

PLATE XVIII.

- Fig. 1. Antennule, male. $\times 126$.
 Fig. 2. Mandible and palp, female. $\times 127$.
 Fig. 3. Mandible and palp, male. $\times 253$.
 Fig. 4. Maxilla, male. $\times 253$.
 Fig. 5. Anterior foot-jaw, male. $\times 253$.
 Fig. 6. Fifth pair of feet, male. $\times 127$.
 Fig. 7. Fifth pair of feet, immature male. $\times 190$.
 Fig. 8. Abdomen, male. $\times 84$.
 Fig. 9. Abdomen, female. $\times 84$.

LV.—*Natural History Notes from H.M. Indian Marine Survey Steamer 'Investigator,' Commander C. F. Oldham, R.N.—Series II., No. 22. Descriptions of new Deep-sea Mollusca.* By EDGAR A. SMITH.

OF the twelve new species about to be described I regret to say that, with one exception, all are based upon single examples which have to be returned to the Indian Museum at Calcutta. Dr. Alcock, the Superintendent of that institution, kindly promises, however, to send to the British Museum any duplicates which may eventually be obtained. The species are to be figured in the "Illustrations of the Zoology of the 'Investigator'."

Some of them are extremely interesting on account of their remarkable form and surface ornamentation, whilst others are peculiar on account of their close similarity to species which occur in the North Atlantic. In one instance, *Puncturella asturiana*, I can find no distinguishing features between the Atlantic and Indian Ocean specimens.

Pleurotoma Kieneri, Doumet.

Pleurotoma Kieneri, Doumet, Mag. de Zool. 1840, pl. x.

Pleurotoma carinata, Reeve (non Gray), Con. Icon. fig. 56; Tryon, Man. Conch. vol. vi. p. 173, pl. iv. fig. 49; Weinkauff, Jahrbuch. deutsch. mal. Gesell. vol. ii. p. 288, pl. ix. fig. 2; Conch.-Cab. p. 15, pl. iii. fig. 1.

Hab. ? (*Rve.*, Tryon, Weinkauff); China (*Brit. Mus.*); off Ceylon, lat. N. $6^{\circ} 50' 20''$, long. E. $79^{\circ} 36' 20''$, in 180–217 fathoms ('*Investigator*').

Only a single specimen was obtained. The colour is normal, except that the keel below the suture is rather redder than usual and the spotting or dotting upon the ridges encircling the body-whorl is rather fine and inconspicuous.

Pleurotoma carinata, Gray.

Pleurotoma carinata, Gray, Griffith's Cuvier An. King. vol. xii. p. 599, pl. xxiii. fig. 2.

Pleurotoma speciosa, Reeve, Con. Icon. fig. 9; Tryon, Man. Conch. vol. vi. p. 173, pl. iv. fig. 48; Weinkauff, Jahrb. deutsch. mal. Gesell. vol. ii. p. 289, pl. ix. fig. 7 (as *P. nobilis*, Rve., by error); Conch.-Cab. p. 72, pl. xv. fig. 5.

Hab. China, Hong Kong (*Weinkauff*, *Tryon*); Bay of Bengal, off Gangetic Delta, in 65 fathoms ('*Investigator*').

With regard to Reeve's remark that he had seen the type of this species and that it was "identical with the shell subsequently dedicated to Kiener by Doumet," there must have been some mistake. The type from Dr. Gray's collection is now in the Museum, and it belongs unquestionably to the same species as *speciosa*, Rve., and is therefore distinct from *P. Kieneri*. I presume that Reeve's statement must have misled both Tryon and Weinkauff in associating it with the latter. The brownish spots between the nodules on the keel, as represented in Gray's figure, are hardly visible in the shell itself. This, however, is probably a fault in the colouring, so as to give the keel a nodulous appearance. This view of the case is supported by the fact that in the brief description by Gray he describes the shell as "white, whorls keeled," and does not mention the existence of any brown spotting.

Pleurotoma (Ancistrostrix) travancorica.

Testa fusiformis, turrita, sordide albida, epidermide tenuissima grisea induta; anfractus normales 7, supra oblique et concave tabulati, supra medium carina dentata tenui sursum erecta instructi, infra carinam recti, contracti, lineis incrementi tenuibus striati, ultimus antice recte et longe rostratus, oblique striatus; apertura cum canali longit. totius $\frac{1}{2}$ paulo superans; labrum tenue, supra carinam ad suturam profunde sinuatum.

Longit. 40 millim., diam. 10.

Hab. Off coast of Travancore, lat. N. $9^{\circ} 34' 57''$, long. E. $75^{\circ} 36' 30''$, in 406 fathoms.

The unique specimen has the nuclear whorls broken away, and consequently they cannot be described. In general appearance it much resembles *P. cedo-nulli*, Reeve, from Panama. In the latter the dentate keel is *at* and not *above* the middle of the whorls, the dentations stand out more horizontally, the upper part of the whorls is less concave and bears a fine spiral liration. The body-whorl is also carinate a little below the dentate periphery.

Pleurotoma (Surcula) profundorum.

Testa breviter fusiformis, alba, periostraco tenuissimo griseo plus minus induta; anfractus normales, in medio concavi, inferne ad suturam tuberculati, infra suturam lineis incrementi angulatis fortibus instructi, ad angulum carinati, et spiraliter striati, ultimus ad peripheriam oblique tuberculatus, infra convexiusculus, liris transverse leviter obliquis tenuibus instructus, antice rostratus; apertura angusta, longit. totius $\frac{1}{2}$ æquans.

Longit. 34 millim., diam. 12.

Hab. N.E. of Maldiv Islands, lat. N. $7^{\circ} 05' 45''$, long. E. $75^{\circ} 04'$, in 719 fathoms.

The labral sinus is broad and rather deep and situated at the suture. One specimen only. This species might be placed in Dall's subgenus *Leucosyrinx*, which, however, is scarcely separable from *Surcula*.

Pleurotoma (Surcula) Thurstoni.

Testa fusiformis, albida, periostraco tenuissimo dilute olivaceo induta; anfractus normales 10, paulo infra medium angulati, supra concavi, infra suturam tenuiter plicati, ad angulum oblique et fortius plicati, infra medium spiraliter striati, supra læves, ultimus antice rostratus, lineis incrementi flexuosis aliisque transversis sculptus; apertura longit. totius $\frac{1}{2}$ fere æquans; labrum tenue, superne late et subprofunde sinuatum.

Longit. 40 millim., diam. 13; apertura cum canali 19 longa, in medio 5 lata.

Hab. Off Trincomalee, Ceylon, in 200–350 fathoms.

Named after Mr. Edgar Thurston, of the Madras Museum. In general form recalling *P. javana* (L.). The nodules at the periphery are rather similar, but the fine sutural plicæ are wanting in that species.

Pleurotoma (Surcula?), sp.

Hab. Off Trincomalee, in 200–350 fathoms.

A single immature specimen is all that was obtained. It is shortly fusiform, white, and covered with a very thin periostracum. The whorls are concave above, acutely tuberculated above the suture, finely spirally striated, and marked with fine curved lines of growth. The outer lip is thin, shallowly sinuated above, curved and prominent in the middle. Anterior canal broad, oblique, slightly recurved. Spire conical, short, acute.

Metula clathrata, Ad. & Rve.

Buccinum clathratum, Adams & Reeve, Voy. 'Samarang,' p. 32, pl. xi. fig. 12.

Metula clathrata, H. & A. Adams, Gen. Moll. vol. iii. pl. ix. fig. 4; Tryon, Man. Conch. vol. iii. p. 152, pl. lxxii. fig. 238.

Hab. Cape of Good Hope, in 136 fathoms (*Ad. & Rve.*); off Ceylon, lat. N. $6^{\circ} 50' 20''$, long. E. $79^{\circ} 36' 20''$, in 180–217 fathoms ('*Investigator*').

The single specimen obtained by the '*Investigator*' is of enormous size in comparison with those hitherto described and figured. It is 41 millim. in length, 15 in width, and the aperture is 19 long. Although in dead condition, the brown banding is still traceable. The labrum is thickened both within and without, and bears about twenty short liræ on the inner margin.

Natica (Lunatia) abyssicola.

Testa ovato-globosa, imperforata, alba, periostraco tenuissimo plus minus induta, incrementi lineis obliquis lævibus striata; spira brevis, ad apicem erosa; anfractus 3–4, convexiusculi, ultimus globosus; apertura semicircularis, obliqua; labrum tenue; columella incrassata, superne callo crasso labro juncta; operculum tenue, corneum.

Longit. 9 millim., diam. $8\frac{1}{2}$; apertura 7 longa, 3 lata.

Hab. Arabian Sea, off Cutch, lat. N. $22^{\circ} 14' 25''$, long. E. $67^{\circ} 08' 55''$, in 947 fathoms.

Somewhat resembling *N. pusilla* of Say.

Natica (Lunatia) levis.

Testa globosa, umbilicata, alba, lineis incrementi tenuibus striata, lævigata; anfractus 5, convexi, subgradati; apertura semicircularis, longit. totius $\frac{5}{8}$ adæquans; peristoma tenue, margine columellari inferne leviter incrassato, superne expanso et reflexo margini exteriori callo tenui juncto; umbilicus simplex, pervius, mediocriter latus; operculum tenue, corneum.

Longit. 16 millim., diam. 14; apertura 10 longa, 6 lata.

Hab. Bay of Bengal, off Coromandel coast, long. E. $81^{\circ} 30' 30''$, lat. N. $15^{\circ} 56' 20''$, in 240–276 fathoms.

Somewhat resembling *N. Fortunei*, Rve., in form, but with the umbilicus wider and without any trace of an internal thickening.

Rostellaria curta, Sowerby.

Hab. Off the Sindh coast, in 20–30 fathoms.

I do not agree with Kiener and Tryon in considering this form a variety of the common *R. curvirostris*. The points of difference referred to by Sowerby and Reeve appear to be persistent; they consist of (1) the shorter body-whorl, (2) the longer and straighter canal, (3) the broad brown band beneath the suture. Judging from the description and figure, *R. luteostoma* of Angas, also considered by Tryon a variety of *curvirostris*, appears sufficiently distinct.

Puncturella (Cranopsis) asturiana (Fischer).

Puncturella (Cranopsis) asturiana (Fischer), Watson, Gaster. 'Challenger' Exped. p. 45, pl. iv. fig. 4; Pilsbry, Man. Conch. vol. xii. p. 241, pl. xxvi. figs. 36, 37; Dall, Bull. Mus. Comp. Zool. Harvard, vol. xviii. p. 404.

Hab. Bay of Biscay, 480–670 fathoms (*Fischer*); W. Indies, 85–640 fathoms (*Dall*); off Culebra Island, West Indies, in 390 fathoms ('*Challenger*'); off west coast of Ceylon, lat. N. $8^{\circ} 35' 45''$, long. E. $81^{\circ} 17' 45''$, in 609 fathoms ('*Investigator*').

Only a single small specimen 7 millim. long was obtained. It agrees exactly in every detail with the West-Indian example dredged by the 'Challenger,' and I feel no doubt with regard to the correctness of this identification.

Dentalium quadrapicale, Sowerby.

Dentalium quadrapicale (Hanley, MSS.), Sowerby, Thes. Conch. vol. iii. p. 103, pl. ccxxiii. fig. 61; Conch. Icon. vol. xviii. pl. vii. fig. 46.

Hab. Lat. $9^{\circ} 34' 57''$ N., long. $75^{\circ} 36' 30''$ E. (depth 406 fathoms, bottom green mud, temperature 40° F.); off the coast of Travancore, South India.

The types of this species are said to have come from Cochin. The specimens obtained by the 'Investigator' are somewhat larger than the shell figured by Sowerby, the largest specimen having a length of 40 millim.

Dentalium magnificum.

Testa magna, crassa, mediocriter curvata, postice sensim attenuata, antice oblique truncata, undique costis tenuibus numerosis, striis transversis crenulatis, instructa; fissura angusta, longitudine varia.

Longit. 115 millim., diam. max. 15.

Hab. Lat. $8^{\circ} 40'$ N., long. $81^{\circ} 27' 35''$ E., 637–800 fathoms (bottom green mud, temperature 41° – $42^{\circ} 25'$ F.); off Trincomalee, east coast of Ceylon.

This fine species is as large as the Japanese *D. Vernedei* or the fossil *D. grande*, Desh. The form, however, is more rapidly tapering than that of either, and the sculpture is not precisely similar. The aperture is larger than in either of the species quoted and almost circular. The longitudinal ridges are fine and numerous, numbering about twenty-five to thirty at an inch from the apex. Towards the anterior end intervening riblets appear, so that the interstices, which above are broader than the liræ, become narrower. The lines of growth are distinct, and on crossing the riblets towards the posterior end produce a granulated appearance. The ridges are much smoother anteriorly and less elevated. The length of the fissure is variable; but this is probably chiefly due to damage. In the most perfect specimen it is 13 millim. in length and rather more than half a millimetre in width. All three specimens exhibit reparation of injuries at the anterior end, and in two the posterior extremity has been broken off. These injuries are probably done by fishes or crustaceans. The shells are whitish, but coated with a dark brown earthy deposit. The Rev. Professor H. M. Gwatkin informs me that the radula is quite normal and that the figure given by Sars of *Antalis striolata* closely represents it, except that in the present species "the central tooth is a little wider and the inner edge of the lateral makes a smoother muzzle."

Cardium (Fragum) simillimum.

Testa alba, mediocriter globosa, antice rotundata, postice truncata, quadrata, striis confertis tenuibus radiantibus sculpta, incrementique lineis plus minus decussata, latus posticum versus minute granulata; umbones prominentes, incurvati; pagina interna alba, nitida, marginibus anteriore, postico et ventrali minute denticulatis circumdata; cardo tenuis, dente laterali antico valvæ sinistræ conico, acuto, compresso, postico parvo fere obsoleto.

Longit. 21 millim., alt. 21, diam. 17.

Hab. Off Colombo Lighthouse, in 142-400 fathoms.

A single left valve is all that was obtained of this interesting species. The fine radiating striæ are absent in the lunular region, which consequently is smooth. The granules, arranged in radiating series, appear to be restricted to the hinder part of the shell, judging from the specimen at hand. The sculpture is similar to that of *C. peramabilis*, from 50-125 fathoms in the West-Indian region, as described by Mr. Dall*. The posterior portion of the surface is

* Bull. Mus. Comp. Zool. Harvard, vol. ix. p. 132, vol. xii. p. 269, pl. iv. fig. 7, pl. xl. fig. 4.

somewhat more finely cancellate than the anterior, and is divided off in the same manner by two approximated ribs, but occupies nearly half the valve. The posterior end is distinctly truncate, not curved as in *C. peramabilis*.

Yoldia nicobarica, Bruguière.

Leda nicobarica, Hanley in Sowerby's Thes. Conch. vol. iii. p. 136, pl. ccxxiii. fig. 7.

Hab. Nicobar Island (*Chemnitz*); off Delta of Ganges, in 65 fathoms ('*Investigator*').

Two fine specimens of this species were obtained by the '*Investigator*,' the largest being 29 millim. long, $15\frac{1}{2}$ high, and 10 in diameter. They are white, covered with a thin olive periostracum, and not "pale tawny," as described by Hanley.

Yoldia anatina.

Testa magna, oblonga, postice vix rostrata, inæquilateralis, sordide albida, periostraco olivaceo nitente induta, concentrice et oblique tenuiter striata (striis obliquis postice evanidis), haud lunulata; margo dorsi anticus leviter descendens et curvatus, posticus valde longior, declivior, rectiusculus; margo ventris antice curvatus paulo pone medium leviter incurvatus; latus anticum rotundatum, posticum angustius; area dorsi postica linearis, acute marginata; linea cardinis fortis, dentibus anterioribus circiter 24 et posterioribus ad 36 instructa; pagina interna dilute carnea; cicatrices parvæ, subtriangulares; sinus pallii profunda, linguæformis.

Longit. 45 millim., alt. 20, diam. 13.

Hab. Bay of Bengal, off Godavari Delta, in 258-281 fathoms.

The oblique striation is excessively fine and invisible to the naked eye, much finer than in *Y. nicobarica*. One specimen only.

Cuspidaria approximata.

Testa mediocriter tenuis, globosa, postice breviter rostrata, alba, prope marginem ventralem et supra rostrum periostraco luteo induta, lineis incrementi tenuibus sculpta, lirisque obliquis paucis apice radiantibus postice ornata; margo dorsi anticus valde declivis, leviter arcuatus, posticus minus declivis leviter concavus; margo ventris antice valde arcuatus, postice late incurvatus; rostrum cuneiforme, ad extremitatem arcuatim truncatum, dimidio superiore radiatim lirato; umbones prominentes, incurvati, paulo antemediani; cardo in valva sinistra edentulus, in

dextra dente unico laterali acuto postice instructus; fossa ligamenti parva, postice inclinata.

Longit. 15 millim., alt. 11, diam. $9\frac{1}{2}$.

Hab. Off Andaman Islands, lat. N. $11^{\circ} 25' 5''$, long. E. $92^{\circ} 47' 6''$, in 405 fathoms.

Closely allied to *C. cuspidata*, Olivi, but slightly different in form and having a few radiating lines posteriorly.

Myonera bicarinata.

Testa æquivalvis, inæquilateralis, postice hians et breviter rostrata, antice rotundata, alba, tenuis; valvæ tenues, inflatæ, carinis duobus acutis radiantibus post medium instructæ, ante carinam anteriorem concentricæ subdistanter costulatæ, pone carinam læves, lineis incrementi tenuissimis striatæ; umbones prominentes, incurvati; margo dorsi utrinque declivis, ventris antice arcuatus, post et inter carinas excavatus; cardo edentulus; ligamentum internum in fossa angusta in utraque valva situm, ossiculo tenui firmatum.

Longit. 14 millim., alt. 11, diam. 9.

Hab. West of Malabar coast, lat. N. $13^{\circ} 47' 49''$, long. E. $73^{\circ} 07' 0''$, in 636 fathoms.

A very beautiful species, readily distinguishable by its remarkable sculpture. The concentric costæ on the anterior half of the valves are finer and closer together towards the umbo than towards the ventral margin; they do not extend quite to the submedian keel, and become finely attenuated anteriorly.

Lyonsia jucunda.

Testa tenuis, fragilis, oblonga, antice rotundata, postice subtruncata, æquivalvis, inæquilateralis, alba, radiatim carinata, carinis duobus post medium aliis majoribus, omnibus spinulosis vel tuberculatis, undique minute granulata; margo dorsi anticus rectiusculus, valde declivis, posticus longior, minus obliquus, leviter concavus, ventralis inter carinis sinuatus; cardo edentulus; ligamentum internum ossiculo parvo munitum; pagina interna subnacreæ, radiatim sulcata, sulcis punctatis.

Longit. $12\frac{1}{2}$ millim., alt. 8, diam. 6.

Hab. N. Sentinel, bearing N. 15° W. 18 miles, 250 fathoms.

Cryptodon investigatoris, Smith.

Cryptodon investigatoris, Smith, Ann. & Mag. Nat. Hist. 1895, vol. xvi. p. 13, pl. ii. figs. 6, 6 a.

Hab. Off west coast of Ceylon, lat. N. $8^{\circ} 35' 45''$, long. E. $81^{\circ} 17' 45''$, in 609 fathoms.



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