or living state.

Fossil. Miocene? : Sicily (*Seguenza*). Pliocene : Sicily.

This appears to be Libassi's species, and agrees with his short description and his figure. I lately received from my kind and learned friend, the Abbé Brugnone of Palermo, a fossil shell named *E. tuberculosa*, which had the same shape as the recent shell, and in which the sculpture on the upper part was likewise wavy, although the cancellation was rather more nodulous in consequence of the specimen not being in good preservation. It differs from *E. papillosa* in being more compressed at the sides, and is shorter or has a rounded and more globular outline ; it is readily distinguishable from *E. elongata* by the shape and much finer sculpture.

- ✓ 8. *EMARGINULA MULTISTRIATA*, Jeffreys. (Plate L. fig. 12.)
E. multistriata, Jeffr. in Ann. & Mag. N. H. July 1882, p. 30.
 'Porcupine' Exp. 1870: Atl. St. 24-28.
Distribution. Mediterranean (Italian Expedition, 1881); 217 fms.

Family IV. CALYPTRÆIDÆ.

- ✓ *CALYPTRÆA CHINENSIS*, Linné.
Patella chinensis, L. S. N. p. 1257.
C. chinensis, B. C. iii. p. 273, pl. vi. f. 6; v. p. 201, pl. lx.
 f. 1, 1a.

'Porcupine' Exp. 1870: Atl. St. Vigo B., 16, Setubal B., off C. Sagres, Tangier B., Gibraltar B.; Med. Algesiras B., Cartagena B., Benzert Road, Rasel Amoush, Adventure Bank.

Distribution. Dublin Bay, Milford Haven, southern coasts of England and Channel Isles, Brittany, S.W. France, throughout the Mediterranean and Adriatic, Black Sea (*Clessin*), Red Sea (*Issel*), off Morocco ('Travailleur' Exp. 1881), Madeira and Canaries; 0-130 fms., usually inhabiting shallow water. The Scotch localities, given on the authority of Laskey and Leach, are certainly unreliable.

Fossil. Miocene?: Modena (*Foresti*). Pliocene: Coralline, Red, and Norwich Crags, Belgium, S. France, Italy, N.W. Germany, Switzerland, Vienna Basin, Transylvania, Hungary, Rhodes, and Cos. Post-tertiary: Leghorn (*Castelli*, f. *Appelius*).

There are about a dozen more or less recognized synonyms, including *C. sinensis*. The monstrous variety which is moulded on *Turritella terebra* is very curious.

- ✓ *CREPIDULA UNGUIFORMIS*, Lamarck.

C. unguiformis, Lam. An. s. Vert. vi. (2) p. 25; Sowerby, Gen., *Crepidula*, f. 6.

'Porcupine' Exp. 1870: Med. St. Adventure Bank.

Distribution. G. Gascony (*De Folin*)!, Morocco, Mediterranean and Adriatic, G. St. Lawrence and eastern coasts of N. America; 0-40 fms.

Fossil. Miocene: Vienna Basin, Switzerland, S.W. France. Pliocene: Belgium, S. France, Italy, Algeria. Post-tertiary: Pozzuoli (*Philippi*).

This species also rejoices in, or rather laments, about a dozen synonyms. It is the *Patella crepidula* of Linné, *C. fornicata* of some authors (but, perhaps, not *P. fornicata* of Linné), and *C. plana* of Say. When the so-called *C. fornicata* is found adhering to the outside and *C. plana* to the inside of the same specimen of another American shell, they may easily be mistaken for distinct species. *C. moulinsi* of Michaud is a well marked variety, its principal character being dependent on coloration. The young have a short spire like that of *Calyptrea chinensis*. *Crepidula spirata* of Nardo is also the present species, and derives its peculiar shape and prominent spire from being affixed to *Turritella terebra*, like *Calyptrea chinensis*.

SUMMARY OF THE FOREGOING LIST.

Class SOLENOCONCHIA.

Families.	Genera.	No. of species.
DENTALIIDÆ	DENTALIUM	12
	SIPHODONTALIUM	5
	DISCHIDES	1
	CADULUS	9

Class GASTROPODA.

CHITONIDÆ	CHITON	10
PATELLIDÆ	PATELLA	1
	HELCION	1
	TECTURA	6
	ADDISONIA	1
	PROPILIDIUM	4
FISSURELLIDÆ	FISSURISEPTA	3
	PUNCTURELLA	3
	FISSURELLA	3
	EMARGINULA	8
CALYPTRÆIDÆ	CALYPTRÆA	1
	CBEPIDULA	1
	Total	69

In order to make this work as complete as possible up to the present time, I will add a few notes, chiefly with regard to distribution, which have occurred to me since the publication of the last Supplement. These addenda and corrigenda seem to be endless; but in the continual progress of science they are unavoidable.

Through the obliging courtesy of Professor Verrill I have now been enabled to examine examples of many of the species procured during his long and careful exploration of the sea-bed adjoining the coasts of New England at considerable depths, which have been lately described or noticed by him in the 'Transactions of the Connecticut Academy.' The result of my comparison of these species with European species from deep water is most interesting and important. Out of 35 species which Professor Verrill has thus kindly sent me, I consider 29 or 30 identical with European species. It shows the far more extensive range of marine Mollusca at certain depths than of land and freshwater Mollusca over any territorial area of equal space.

SUPPLEMENT TO PARTS I., II., III., IV.

Part I., P. Z. S. 1878 :—

- Page 399. *Terebratula caput-serpentis*. Fossil. Miocene : Marne Vaticano (Ponzi).
 „ 402. *Terebratula tuberata*. Bay of Biscay ('Travailleur' Exp., 1881); 1093 fms.

- P. 403. *Terebratula vitrea*. Very fine specimens were taken from 214 fms. during the Italian exploration of the Mediterranean 1881; one of them was an inch and six tenths long. An oblong variety occurred in 841 fms., and the variety *sphenoïdea* in 217 fms. The inside ribs of the upper or deeper valve are sometimes visible on the outside, owing to the semitransparency of the shell. Var. *sphenoïdea*. Bay of Biscay ('Travailleur' Exp., 1881); 578½ fms.
- P. 405. *Terebratula cranium*. Bay of Biscay ('Travailleur' Exp., 1881); 212 fms.
- P. 407. *Terebratula septata*. West coast of Norway (*Norman*); 58–200 fms. Bay of Biscay ('Travailleur' Exp., 1881); 512 fms. G. Marseilles ('Travailleur' Exp., 1881); 301 fms. Var. *floridana*. N. Spain ('Travailleur' Exp. 1882); 731 fms.
- P. 411. *Megerlia truncata*, var. *monstruosa*. Bay of Biscay ('Travailleur' Exp. 1881); 578½ fms. Off Ajaccio (same Exped.); 303 fms.
- P. 413. *Rhynchonella sicula*. Bay of Biscay ('Travailleur' Exp., 1881); 578½ fms. A valve and small living specimen.
- P. 415. *Discina atlantica*. Bay of Biscay ('Travailleur' Exp., 1881); 1791 fms.

Part II., P. Z. S. 1879:—

- P. 556. *Spondylus jussoni*. Azores ('Josephine' Exp.); 200–300 fms.
- „ *Pecten pusio*, C. Verd I. (*de Rochebrune*).
- P. 557. *Pecten pes-lutræ*. Bay of Biscay ('Travailleur' Exp., 1881); 212 fms. Gigantic valves.
- „ *Pecten sulcatus*. Between the Hebrides and Faroes ('Triton' cruise, 1882); 530 fms., living. C. Verd I. (*de Rochebrune*).
- P. 559. *Pecten striatus*. Adriatic (*Brusina*).
- P. 560. *Pecten groenlandicus*. Between Gibraltar and Azores ('Josephine' Exp.); 550 fms.
- P. 561. *Pecten vitreus*. Between Gibraltar and the Azores ('Josephine' Exp.); 790 fms.
- „ *Amussium fenestratum*. New England coast (*Verrill*); 100 fms.! Sculpture of American specimens finer and closer than in European specimens.
- P. 562. *Amussium hoskynsi*. W. Mediterranean (Italian Exp., 1881); 214–609 fms. Between Hebrides and Faroes ('Triton' cruise); 570 fms. Fossil. Pliocene: Calabria (*Seguenza*, as *Pleuronectia differens*)!
- „ *Amussium lucidum*. N. Spain ('Travailleur' Exp. 1882); 1025 fms. Between Gibraltar and Azores ('Josephine' Exp.): 550 fms. Fossil. Pliocene: Monte Mario.

P. 563. *Lima subovata*. Between Lisbon and Canaries ('Travailleur' Exp. 1882); 1192 fms.

P. 564. *Lima subauriculata*. Between the Hebrides and Faroes ('Triton' cruise); 570 fms. Josephine Bank; 110-120 fms.

„ *Lima excavata*. Fossil. Pliocene: Calabria (*Sequenza*)!

P. 566. *Mytilus incurvatus*. Probably a Pliocene fossil of the Bolognese, as *Modiola rectemarginata* of Foresti.

P. 567. *Mytilus phaseolinus*. Black Sea (*Spratt*); 45-50 fms.

P. 569. *Dacrydium vitreum*. Between the Hebrides and Faroes ('Triton' cruise); 570 fms. Azores ('Josephine Exp.');

P. 570. *Idas argenteus*. Between the Hebrides and Faroes ('Triton' cruise); 516 fms. Inhabiting deserted tubes of *Teredo megotara* in a large water-logged piece of pine-wood, to which the *Idas* had fixed itself by a strong byssus. It is covered with a pale brownish-yellow epidermis, which rises into fibrous excrescences on the posterior side. Under the epidermis the shell is silvery white. An internal and long cartilage covers the hinge. I was mistaken as to this when I described the species from two small valves. The beak has a reddish colour like that of *Cypricardia lithophagella*. The shape varies from rhomboidal to oblong. Size of my largest specimens $3\frac{1}{2}$ tenths of an inch or about 8 millimetres. With it in a "commensal" way lived an undescribed species of *Cocculina*, or a new genus of the same family, to which I propose giving the name of *spinigera*; this would seem to have fed on decomposed portions of the *Teredo*. Small Annelids also occupy the tubes and probably have the same habit. The little limpet is coated with a ceratose sponge, which gives it a prickly appearance. The smaller and younger specimens of *Teredo* were living when the piece of wood came up in the trawl. *Idas argenteus* is probably the species of that name noticed by Verrill as var. *lamellosa*, from 337 fathoms off the coast of New England.

„ *Arca barbata*. C. Verd I. (*de Rochebrune*).

„ *Arca nodulosa*. Fossil. Miocene: Marne Vaticano (*Ponzi*).

P. 571. *Arca tetragoaa*. C. Verd I. (*de Rochebrune*).

„ *Arca antiquata*. C. Verd I. (*de Rochebrune*).

P. 572. *Arca obliqua*. Josephine Bank, 340-430 fms.

„ *Arca glacialis*. G. Mexico (*Dall*)?

„ *Arca pectunculoïdes*, var. *septentrionalis*. New England (*Verrill*); 310 fms.! Between the Hebrides and Faroes ('Triton' cruise); 570 and 608 fms. Mediterranean (Italian Exp., 1881); 337-464 fms.



Jeffreys, J G. 1883. "On the Mollusca procured during the 'Lightning' and 'Porcupine' Expeditions, 1868-70, Part 5." *Proceedings of the Zoological Society of London* 1882, 656–687.

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