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# THE ANNALS

AND

## MAGAZINE OF NATURAL HISTORY.

[SEVENTH SERIES.]

No. 105. SEPTEMBER 1906.

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XXV.—*Natural History Notes from R.I.M.S. 'Investigator.'*  
—Series III., No. 10. *On Mollusca from the Bay of Bengal  
and the Arabian Sea.* By EDGAR A. SMITH, I.S.O.

TEN communications to these 'Annals' upon the Mollusca obtained by the 'Investigator' have already appeared—two by the late Professor Wood-Mason and Professor Alcock (1891, vol. vii. pp. 15–19, and vol. viii. pp. 443–448), and eight by the present writer (1894, vol. xiv. pp. 157–174; *l. c.* pp. 366–368; 1895, vol. xvi. pp. 1–19; *l. c.* pp. 262–265; 1896, vol. xviii. pp. 367–375; 1899, vol. iv. pp. 237–251; 1904, vol. xiii. pp. 453–473; vol. xiv. pp. 1–14). The new and more interesting species have been figured in the above papers or in the "Illustrations of the Zoology of the Investigator," edited by Prof. Alcock. The species still unfigured and those described in the following pages will eventually be illustrated in the latter work.

Of the numerous species now described the most interesting, perhaps, is the *Morio Alcocki*, which may be regarded as an Indian-Ocean representative of the Mediterranean and North-Atlantic *M. rugosa*. The occurrence of *Oocorys sulcata*, another Atlantic form, off Ceylon, is also extremely interesting. Other fine shells are *Bathybembix Nevilli*, *Gaza Frederici*, *Dentalium cornu-bovis*, and *Nucula (Acila) granulata*. What is especially noticeable in all these collections is the absence of many new generic types—indeed, up to the

present only two have been discovered, namely, *Pontiothauma*\*, described in 1895, and *Manaria*, in the present paper.

*List of Stations.*

Station Nos.	Latitude North.	Longitude East.	Station Nos.	Latitude North.	Longitude East.
232	7° 17' 30"	76° 54' 00"	291	26° 22' 00"	56° 10' 00"
237	13 17 00	93 7 00	295	26 20 30	54 16 00
244	14 31 15	73 10 00	297	25 11 30	57 15 00
246	11 14 30	74 57 15	299	23 43 00	58 51 30
248	8 37 00	75 37 30	301	24 37 30	62 2 30
249	7 0 00	76 36 15	310	13 29 30	95 29 00
256	7 58 00	79 23 00	316	5 43 30	80 05 30
258	8 23 00	76 28 00	317	7 04 00	79 32 00
259	10 08 43	75 33 30	318	7 28 00	79 19 30
260	8 28 15	76 07 00	321	5 4 8 $\frac{1}{2}$	80 22 00
261	8 10 00	76 26 00	322	11 26 30	92 53 45
263	8 56 00	81 09 00	323	16 25 00	93 43 $\frac{1}{2}$
265	9 32 00	80 59 30	324	18 0 15	93 30 45
267	7 02 30	79 36 00	325	18 18 00	93 25 00
268	7 36 00	78 05 00	327	17 7 30	94 5 30
269	8 09 00	76 30 00	328	14 46 00	95 52 00
271	13 19 00	74 26 00	329	14 50 00	96 0 00
273	12 47 00	73 44 45	331	11 46 30	93 16 00
275	8 27 00	75 35 00	332	10 21 00	92 64 $\frac{1}{4}$
276	7 11 00	76 35 30	333	6 31 00	79 38 $\frac{3}{4}$
277	5 48 15	80 56 00	336	7 37 $\frac{1}{4}$	76 41 00
278	6 52 00	81 11 00	337	9 43 00	75 35 00
280	11 29 45	80 02 30	340	23 44 30	58 52 15
281	11 15 15	80 07 00	341	23 47 00	58 30 30
282	10 08 00	80 49 30	343	23 46 15	58 31 50
283	8 53 15	81 20 30	345	26 20 30	54 52 30
289	23 56 45	58 34 00	346	26 37 30	53 03 30

*Conus planiliratus*, Sowerby.

*Conus planiliratus*, Sowerby; Smith, Ann. & Mag. Nat. Hist. 1894, vol. xiv. p. 159, pl. iii. fig. 2; 1904, vol. xiii. p. 454.

*Hab.* Persian Gulf, 27 fath. ('Investigator'); Persian Gulf, Shaikh Shuaib Island, 7 fath.; and 125 miles W.S.W. of Bombay, 45 fath.

*Conus Sieboldii*, Reeve.

*Conus Sieboldii*, Reeve; Smith, Ann. & Mag. Nat. Hist. 1904, vol. xiii. p. 455.

\* The anatomy of this genus has been described by S. Pace, Journ. Linn. Soc., Zool. vol. xxviii. pp. 455-462, pl. xlii.

*Hab.* Station 260, W. of Cape Comorin, 487 fath., green mud and sand; Station 333, Gulf of Manar, 401 fath.

The specimens from Station 260 are much larger than any examples which I have seen from Japan, the original locality of this species. The largest is 80 mm. long and 37 broad.

Like the specimens mentioned at the above reference all those in the present series have the top of the spire eroded. The operculum is narrow, 17 mm. in length, and has the right margin serrated.

*Pontiothauma? abyssicola*, Smith.

*Pontiothauma abyssicola*, Smith, Ann. & Mag. Nat. Hist. 1895, vol. xvi. p. 2, pl. i. fig. 2; Illust. Zool. 'Investigator,' Mollusca, pl. v. figs. 2, 2 a (enlarged); Pace, Journ. Linn. Soc., Zool. vol. xxviii. p. 459, pl. xlii. figs. 10-14 (anatomy).

*Hab.* Station 268, S.E. of Cape Comorin, 556-595 fath., green mud and sand.

According to Mr. Pace this species should be removed from *Pontiothauma*, although in many respects it closely agrees with that genus.

*Pontiothauma minus*, sp. n.

Testa ovato-fusiformis, alba; anfractus 8?, superiores detriti, cæteri supra concavi, infra convexiusculi et costati, costis subangulatis, spiraliter tenuiter lirati lineisque incrementi tenuibus striati, ultimus costis infra medium evanidis, antice contractus; apertura alba, longit. totius  $\frac{1}{2}$  æquans; labrum tenue, supra vix sinuatum; columella lævis, callo albo circumscripto induta; canalis anterior latus, brevis, subrecurvus.

Longit. 30 mm., diam. 14; apertura cum canali 15 longa, 5 lata.

*Hab.* Station 318, off W. of Ceylon, 1085 fath.

Another specimen, in worn condition, is rather larger than the type, being 39 mm. in length. The costæ in this species are about eighteen in number, somewhat acute, and do not reach to the suture above, but terminate at the depression at the upper part of the whorls. The transverse liræ are fine, contiguous, and continuous over and between the costæ. Animal without eyes or operculum, and the foot is much flattened behind.

*Pontiothauma Pacei*, sp. n.

Testa late fusiformis, alba; anfractus 10?, superiores detriti, cæteri supra concave declives, in medio leviter angulati, oblique costati, spiraliter tenuiter lirati lineisque incrementi flexuosis sculpti, ultimus paulo inflatus, antice angustatus; apertura cum canali

longit. totius  $\frac{1}{2}$  adæquans, intus fuscescens; labrum tenue, supra late sed haud profunde sinuatum, ad medium arcuatim prominens; columella lævis, callo tenui pallide corneo circumscripto induta; canalis brevis, latus, obliquus, subrecurvus.

Longit. 60 mm., diam. 27; apertura cum canali 29 longa, 13 lata.

*Hab.* Station 249, S.W. of Cape Comorin, 1022 fath., green mud and Globigerina ooze; also Station 318, off W. of Ceylon, 1085 fath.

This species differs from *P. mirabile*, Smith, in having the whorls angulated in the middle, in the finer spiral liræ, more slender costæ, &c. The ribs are nineteen in number upon the body-whorl and only slightly developed in the concavity or upper part of the whorls.

A specimen from Station 318 has only sixteen costæ and the aperture is white within.

Animal apparently without eyes or operculum.

Named after Mr. S. Pace, who kindly reported upon the soft parts of the genus *Pontiothauma* (Journ. Linn. Soc., Zool. 1903, vol. xxviii. pp. 455-462, pl. xlii.).

*Clavatula navarchus* (Melvill and Standen).

*Pleurotoma* (*Gemmula*) *navarchus*, Melvill and Standen, Ann. & Mag. Nat. Hist. 1903, vol. xii. p. 310, pl. xxi. fig. 15.

*Hab.* Station 258, West of Travancore, 102 fath., sand ('Investigator'); Persian Gulf, 140 fath. (*M. & S.*).

Several specimens rather smaller than the type, now in the British Museum, but otherwise the same. The operculum is rather thick, semioval, having one side straight and the outer margin curved. The nucleus is at the middle of the straight edge, the outer surface being finely concentrically striated and the underside with a raised edge, with some concentric wrinkles in the middle. In general form the shell bears a resemblance to *C. bimarginata*, Lamarck, and *C. diadema*, Kiener.

*Pleurotoma carinata*, Gray.

*Pleurotoma carinata*, Gray; Smith, Ann. & Mag. Nat. Hist. 1896, vol. xviii. p. 368.

*Hab.* Stations 328, 329, S. of Lower Burmah, 61 and 46 fath.

*Pleurotoma congener*, Smith.

*Pleurotoma congener*, Smith, Ann. & Mag. Nat. Hist. 1894, vol. xiv. p. 160, pl. iii. figs. 4, 5.

*Hab.* Station 258, W. of Travancore, 102 fath., sand;

Station 259, W. of Malabar coast, 295–360 fath., green mud and sand; Station 341, Gulf of Oman, 230 fath.

These specimens have the peculiar nodule or swelling on the upper part of the columella referred to in the case of the Ceylon examples. Operculum normal, unguiculate.

*Pleurotoma vagata*, Smith.

*Pleurotoma vagata*, Smith, Ann. & Mag. Nat. Hist. 1895, vol. xvi. p. 3, pl. i. fig. 3; 1904, vol. xiii. p. 456.

*Hab.* Station 259, W. of Malabar coast, 295–360 fath., green mud and sand; also Station 337, off Malabar coast, 271 fath.

*Pleurotoma optata*, Smith.

*Pleurotoma optata*, Smith, Ann. & Mag. Nat. Hist. 1899, vol. iv. p. 238; 1904, vol. xiii. p. 456; Illust. Zool. 'Investigator,' pl. ix. figs. 1, 1 a.

*Hab.* Same as preceding species, and Station 332, off S. of Andaman Islands, 279 fath.

*Pleurotoma præsignis*, Smith.

*Pleurotoma præsignis*, Smith, Ann. & Mag. Nat. Hist. 1895, vol. xvi. p. 4, pl. i. fig. 4.

*Hab.* Station 281, off Coromandel coast, 300 fath.

One specimen agreeing exactly with the type from deep water off Ceylon.

*Pleurotoma (Surcula) Nereis*, sp. n.

Testa fusiformis, alba, epidermide tenui grisea induta; anfractus 9?, superiores detriti, reliqui supra declives, in medio angulati, infra angulum constricti, rectiusculi, leviter plicati, spiraliter tenuiter lirati, plicis inferne attenuatis, vix ad suturam producti, ultimus antice angustatus, undique transversim liratus; apertura elongata, antice angustata, producta, canaliculata; labrum tenue, supra prope suturam minime profunde sinuatum; columella rectiuscula, leviter sinuosa.

Longit. 35 mm., diam.  $13\frac{1}{2}$ ; apertura cum canali 18 longa, 6 lata.

*Hab.* Station 331, off Andaman Islands, 569 fath.

A single specimen only. The longitudinal costæ are very fine, obliquely arcuate above the angle, subnodose at the angulation, and attenuated below, so that they hardly reach to the suture. The labral sinus is very shallow indeed and the shell has a general Belæform aspect.

*Pleurotoma (Surcula) subcorpulenta*, Smith.

*Pleurotoma (Surcula) subcorpulenta*, Smith, Ann. & Mag. Nat. Hist. 1894, vol. xiv. p. 161, pl. iii. fig. 6.

*Hab.* Station 321, off S. of Ceylon, 660 fath.

Two half-grown specimens, differing from the type in having the costæ more numerous and in their rather more slender form.

*Pleurotoma (Surcula) vepallida*, Martens.

*Leucosyrinx vepallida*, Martens, Deutsch. Tiefsee-Exped. 'Valdivia,' vol. vii. p. 80, pl. ii. fig. 6.

*Hab.* Station 281, off Coromandel coast, 300 fath.; Gulf of Aden, in very deep water (*Martens*).

One specimen, agreeing in all respects with the type. Said to have no operculum.

*Pleurotoma (Surcula) Thisbe*, sp. n.

Testa fusiformis, turrita, sordide albida; anfractus 10?, superiores erosi, cæteri supra concavi, in medio convexiusculi, oblique tenuiter plicati, plicis vel costis inferne attenuatis ad suturam vix productis, lineis incrementi tenuissimis sinuosis sculpti, infra concavitatem, supra et infra costas, transversim tenuiter striati, ultimus antice valde contractus, transversim striatus; apertura elongata, antice canaliculata; labrum tenue, ad suturam late et subprofunde sinuatum, in medio arcuatim prominens; columella curvata, callo tenui lævi circumscripto induta.

Longit. 44 mm., diam. 14; apertura cum canali 18 longa, in medio 6 lata.

*Hab.* Station 283, off E. of Ceylon, 1086 fath.

The chief characteristics of this species, represented by a unique specimen, are the smooth concavity at the upper part of the whorls, exhibiting only very delicate lines of growth and faint traces of spiral striæ, the numerous slender oblique costæ upon the lower two thirds of each whorl, and the distinct close wavy striæ on and between the ribs. These are nineteen in number upon the penultimate volution, thickest at their upper ends, obliquely curved, attenuated below, and only just reach to the suture. The body-whorl, excepting in the concavity above, is delicately wavy striated throughout.

*Pleurotoma (Surcula) agalma*, sp. n.

Testa parva, fusiformis, turrita, alba, epidermide tenui grisea induta; anfractus 11?, superiores erosi, cæteri lente accrescentes, supra ad



suturam carina tuberculata cincti, in medio angulati, serie nodulorum ornati, liris tenuibus spiralibus paucis lineisque incrementi flexuosis sculpti, liris infra angulum minute nodulosis, anfr. ultimus infra peripheriam liris transversis 14-15, partim nodulosis, cinctus; apertura parva; labrum tenue, supra angulum haud profunde sinuatum, infra arcuatim prominens; columella subrecta, callo tenui induta; canalis brevis.

Longit. 18 mm., diam. 6; apertura cum canali 6 longa,  $2\frac{1}{2}$  lata.

*Hab.* Station 269, W. of Cape Comorin, 464 fath., green mud and sand.

Only a single example obtained. The lines of growth are rather strong and very flexuous, and on passing the delicate spiral liræ, except in the concavity above the angle of the whorls and at the base of the body-whorl, are delicately nodulous. The last volution below the nodose periphery has about fifteen liræ, of which about six of the upper ones are nodulous, the rest, around the anterior contracted portion, being simple and thread-like. The tubercles on the angle are about eighteen in number, and the liræ above it three or four.

*Pleurotoma (Surcula) exstructa*, Martens.

*Surcula exstructa*, Martens, Deutsch. Tiefsee-Exped. 'Valdivia,' vol. vii. p. 81, pl. i. fig. 4.

*Hab.* Station 280, off Coromandel coast, 446 fath.; also Station 331, off Andaman Islands, 569 fath.; off the Nicobar Islands (*Martens*).

*Pleurotoma (Surcula) arcana*, Smith.

*Pleurotoma (Surcula) arcana*, Smith, Ann. & Mag. Nat. Hist. 1899, vol. iv. p. 239; 1904, vol. xiii. p. 458; Illust. Zool. 'Investigator,' pl. ix. figs. 6, 6 a.

*Hab.* Station 276, W. of Ceylon, 1006 fath.; also Station 310, N.E. of Andaman Islands, 960 fath.

Only two specimens, with the apical whorls eroded.

*Pleurotoma (Ancistrostrix) travancorica*, Smith.

*Pleurotoma (Ancistrostrix) travancorica*, Smith, Ann. & Mag. Nat. Hist. 1896, vol. xviii. p. 368; 1904, vol. xiii. p. 459; Illust. Zool. 'Investigator,' Mollusca, pl. vii. figs. 1, 1 a.

*Hab.* Station 259, W. of Malabar coast, 295-360 fath., green mud and sand.

*Pleurotoma (Bathytoma) Oldhami*, Smith.

*Pleurotoma (Bathytoma) Oldhami*, Smith, Ann. & Mag. Nat. Hist. 1899, vol. iv. p. 238; 1904, vol. xiii. p. 459; Illust. Zool. 'Investigator,' Moll. pl. ix. figs. 2, 2 a.

*Hab.* Station 259, W. of Malabar coast, 295–360 fath., green mud and sand.

One dead specimen. This species is placed by Martens in *Dolichotoma* as a subgenus of *Genota*.

*Pleurotoma (Bathytoma) urania*, sp. n.

Testa ovato-fusiformis, alba; anfractus 10?, reliqui septem supra concavi, infra ad suturam tuberculato-carinati, transversim undique tenuiter lirati, lineis incrementi tenuibus flexuosis striati, ultimus infra angulum convexiusculus, antice contractus; apertura elongata, supra acuminata, antice canaliculata, alba, lævis; columella in medio arcuato, callo albo lævi tenui induta; canalis brevis, subobliquus et leviter recurvus; labrum tenue, supra minime profunde sinuatum.

Longit. 23 mm., diam. 11; apertura cum canali 13 longa, 4 lata.

*Hab.* Station 280, off Coromandel coast, 446 fath.; also Station 332, off S. of Andaman Islands, 279 fath.

The tubercles just above the suture are crossed by two or three sulci, so that each of them is tripartite or quadripartite. In some of the upper whorls the upper margin just beneath the suture is also more or less nodose.

*Drillia mindanensis*, Smith.

*Drillia mindanensis*, Smith, Ann. & Mag. Nat. Hist. 1877, vol. xix. p. 493.

*Hab.* Persian Gulf, 35 fath.

A single specimen, agreeing in all respects with the type from the Philippine Islands excepting that the spire is a little shorter.

*Tritonidea agalma*, sp. n.

Testa fusiformi-ovata, albida, epidermide fuscescente pilosa induta; anfractus 8, convexi, superiores longitudinaliter costati (costis in anfr. penultimo et ultimo sensim evanidis), spiraliter tenuiter lirati, lineis incrementi conspicue striati; apertura alba, longit. totius  $\frac{1}{2}$  vix æquans; labrum extra varice incrassatum, intus tenuiter liratum; columella arcuata, callo tenui induta, antice subdentata.

Longit. 24 mm., diam. 11; apertura 12 longa, 5 lata.

*Hab.* Station 258, W. of Travancore, 102 fath., sand.

The epidermis is thick, longitudinally striated, and more or less hairy upon the spiral liræ. The ribs upon the upper whorls are ten or twelve in number, thick and rounded, and crossed by the spiral threads.

*Metula andamanica*, sp. n.

Testa angusta, elongata, albida, zonis interruptis fuscis (in anfr. penultimo duabus, in ultimo quatuor) picta, costulis numerosis longitudinalibus exilibus et liris transversis tenuibus decussata, varicibus paucis hic illic instructa; anfractus 9, primus lævis, convexus, secundus in medio transversim carinatus, tertius lævis, bicarinatus, cæteri convexiusculi, infra suturam marginati, ultimus pone descendens, sed ad labrum breviter ascendens; apertura elongata, utrinque angustata; labrum extra incrassatum, intus ad marginem tenuiter crenulatum; columella leviter arcuata, callo tenui circumscripto induta.

Longit. 26 mm., diam. 9; apertura 13 longa, 3 lata.

*Hab.* Off Port Blair, Andaman Islands, 100 fath.

In some respects resembling *Metula daphnelloides*, Melvill and Standen, from the Gulf of Oman, but larger and more finely sculptured. That species also exhibits variciform swellings at intervals, although they are not referred to in the description.

*Phos roseatus*, Hinds.

*Phos roseatus*, Hinds; Smith, Ann. & Mag. Nat. Hist. 1904, vol. xiii. p. 463.

*Hab.* Station 291, Gulf of Oman, 49 fath.

Two specimens having the spire rather produced and the spiral liræ finer than usual. Also recorded from the Gulf of Oman by Melvill and Standen (Proc. Zool. Soc. 1901, vol. ii. p. 417).

*Phos (Strongylocera) textum*, Gmelin.

*Phos textum*, Gmelin; Tryon, Man. Conch. vol. iii. p. 217, pl. lxxxiii. figs. 498, 503, 504 (bad).

*Hab.* Andaman Islands, 60 fath.; Andaman Islands (*Smith*), Proc. Zool. Soc. 1878, p. 811.

*Nassa subsimilis*, sp. n.

Testa parva, ovata, supra acuminata, albo-fuscescens, zonis duabus indistinctis dilute rufis supra anfractum ultimum ornata, cancellata; anfractus 9, superiores læves, in medio angulati et carinati, cæteri convexiusculi, turriti, costis longitudinalibus numerosis et

liris spiralibus (in anfr. penultimo 6, in ultimo circiter 20) cancellati, nodulis subquadratis, sutura profunda canaliculata sejuncti; apertura acuminate ovata, albo-fuscescens; labrum ad marginem denticulatum, extra incrassatum, intus liris brevis circiter 12 instructum; columella valde arcuata, callo tuberculato circumscripto induta; canalis anticus brevis, obliquus.

Longit.  $17\frac{1}{2}$  mm., diam.  $7\frac{1}{2}$ ; apertura cum labro  $7\frac{1}{2}$  longa, 4 lata.

*Hab.* Station 244, off west coast of India, 119–124 fath.

Somewhat recalling *N. eucomista*, Melvill and Sykes, from the Andaman Islands (Proc. Malac. Soc. vol. ii. p. 169, pl. xiii. fig. 11), but with a longer spire, shorter body-whorl, with the granules closer and squarer, and the margin of the labrum more denticulate. *N. ravidata*, A. Adams, is another allied form, but much more globose. As in many other species of *Nassa*, the upper row of nodules below the suture are slightly larger than the rest.

*Nassaria levior*, Smith.

*Nassaria levior*, Smith, Ann. & Mag. Nat. Hist. 1899, vol. iv. p. 242; 1904, vol. xiii. p. 464; Illust. Zool. 'Investigator,' pl. x. figs. 6, 6 a.

*Hab.* Off Port Blair, Andaman Islands, 100 fath.

*Nassaria coromandelica*, Smith.

*Nassaria coromandelica*, Smith, Ann. & Mag. Nat. Hist. 1894, vol. xiv. p. 163, pl. iv. fig. 3.

*Hab.* Station 276, W. of Ceylon, 1006 fath.; Station 258, W. of Travancore, 102 fath., sand; N.W. of Calicut, 100 fath.

In some of these specimens the longitudinal costæ are less numerous than in the type figured, and a few of them are larger than the rest and variciform.

*Nassaria nodicostata* (A. Adams).

*Nassaria nodicostata* (A. Adams), Smith, Ann. & Mag. Nat. Hist. 1904, vol. xiii. p. 463.

*Hab.* Off Port Blair, 100 fath.; Andamans, 60 fath.

*Fusus rubrolineatus*, Sowerby.

*Fusus rubrolineatus*, Sowerby, Proc. Zool. Soc. 1870, p. 252; Thesaur. Conch. vol. iv. p. 80, pl. cccxi. fig. 68.

*Hab.* Station 337, off Malabar coast, 271 fath.; also "Indian Seas," 1055 fath. ('Investigator'); Agulhas Bank (*Sowerby & Martens*).

The figure of this species in the 'Thesaurus' is very bad, the costæ being represented too broad and too few in number. I have a very strong impression that *F. rufinodis*, Martens\*, is only a variety of this species.

*Fusus incertus*, sp. n.

Testa fusiformis, alba; anfractus 8?, superiores detriti, cæteri convexi, costati, costis in anfractu penultimo circiter 13, liris filiformibus confertis undique spiraliter cincti lineisque incrementi striati, ultimus infra medium contractus, costis antice evanidis; apertura inverse piriformis, cum canali longit. totius  $\frac{1}{2}$  æquans; columella tortuosa, callo lævi induta; canalis angustus, obliquus, recurvus.

Longit. 51 mm., diam. 22; apertura cum canali 25 longa, 9 lata.

*Hab.* Station 317, off W. of Ceylon, 590 fath.

A single specimen in dead condition. It somewhat recalls the British *Tritonofusus* (*Siphonorbis*) *fusiformis* (Broderip), except that the body-whorl is produced into a longer rostrum anteriorly.

The spiral thread-like lines are very fine and close-set, and occasionally two or three form slightly raised ridges. Three or four such ridges are noticeable on the upper whorls and almost form nodules upon the costæ. The lines of growth are close together, and on crossing the transverse liræ give them a minutely crispate appearance.

MANARIA, gen. nov.

Testa fusiformis, longitudinaliter costata, periostraco induta; columella in medio plica unica intrante instructa; labrum ad marginem tenue, intus incrassatum et liratum. Operculum unguiforme, corneum.

This genus has the general aspect of a costate *Tritonofusus*, but is distinguished by the fold on the columella and the lirate aperture.

*Manaria Thurstoni*, sp. n.

Testa breviter fusiformis, alba, periostraco luteo induta, longitudinaliter costata et spiraliter striata; anfractus 9?, superiores abrupti, reliqui leviter convexi, sensim accrescentes, ultimus costis 16-17 infra medium evanidis instructus, antice breviter rostratus; apertura elongata, alba; labrum ad marginem acutum,

\* Deutsch. Tiefsee-Exped. 'Valdivia,' vol. vii. p. 103, pl. ii. fig. 10.

intus incrassatum et denticulatum; columella supra arcuata, infra obliqua, in medio plica unica intrante munita, callo albo induta. Longit. 33 mm., diam. 12.5; apertura cum canali 14 longa, 5 lata. Operculum unguiforme, fusco-corneum.

*Hab.* Station 333, Gulf of Manar, 401 fath.

The longitudinal costæ are not very thick and do not vary much in stoutness, and they are crossed by the spiral sulci or striæ, which are about eight in number on the penultimate whorl. The periostracum is rather thick and longitudinally striated with the lines of growth. The denticles within the labrum are six or seven in number, and from them faint liræ run inwards. The fold on the columella is peculiar and forms a prominence at the middle. It is somewhat oblique, but how far it is continued up the columella I cannot say, as only a single specimen is at hand, and that is too precious to break up. Named in honour of Mr. Edgar Thurston, of the Madras Museum.

*Trophon (Boreotrophon) planispina*, sp. n.

Testa fusiformis, alba; spira elongata, turrita; anfractus 10?, superiores abrupti, cæteri supra declives, in medio angulati, infra contracti, longitudinaliter lamellati, lamellis appressis, ad angulum spinas planas sursum inclinatas formantibus; anfr. ultimus antice rostratus; apertura alba irregulariter triangularis, cum canali longit. totius  $\frac{1}{2}$  subæquans; labrum tenue, ad angulum canaliculatum; columella contorta, supra arcuata, callo tenui induta; canalis haud rectus, leviter recurvus.

Longit. 37 mm., diam. 25; apertura cum canali 18 longa, 6 lata.

*Hab.* Station 327, W. of Burmah, 419 fath.

Very like *T. carduelis*, Watson\*, from off Sydney in 410 fath., but with a longer spire and compressed or flattened spines at the angle of the whorls. The lamellæ which form the spines are quite closely appressed to the shell, whereas in *carduelis* they stand away quite free from the general surface of the whorls. A very similar form, *T. actinophorus*, Dall, occurs in the West Indies in 140-248 fath.

*Murex axicornis*, Lamarck, var.

*Murex axicornis*, Lam.; Smith, Ann. & Mag. Nat. Hist. 1904, vol. xiii. p. 462.

*Hab.* Andaman Is., 53 fath.

\* 'Challenger' Gasteropoda, p. 167, pl. x. fig. 7.

*Murex rectirostris*, Sowerby, var.

*Murex rectirostris*, Sowerby, Proc. Zool. Soc. 1840, p. 138; Reeve, Conch. Icon. vol. iii. fig. 91.

*Murex rectirostrum*, Sowerby, Conch. Illust. sp. 11, fig. 111.

*Hab.* Station 328, S. of Lower Burmah, 61 fath.

The specimens from this locality differ from the type only in having the transverse liræ red. The specimens in the Cuming collection appear to have been over-cleaned with acid, and consequently this red lineation, of which, however, I can still find traces, may have been destroyed. The locality given by Reeve, "West Colombia," I regard as a mistake, for Mr. G. B. Sowerby informs me that he knows it for a certainty as a Hong Kong species.

*Bursa rana*, Linn.

*Ranella albivaricosa*, Reeve, Conch. Icon. vol. ii. fig. 2.

*Hab.* Off Port Blair, Andaman Is., 100 fath.; Ceylon (Reeve).

*Bursa (Bufonaria) lampas* (Linn.).

*Hab.* Andaman Is., 60 fath.

A young, finely granose example of this species, so remarkable on account of such great variation both in size and sculpture.

*Gyrineum bituberculare* (Lamarck).

*Ranella bitubercularis*, Lam.; Smith, Ann. & Mag. Nat. Hist. 1904, vol. xiii. p. 470.

*Hab.* Andaman Is., 60 fath.

*Gyrineum (Biplex) perca* (Perry).

*Ranella (Biplex) perca* (Perry), Smith, Ann. & Mag. Nat. Hist. 1895, vol. xvi. p. 6; 1904, vol. xiii. p. 470.

*Hab.* Off Port Blair, 100 fath.

*Distortrix cancellinus* (Roissy), var.

*Distortrix cancellinus* (Roissy), Smith, Ann. & Mag. Nat. Hist. 1895, vol. xvi. p. 263; 1904, vol. xiii. p. 470.

*Hab.* Station 246, W. of Calicut, 68–148 fath., sand and stones; Station 341, Gulf of Oman, 230 fath.

The specimens from the above locality are nearest the var. *decipiens* and are rather shorter and more stumpy than Reeves's type.

*Pirula ficoides*, Lamarck.

*Pirula ficoides*, Lam.; Smith, Journ. Malac. vol. iii. p. 67.

*Hab.* Station 248, W. of Travancore, 224–284 fath., sand.

*Morio Alcocki*, sp. n.

Testa ovato-fusiformis, ventricosa, tenuis, alba, periostraco tenui olivaceo griseo induta, spiraliter tenuiter lirata, lineis incrementi tenuibus arcuatis striata; anfractus 9, sensim accrescentes, convexi, sutura profunda canaliculata sejuncti, ultimus antice contractus, ad aperturam ascendens; apertura obliqua, alba, subauriformis; labrum vix incrassatum, leviter expansum; columella in medio arcuata, callo tenui lato labro juncta; canalis anterior obliquus, recurvus.

Longit. 99 mm., diam. max. 61; apertura cum canali 64 longa, 27 lata.

Operculum corneum, dilute fuscens, elongatum, concentricum striatum, prope nucleum paucispirale; nucleus haud centralis. Longit. 37 mm., diam. 18.

*Hab.* Station 280, off Coromandel coast, 446 fath.

In form rather like the *M. rugosa*, Linn., of the Mediterranean and N. Atlantic, but with a rather longer spire, a broader aperture, finer liration, and a more deeply channelled suture. It is also imperforate, the columellar callus being appressed to the shell throughout its length, and not free and prominent as in the species referred to.

*Oocorys sulcata*, Fischer, var. *indica*.

*Oocorys sulcata*, Fischer, J. de Conch. 1883, p. 392; Dall, Bull. Mus. Comp. Zool. Harvard, vol. xviii. p. 228; Watson, 'Challenger' Gasteropoda, p. 412, pl. xvii. fig. 11; Locard, Moll. 'Travailleur' and 'Talisman,' p. 288, pl. xv. figs. 4–6.

*Hab.* Station 278, off S. of Ceylon, 1912 fath.

A single specimen, length 42.5 mm., diam. 28, differs from the 'Challenger' Atlantic form in size and in possessing an unclosed umbilical opening. The latter, however, might possibly be concealed if the columellar callus were not broken at that part or had the specimen lived a little longer and so completed the reflection of the callosity. The spiral liræ appear to be rather more remote from one another, but this results from the larger size of the specimen. The remarkable lines of growth, causing the liræ to be crenulated, are of the same character in both specimens, and the operculum is horny and spiral, as described and figured by Verrill\* of his genus *Benthodolium*, which is evidently

\* Trans. Connect. Acad. vol. vi. p. 177, pl. xxxi. fig. 12 a.



synonymous with *Oocorys*; indeed, it seems almost certain that *O. sulcata*, Fischer, *O. Fischeri*, Locard, and *B. abyssorum*, Verrill, are varieties of one and the same species. The last-named species is described both by Dall and Verrill as having an umbilical chink, a feature present in the Indian Ocean shell. It is essentially a deep-water genus, having been recorded by Verrill from 2221 fath., by Fischer from 1980 fath., by Watson from 1850 fath., by Dall from 955 fath., and the present specimen is from 1912 fath. Dall, however, has mentioned the occurrence of *O. abyssorum* in 169 fath. in the northern part of the Gulf of Mexico.

In connexion with similar forms in the Indian Ocean and the Atlantic, I might recall the fact of the occurrence of *Lucina spinifera* (Montagu) \* and *Poromya tornata* (Jeffreys) in both oceans, and that *Turbo indicus*, Smith, from off Ceylon in 597 fath., is scarcely separable from *T. peloritanus*, Cantraine.

*Rostellaria Powisii*, Petit.

*Rostellaria Powisii*, Petit; Smith, Ann. & Mag. Nat. Hist. 1904, vol. xiii. p. 469.

*Hab.* Station 237, off Andaman Islands, 90 fath., stones; and off Port Blair, 100 fath.

*Mitra (Turricula) melongena*, Lamarck.

*Mitra turricula*, Lamk.; Reeve, Conch. Icon. vol. ii. figs. 47 a, b; Sowerby, Thes. Conch. vol. iv. pl. cccliii. figs. 18, 19.

*Hab.* Andaman Islands, 60 fath.; Molucca and Philippine Islands.

The single specimen agrees with the figures given by Sowerby.

*Columbella suavis*, sp. n.

Testa parva, ovato-fusiformis, sordide albida, lineis longitudinalibus opaco-albis, infra medium anfractus ultimi rufis, obscure picta, nitida, subprismatica; spira conica; anfractus 7, superiores tres convexi, cæteri fere plani, ultimus ad medium rotunde subangulatus; apertura irregulariter ovalis; labrum ad marginem acutum, extra varice instructum, intus læve; columella fere recta, haud callosa.

Longit. 5 mm., diam. 2.25; apertura 1.5 longa, 1 lata.

Operculum minutum, ovatum, nucleo laterali.

\* See A. Alcock's 'A Naturalist in Indian Seas,' 1902, p. 280, fig. 77.

*Hab.* Off Sacramento Shoal, off the Delta of the Godavari River, 70 fath.

A small smooth species with peculiar markings and a prismatic surface. Possibly the latter feature may have been produced by the medium in which they have been preserved. Two indistinct pale brownish blotches can be traced upon the labral varix, one at the middle, the other below.

*Columbella (Meta) philippinarum*, Reeve.

*Columbella philippinarum*, Reeve (1842), Conch. Icon. vol. xi. figs. 207 a-c.

*Columbella epamella*, Duclos, Chenu's Illust. Conch. pl. v. figs. 19-20 (1846-1858).

*Hab.* Andaman Is., 60 fath.

*Marginella grisea* (Jousseaume).

*Marginella grisea* (Jousseaume), Smith, Ann. & Mag. Nat. Hist. 1904, vol. xiii. p. 468.

*Hab.* Station 328, S. of Lower Burmah, 61 fath.

*Ancilla Alcocki*, sp. n.

Testa ovato-cylindræa, fusca, antice saturate fusco balteata, supra spiram callo albo induta; anfractus 4-5, ultimus supra medium lineam impressam obliquam bisectus, transversim tenuiter striatus, lineisque incrementi exilissimis sculptus; spira obtusa, ad apicem mucronata; apertura elongata, angusta, albida; columella superne callo crasso supra producto amicta, antice alba, oblique sulcata; labrum leviter incrassatum, ad marginem fuscum, supra late sed haud profunde sinuatum.

Longit. 38 mm., diam. 16.

Operculum magnum, nigro-fuscum, elongatum, apice terminali, costa rotundata marginem versus externum instructum. Longit. 16 mm., diam. 5.

*Hab.* Station 322, Andaman Is., 378 fath.

This species is well distinguished by its very remarkable form, no other species having such a peculiar obtuse spire. The operculum also is remarkable on account of its narrow form and the rounded ridges almost parallel with the outer margin, which is also thickened.

*Natica dimidiata*, sp. n.

Testa globosa, anguste umbilicata, alba, rufo-fusco late fasciata, infra suturam alba, lineis incrementi oblique striata; anfractus 4, convexi, ultimus globosus; apertura semicircularis, supra rufescens, infra alba; columella callo crassiusculo instructa, in umbilico

porcam mediocriter prominentem formans. Operculum testaceum planum, margine externo curvato liris duabus instructo. Longit. 19.5 mm., diam. 19.

*Hab.* Station 333, Gulf of Manar, 401 fath.

The umbilical callosity forms a not much raised swelling at the lower part of the opening; in *N. rufa* it is higher up. The flat operculum is not thick, and the two ridges upon the curved margin are raised above the general surface and are separated by a narrow deep groove. Within the inner ridge and parallel with it the flat surface exhibits a few obscure shallow sulci. Viewed from the front the upper part of the shell is brown and the lower half white.

*Natica simulans*, sp. n.

Testa globosa, late umbilicata, alba, epidermide tenui olivacea induta, lævis, lineis incrementi obliquis striata; anfractus 5-6, convexi, celeriter crescentes, ultimus supra subhumerosus; apertura obliqua, semicircularis, alba; columella callo mediocriter tenui labro juncta. Operculum corneum. Longit. 29 mm., diam. 27; apertura 20 longa, 11 lata.

*Hab.* Stations 324 and 327, W. of Burmah, 448 and 419 fath.; Station 280, off Coromandel coast, 446 fath.

In form resembling the British *N. catena*, but thinner, without markings, and rather more widely umbilicated. The lines of growth are slightly plicate beneath the suture and upon the margin of the umbilicus, and there are faint traces of very fine transverse striation upon the body-whorl.

In the specimens from Station 280 the plicæ upon the margin of the umbilicus are conspicuously strong, but in other respects agree with the larger shell described from Station 327. They are only 21 mm. in diameter, but may not be full-grown.

*Natica incerta*, sp. n.

Testa obliqua, subglobosa, late umbilicata, alba, fascia latissima dilute fuscescente circa anfractum ultimum ornata, lævis, lineis incrementi obliquis striata; anfractus 5, celeriter accrescentes, leviter convexi, ultimus magnus, antice paulo descendens; apertura oblique semicircularis, intus pallide purpureo-fusco tincta; columella obliqua, fere rectilinearis, vel in medio leviter prominens, superne callo crasso reflexo labro juncta. Longit. 26 mm., diam. 24; apertura 19 longa, 10 lata.

*Hab.* Station 248, W. of Travancore, 224-284 fath., sand.

A widely umbilicated form, without any callous ridge

within the opening. Besides the obscure broad zone above referred to, the suture also is bordered beneath with the same colour.

*Natica apertissima*, sp. n.

Testa subglobosa, latissime umbilicata, tenuis, sordide albida, lævis, lineis incrementi striata; anfractus 5, perconvexi, sutura profunda sejuncti, ultimus circa umbilicum pervium obtuse angulatus; apertura alba, oblique semicircularis; columella tenuis, callo tenui reflexo labro juncta. Operculum corneum.

Longit. 15 mm., diam. 15; apertura 10 longa, 6 lata.

*Hab.* Station 343, Gulf of Oman, 609 fath.

This species is remarkable for its thinness and the very open pervious umbilicus. Upon the upper whorls the lines of growth beneath the suture are rather strong or subplicate.

*Natica inutilis*, sp. n.

Testa ovato-globosa, mediocriter late umbilicata, alba, lævis, lineis incrementi oblique striata; anfractus 5, convexi, ultimus antice oblique descendens; apertura obliqua, semicircularis, alba; columella rectilinearis, obliqua, supra callo reflexo appresso labro juncta.

Longit. 19 mm., diam. 17; apertura 12 longa, 6 lata.

*Hab.* Station 259, W. of Malabar coast, 295–360 fath., green mud and sand.

A smaller thinner shell than *N. incerta*, more ovate in form, and apparently without any colour. The lines of growth are more conspicuous below the suture than elsewhere. Under a lens the surface is seen to be very finely spirally striated.

Only a single specimen obtained.

*Natica albospira*, Smith.

*Natica albospira*, Smith, Ann. & Mag. Nat. Hist. 1895, vol. xvi. p. 6, pl. i. fig. 8.

*Hab.* Station 269, W. of Cape Comorin, 464 fath., green mud and sand; Station 259, W. of Malabar coast, 295–360 fath., green mud and sand; Station 337, off Malabar coast, 271 fath.

This species somewhat resembles the widely distributed *N. maroccana*, but has a different operculum.

*Natica rufa*, var.

*Natica rufa*, var., Smith, Ann. & Mag. Nat. Hist. 1894, p. 165, pl. iv. figs. 14, 14 a.

*Hab.* Station 248, W. of Travancore, 224–284 fath., sand. Quite similar to the specimens previously described, but rather larger and with a wider umbilicus. Diam. 27 mm., alt. 27.

*Natica apora*, Watson.

*Natica (Amcauropsis) apora*, Watson, 'Challenger' Gasteropoda, p. 454, pl. xxvii. fig. 11.

*Hab.* Station 318, off W. of Ceylon, 1085 fath. ('Investigator'); off Arrou Is., 800 fath. ('Challenger').

One specimen only, a little larger and more globose than the type, but otherwise similar.

*Siliquaria muricata*, Born.

*Serpula muricata*, Born, Test. Mus. Cæsar. Vindobon. p. 440, pl. xviii. fig. 16; Tryon, Man. Moll. vol. viii. pl. lviii. figs. 23–25 (*S. anguina*).

*Hab.* Andaman Islands, 60 fath.

*Radius volva* (Linn.).

*Hab.* Station 328, S. of Lower Burmah, 61 fath.

Also quoted from China, Philippine Islands, Japan.

*Trifora corrugata*, Hinds.

*Triforis corrugatus*, Hinds; Tryon, Man. Conch. vol. ix. p. 189, pl. xxxix. fig. 59.

*Hab.* Station 291, Gulf of Oman, 48–49 fath.

Originally described by Hinds from New Guinea. The species is also quoted by Messrs. Melvill and Standen (P. Z. S. 1901, vol. ii. p. 376) from the Persian Gulf, Maskat, coast of India, and Karachi. It is also known from the Straits of Malacca, Kingsmill Is., and New Caledonia.

[To be continued.]

XXVI. — Notes on the Genus *Tamarrha*, Wkr. [LEP.—TINEINA]. By the Rt. Hon. LORD WALSHINGHAM, M.A., LL.D., F.R.S.

MR. BUSCK (Pr. U.S. Nat. Mus. xxx. 728–30) discusses the genus *Tamarrha*, Wkr., and quotes a paragraph for which I am responsible (Proc. Zool. Soc Lond. 1897, p. 114).